

# A history of Audi The 1980s

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This is the decade when Audi's *Vorsprung durch Technik* philosophy really broke through with the launch of the Audi quattro, widely reckoned to have rewritten the rule book for high performance cars.

Members of the press were so amazed at its roadholding, speed and security that they bracketed it with supercars from Ferrari, Lamborghini, Porsche and Lotus.

From the moment of its launch, people's expectation of Audi rose to a new level, and the company began its prolific introduction of new technology, while simultaneously raising quality standards.

Innovations poured from Ingolstadt, ranging from the flush glazing that was the most obvious visual evidence of the new Audi 100 saloon's low-drag body to the ingenious Procon-Ten safety system and corrosion-proof galvanised bodyshells. Audi was among the very first manufacturer to sell direct injection diesel engines, too.

But its most dramatic innovation was the quattro permanent four-wheel drive system. First fitted to the high-performance coupé of the same name (this model is nowadays known as the *ur-quattro*, above, or *original* Audi quattro), the quattro drivetrain rapidly spread through the range.



Some of its success stemmed from Audi's determination to prove the worth of four-wheel drive in the frenzy of competition, the quattro demonstrating that to win a rally this was the drive system needed. It was proven by two world drivers' championships and a pair of World Rally Championship constructor's titles.

But all-wheel drive didn't merely penetrate rallying's forest and Tarmac stages – it was considered a breakthrough worth emulating by virtually every major manufacturer around the world, from Alfa Romeo to Volvo, from Porsche to Audi's

sister company Volkswagen. The impact of this innovation is still being seen today.

The 1970s also signalled Audi's upscale ambitions with models that took it closer to the luxury segment, the 100-based 200 saloon confidently being renewed before the launch of the luxury V8 saloon in 1988.

Audi's quality standard, though already high, advanced significantly in the 1980s, with 'just-in time' production delivery techniques being introduced, while a new Quality Centre brought all staff from this discipline under one roof from 1986.

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**1980** Audi introduces the quattro, the world's first volume produced four-wheel drive high performance car

**1981** Audi displays a research vehicle at the Frankfurt Motor Show illustrating the scope for saving raw materials, reducing weight, improving economy and advancing the car's environmental acceptability. Many of these ideas appeared in the next Audi 100.

**1981** Audi enters the World Rally Championship with the quattro and wins three events.

**1982** The new Audi 100 records the lowest drag coefficient of any production car to date, at 0.30Cd.

**1982** The Audi 80 quattro offers all-wheel drive to a wider audience. By 1984, there are quattro versions of every Audi model in the range.

**1983** Catalytic converters are available across the range, Audi being the first car maker to achieve this in Europe.

**1983** The limited edition, homologation special Sport quattro is released.

**1984** The Audi 90 quattro is launched.

**1984** Audi wins driver and constructor World Rally Championships.



**1985** Audi is first to put a fully galvanised bodyshell into high volume production with the 100/200 ranges. A 10-year corrosion warranty is provided.

**1985** An image of an Audi 100 bodyshell lifted by two women is released. Made from aluminium it signals future thinking.

**1985** Audi NSU AG is renamed Audi AG, and its headquarters are moved from Neckarsulm to Ingolstadt.

**1986** The third generation B3 Audi 80 is introduced, with a galvanised body, a 10-year anti-corrosion guarantee and a drag coefficient of 0.29Cd.

**1986** A new quality centre is opened at Ingolstadt, bringing all quality functions under one roof.

**1987** The B3 Audi 90 is launched.

**1988** Dr Ferdinand Piëch takes over from Dr Wolfgang Habel as chairman of the Audi AG board.

**1988** A new, three-door Audi Coupé is introduced, based on the B3 90.

**1988** The top-of-the-range V8 saloon is launched, featuring a 3.6-litre, four-valve-per-cylinder 250bhp V8 engine.

**1989** Audi is among the first to introduce a direct injection diesel-powered car in the 100 2.5 TDI 120bhp.

**1989** Audi reveals its first hybrid, the 100 Avant quattro-based Duo.

# Audi quattro

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## Audi quattro

1980-91 11,452 built

This is the car that redefined Audi, a trail-blazer that gave the company a glamorous edge, an enviable international competition record and the right to challenge traditional supercar manufacturers.

The quattro became a bedroom pin-up of teenage boys, and provided Audi with a technological advantage that the rest of the car industry scrambled to copy.

The quattro was not the world's first high performance, permanent four-wheel drive coupé, but Britain's 1968 Jensen Interceptor FF was a highly specialised, very low volume model. It was the quattro that put all-wheel drive on the map as a real-world option.

