

Supplier profile:

For years, there was just one well-known name in the PC processor market: Intel. Then in a comparatively short space of time a worthy challenger arose. Rosemary Haworth takes an in-depth look at chip and memory maker AMD



AMD will be a familiar name to *PC Advisor* readers as Intel's main rival in the desktop and portable PC processor market. The company was formed at a similar time to Intel and, like its archrival, is a product of Silicon Valley.

AMD sells to the larger UK and European PC manufacturers and its market dominance is second only to Intel's. At first, AMD was simply a second-source processor manufacturer for Intel. But over the 34 years of its existence AMD has grown to design and develop processors in its own right and has stolen a significant share of its original client's market.

Advanced Micro Devices was set up in May 1969 by Jerry Sanders, former worldwide marketing director for Fairchild Semiconductor. AMD applied itself to the business of building products that were faster and more efficient than the original

electronic components for which they served as licensed second sources. But it took until the early 1980s for AMD to become a serious contender in the integrated circuit market.

Plugging demand

With demand for the x86 PC processor outstripping Intel's production capacity, AMD stepped in to help plug the gap. The company tried its hand at chip design at this stage with the AM486 and, in 1996, its own-brand K5.

A year later, the K6 was welcomed by the IT industry as the first real challenge to Intel's costly Pentium. At this time, AMD also won a long-running dispute with its rival. As a result it was finally able to produce its own version of the AM386 and 486 processors.

As well as undercutting the competition, AMD built quality, high-performance products. PC Advisor's benchmarking tests

on comparable Intel and AMD-powered PCs throughout 1999 consistently show AMD's K6-III and, later, Athlon chips outpacing their Pentium III counterparts.

It's a mark of how far AMD has come that one of the questions *PC Advisor* is most commonly asked in correspondence and phone calls is whether readers should buy an Intel- or an AMD-powered system. Until four or five years ago, Intel had the PC market sewn up and few people even realised there was an alternative.

Nowadays, AMD has a healthy 22 percent of the desktop processor market thanks to the success of its Athlon processor. Aside from making desktop and server microprocessors, its main activities are in the flash memory and wafer manufacturing markets.

Since its high point in 2000, when the company turned over \$2.7bn and employed 15,000 worldwide, technology industries have been through some tough

AMD timeline

- **1 May 1969** Former Fairchild Semiconductor marketing director Jerry Sanders, together with seven others, establishes Advanced Micro Devices.
- **November 1972** Wafer production begins at AMD's Sunnyvale, California site.
- **January 1973** Opens first overseas manufacturing base in Penang, Malaysia.
- **1974** Achieves \$26.5m sales by close of fifth year of trading.
- **1975** Produces 8080A chip; enters RAM market.
- **1976** Cross-licence agreement signed with Intel.
- **1979** Listed for first time on New York Stock Exchange.
- **1981** Heavy R&D investment; by end of year, sales more than double those of 1979.
- **1986** Launches AMD K5 (its first desktop PC processor) to little fanfare.
- **1987** K6 launch finally gets PC industry's interest. AMD hailed as first serious contender to Intel.
- **Oct 1991** Ships millionth 386 processor.
- **1992** Awarded rights to make and sell 386 CPUs.
- **1993** First 486 processors introduced.
- **1995/6** Buys NexGen; develops AMD-K6 processor with aim of capitalising on Windows PC platform.
- **May 1997** Foundation stone laid at Fab 30, aka AMD Saxony.
- **1998** Athlon (K7) chip unveiled; AMD begins copper interconnect alliance with

times. AMD suffered a "very big loss" in 2001 admits Jens Drews, the company's Germany-based PR manager. A corresponding tough plan involving redundancies and a cost-saving restructuring of the flash memory business was about to be implemented when *PC Advisor* visited.

Bucking the trend

Things are less bleak in the desktop processor area of its business. Fab 30, the European manufacturing plant outside Dresden, is AMD's only microprocessor production site and its relative success means there will be no layoffs here.

This area of the former East Germany is characterised as eastern Europe's Silicon Valley and several high-tech firms have manufacturing plants here. Until its enforced division in 1945, Saxony was Germany's second most important industrial region (after the Ruhr) and was also important throughout the Democratic Republic era. Before reunification in 1991, this area supplied most technology products throughout the Eastern Bloc.

AMD invested more than \$2bn in its east German facility – a surprising decision since most technology companies looking to build a factory and research and development base look much further east to the Golden Triangle of Taiwan and Singapore where overheads are far lower and materials are in constant supply.

But in an area of 16 or 17 percent unemployment, investment to encourage the Californian company to set up a manufacturing base here was not hard to come by. Between 20 and 25 percent of the costs were covered by subsidies and grants from the state and federal governments as well as the EU.

Keep it clean

Though there's a far more relaxed and informal atmosphere here than you might expect, there's also scrupulous attention to detail. Materials are unpacked only after going through three layers of checks in separate delivery bays to eliminate any danger of contamination in the ultra-sterile clean rooms. Temperature and emissions are both strictly controlled too so that even the notoriously keen German green lobbyists have no cause for comment.