The quattro was loosely based on the Audi 80 from which the prototype was developed. The longitudinal driveline made it relatively easy to extend a propshaft to the rear, while the rear suspension was essentially the front suspension and subframe turned through 180 degrees.



A centre differential allowed drive to be apportioned between the two axles, preventing wind-up. Power came from the 200 saloon's 2.1-litre 200bhp turbocharged 'five', allowing a 137mph top speed and a 0-60mph time of 7.3sec.

Yet it wasn't the quattro's performance so much as its astounding roadholding, agility and refinement that created an impact. Suddenly, the Audi quattro was one of the

fastest point-to-point cars on earth.

The quattro was partially hand-built on a dedicated line at Ingolstadt, every car undergoing extensive static and test-track quality assurance including a 100mph run. The first UK cars were left-hand drive, but right-hand drive became available in late 1982, when the quattro's popularity grew to the point where UK demand kept it in production beyond Audi's planned deletion date.



# Audi 100

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## Audi 100 (right) 1982-90 1,097,877 built

The most effective aerodynamics of any production car in its day, lightweight construction and the option of four-wheel drive made the 100 one of the most advanced cars in its class, with qualities as relevant today as they were in 1982.

In basic form the 100 scored a Cd of just 0.30, much of this excellent result down to painstaking refinement of the airflow over the body rather than a radical approach to its overall shape.

The aerodynamic effectiveness was the result of an extensive programme of wind tunnel work carried out amid obsessive secrecy in multiple facilities across Europe. Each worked on one aspect of the car without being allowed to see the whole thing.

Why? Because Audi was anxious to prevent competitors from finding out what it was doing.

Smoothing of the airflow into around the engine bay, the fitment of flush-glazed side windows – a production first – and airflow management under the car all contributed. The most aerodynamic models (with the narrowest tyres) carried a 'Cd 0.30' badge in the rear side glass.



Excellent efficiency was a key goal of the project, achieved not only with the slippery bodywork but also through lightweight construction, allowing the 100 to deliver competitive performance from much smaller engines than were typically used in the class. Superior fuel consumption was the result. The quest to pare weight even led to the jack being made from aluminium rather than steel. And in 1985 the 100 and its sister 200 range became the first volume production cars to feature fully



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### Audi 80 quattro (B2)

1980-87

Having launched the quattro, Audi wasted little time introducing the quattro system to more affordable models. The 80 was the least expensive way to acquire quattro technology within the range, but provided the same, permanent all-wheel drive security.



### Audi 90

1984-87

129,068 built

Having achieved some success with the 200, which was a better-equipped, more upmarket version of the 100, Audi applied the same principle to the 80 and produced the 90. It was available with two more powerful five-cylinder engines and a quattro option.



# Audi Coupé GT, Sport quattro

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## Audi Coupé GT (right) 1980-87 169,017 built

This is the car from which the quattro was spawned, although the faster model appeared first. The Coupé could also be had with quattro, although the majority sold were front-drive. Engines ranged from a 1.8 four-cylinder to a 2.3 'five'. Unlike most coupés, this Audi could seat four, even five at a push, and had a decent boot to go with it. But it was best-known for its fine road manners, clean handling and above average build quality.



## Audi Sport quattro 1983-84 224 built

This brutal-looking beast (below left) was a road-going version of the Group B World Rally Championship quattro, Audi building just over 200 examples to meet homologation rules. The most obvious modification from standard was a shortening of the quattro's wheelbase, which gave it startling proportions. The shrinkage was performed in the interests of rally stage agility.

In road-going form it produced 306bhp, weighed 1300kg and erupted to 60mph in just 4.8sec, and 100mph in 12.6sec. The standard quattro's engine was downsized slightly from 2144cc to 2133cc to allow this turbocharged engine to qualify in the under 3.0-litre class, and it eventually developed between 5-600bhp, making the Sport the most potent rally car of its era. It helped to win Audi both the driver's and constructor's championships in 1984, with Stig Blomqvist at the wheel.

In 1986 rule changes drew the Group B rally era to a close, at which point Audi withdrew, having netted bagfuls of silverware and an image hugely burnished by its competition exploits.

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### Audi 80

1986-91 1,438,475 built

The third-generation Audi 80 (codenamed B3) took the new 100's more rounded, aerodynamic style, but shorter overhangs and a wider stance improved its proportioning. It looked terrific, and did much to further modernise Audi's image. Its body was entirely galvanised, a first in the class, and the interior was particularly well designed and made. Engines ranged from a 1.6 through to 2.0 litres, and there was also a 1.6-litre turbodiesel plus, of course, the option of quattro four-wheel drive. The Procon-Ten passive safety system was also available.

### Audi 90

1986-91 141,809 built

The same principle applied – an upmarket, plusher version of the Audi 80, which felt all the more convincing with this generation's improved build quality. Several quattro versions were also available, as was Procon-Ten.





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## Audi V8 1988-94 21,565 built

Although it looked similar to the Audi 200, and shared its core platform with that car, the V8 was more different than it appeared. Most of its panels were unique, as were all its detail styling features.

Mechanically, it was also different despite sharing the quattro system with the 200. The 3.6-litre 32-valve V8 – formed by fusing two 1.8 VW Golf GTi 16v engines together

– developed a healthy 250PS, enough for 155mph and an impressive 7.6sec to 62mph in automatic form. A long wheelbase version appeared in 1990, and a 4.2 V8 in 1992.

In manual form, it had six speeds, while the four-speed automatic was combined with full-time four-wheel drive for the first time. The V8 was not a big seller, but it paved the way for Audi's first serious luxury saloon, the A8.

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**Audi Coupé**  
1988-95 73,857 built

This handsome, plushly appointed car added a tailgate and folding rear seats to Audi's coupé format, as well as the galvanised bodywork that came with the B3 generation 80 and 90 on which it was based. The quattro drivetrain and Procon-Ten was also available, along with the turbocharged five-cylinder engine that would soon produce the S2 version, a successor to the famous *ur-quattro*.



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## Audi quattro system

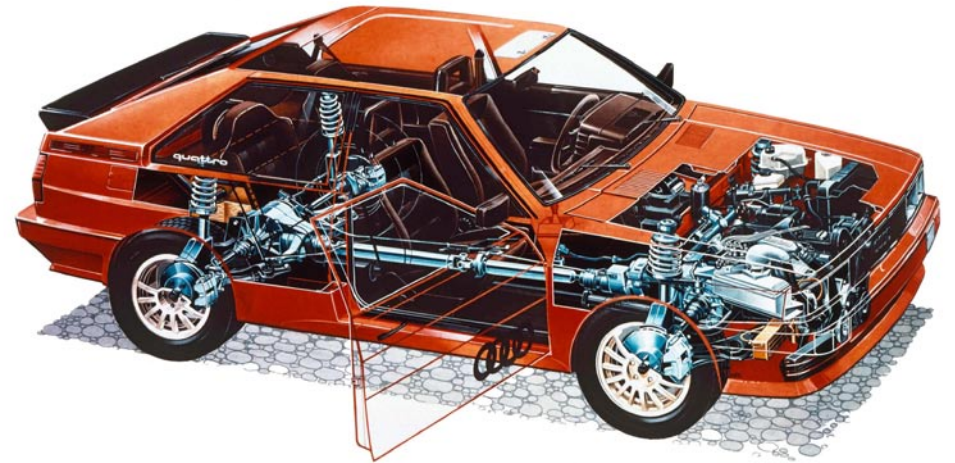
It was while Audi's chief chassis engineer Jörg Bensinger was winter testing the Volkswagen Iltis off-roader in Finland early in 1977 that he had the idea for a road-going four-wheel drive Audi.

Though Volkswagen-badged, the Iltis was an Audi development, a successor to the DKW Munga off-roader, and Bensinger noticed that, despite its modest power output, this small Jeep-like vehicle intended for the military was quicker on the snow-packed roads of Finland than a lot of far more powerful vehicles.

Bensinger contacted engineering boss Ferdinand Piech and suggested developing an Audi 80 four-wheel drive prototype. Piech gave the go-ahead, and the red Audi 80 development car was christened A1, for *Allrad 1*. Its driveline was built by Hans Nedvidek, who had formerly built F1 gearboxes for Stirling Moss and Jan Manuel Fangio, by using an Iltis diff at the rear.

Although there was no centre differential to apportion torque between the axles, the system was always conceived to be permanent four-wheel drive on the basis that the driver would always get the benefit.

By September the same year the project received management backing, although Piëch's visionary idea was not so much



an all-wheel drive family saloon as a high performance coupé that could thrash the opposition and take Audi into motorsport's big league.

Piech's next challenge was to persuade Audi's owners Volkswagen to give it the go-ahead. Volkswagen's board was invited to Austria's steepest mountain pass, the Turracher Höhe, for 'tyre testing' in January 1978, when it would be snowbound. The 160bhp prototype had no trouble climbing the pass, not only without snow chains but on summer tyres, convincingly demonstrating its superiority. Though few board members could see a market even for 400 such cars, Bensinger made himself personally responsible and the project got the green light.