At the moment, the 90nm (nanometer) cleanroom is being fitted out as the plant makes the transition from the existing 130nm production which was introduced two years ago. Now, no 0.18 micron wafers are left and the Opteron and Athlon 64 chips are based on the 0.13 micron production process. There is already excited talk in the corridors of 0.09nm.

Fab 30 runs at full capacity and the 1,200 employees work fixed shifts of 12 hours with no swapovers between night and daytime workers. Robert Stead, AMD's worldwide marketing director, says it's uneconomical to vary production rates. "Fundamentally, it costs the same no matter how many you make," so a steady 500 wafers are started each week.

Staff work four days on then three days off followed by three days on and four days off. Team A hands over to team B at the end of its shift to ensure there's no loss of information.

Jörg-Oliver Weidner who manages the quality control team of 30 to 40 staff wouldn't be drawn on how effective this setup is, but indicated the failure rate was negligible. A minute dead area is built in to each so samples can be tested under different heating and stress conditions.

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Motorola, enabling high-volume output of Athlon processors at Dresden fab.

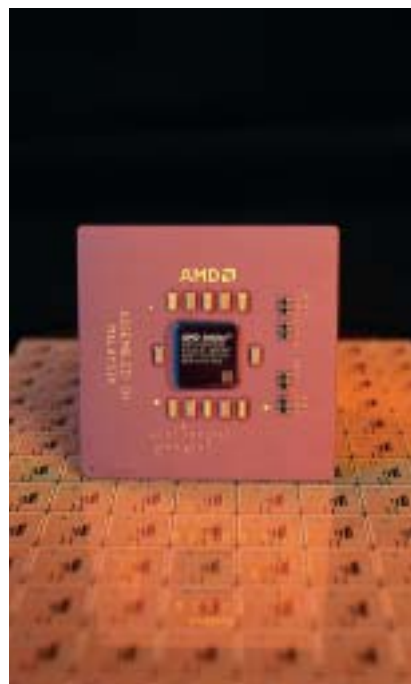
- 2000 Best year so far for AMD with turnover of \$2.7bn and staff of 15,000.

- 2001 Despite heavy losses due to technology slump, AMD introduces Athlon XP processor and Athlon MP

dual processor for workstations/servers.

- 2002 Hector Ruiz, previously of Motorola, becomes CEO. Sanders remains on the board; acquires Alchemy Semiconductor and forms Personal Connectivity Solutions business unit.

- 2003 Costcutting and restructuring of flash memory business; headcount down to 12,000 but company continues to invest. Alliances with Fujitsu in flash memory and wafer manufacturing. Opteron processor launched – move to 64bit computing becomes reality.





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particle, picking up variations as slight as a fraction of a degree.

How much saleable product you get out the other end is less certain. "It's not a completely determined process," says Stead. "It depends on how big they [the wafers] are. With two or three pieces of information people will say, 'Oh, so you can make this many,' but it's not as simple as that. It's chemistry and chemistry is not an exact science."

Niche touch

Finding a niche for Stead's company's products has become easier, however. He is critical of technological developments for the sake of them and believes in focusing on providing real benefits to customers by focusing on their needs.

Stead is one of a handful of UK-based staff making up the pan-European arm of

the company. AMD's green-and-white badge may adorn the shirts of Blackburn Rovers' footballers but its UK base is a leafy business park on the Hampshire/Surrey border.

AMD's customers are OEM manufacturers rather than individual PC users so its sales and marketing team is relatively small. And because it is not, in the main, dealing with consumers and individual end users, its support operation can be small too.

The call centre at Frimley is staffed by around 12 recent graduates from universities across Europe with whom AMD has established links and whose alumni want to come to the UK to improve their language skills. AMD provides them with six months employment and accommodates them in a shared house close to its offices.

Judging by AMD's success, its customers are happy with the products and service they receive. As Evesham's Carolyn Worth puts it, "AMD have proved that by sheer persistence and hard work you can make an impact in a market dominated by one or two players." ■

AMD in a nutshell

AMD is based in Sunnyvale, California. Although best known for its desktop processors, it has three main strands: microprocessors, flash memory (which it produces in tandem with Fujitsu) and wafer manufacturing in which AMD holds a 60/40 percent majority with Fujitsu.

The company's microprocessors are manufactured at Fab 30 in Germany; other plants are in Penang, Bangkok, Texas and Singapore.

- **Head office** One AMD Place PO Box 3453, Sunnyvale, CA
- **2002 revenue** \$2.7bn
- **Fab 30 and Dresden Design Centre** AMD Saxony GmbH, Wilschdorfer Landstrasse 101 D-01109 Dresden, Germany
- **UK Address** European service centre/sales office, AMD House, Frimley Business Park, Camberley Surrey GU16 5SL
- **Telephone** 01276 803 100