A centre differential was added to the formula when the wife of Volkswagen development head Professor Ernst Fiala drove the car into Vienna and complained that it 'jumped around' in tight corners

and when manoeuvring. She had been experiencing driveline wind-up, which was ingeniously eliminated by Nedvidek, who fitted an Audi 50 differential behind the transmission.

## The Audi 100's 0.30Cd

The Audi 100's aerodynamic body concept emerged from no fewer than five wind tunnels, each contracted to work on a separate section of the car. No-one was allowed to see the car in its totality, the canny Ferdinand Piëch figuring that this would make it much harder for his competitors to be fast-followers. Even Volkswagen was excluded, despite Wolfsburg developing the sides of the car – only Piëch and Audi's designers knew how the whole thing came together.

Hartmutt Warkuss was credited with the design, although there was much influence from the five wind tunnels and Piech himself.



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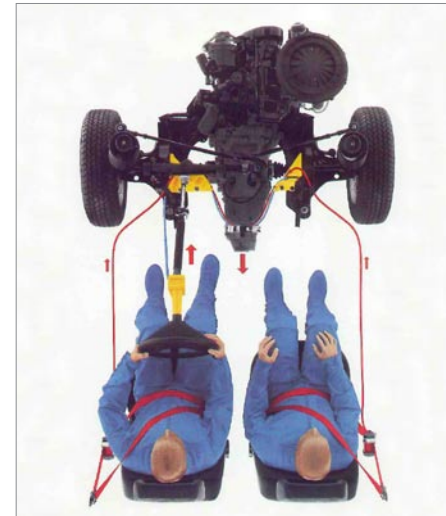
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## Procon-Ten

A unique passive safety system introduced in 1984, Procon-Ten (right) was an ingenious system that pulled the steering column out of the driver's way while tensioning both front seat belts in a frontal collision.

The name stood for Programmed-Contraction-Tension, and it consisted of a substantial steel cable looped around the rear of the powertrain and hooked to the column and the belt-tensioners. In a crash, the rearward movement of the powertrain tensioned the cable, pulling the steering column away from the driver and eliminating slack from the belts.

Models using it included the 80, 90, 100, 200 and V8, but it was discontinued in the mid-1990s as airbags became mandatory.



## Galvanised steel bodywork

The biggest threat to the life of a steel-bodied car has always been rust, a problem that intensified as the industry shifted from building cars with a separate chassis to all-in-one monocoque designs.

Though structurally more efficient, a monocoque was even more susceptible to weakening from corrosion. While paint and rust-proofing methods gradually improved post-war, the key is to stop the steel from rusting in the first place, ideally by galvanising it with a coat of zinc. But welding then becomes difficult as the heat tends to destroy the zinc coating at

the jointing of panels – often the source of corrosion and the very point where it is most needed.

Porsche introduced galvanising on a limited scale with the 911 (left below) in the 1970s, before coating the entire body of the car in 1975. Audi learned how to deal with bigger volumes with the 924 sports car, a model originally conceived as an Audi but eventually built by Porsche. The experience of building 150 galvanised 924s daily taught Audi how to fully galvanise the 100's body at the rate of 600 a day, allowing a 10 year guarantee against corrosion.

## Audi Duo hybrid

As long ago as 1989 Audi demonstrated and built a hybrid car. The Duo was based on a 100 Avant quattro, its rear wheels driven by Siemens electric motors using then-very-advanced nickel-cadmium batteries. The front wheels were driven by the 136bhp 2.3-litre five-cylinder petrol engine. The aim was not so much to reduce CO<sub>2</sub> as eliminate other pollutants in smog-troubled cities such as Los Angeles, where the car could operate in zero emission electric mode. Much of the Duo's roof was occupied by solar cells.

Only around 10 Duos were produced, the car's efficiency compromised by the weight of its batteries, but Audi was among the first to demonstrate the potential for hybrids.

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## Flush glazing

Another Audi 100 'first' was flush-fitting side windows, the glazing along the sides of the car forming a continuous, unbroken surface.

Usually a car's opening windows are recessed from their surrounding frame, which provides the channels to guide the glass. Audi's solution was to turn those channels through 90 degrees to face outwards, and hook pegs positioned in the corner of each window for location.

In fact, reveals engineering chief Ferdinand Piëch some time later, the aerodynamic benefits are smaller than they appear, but the aim was to produce a unique and visible confirmation of the car's aerodynamic prowess. Eventually, a tidier means of locating the glass without the pegs was devised and today, virtually every car has flush glazing.

## Digital dashboard

In the early 1980s, electronic dashboards and voice synthesisers were at the forefront of high-tech car design. Audi was right there with the leaders, introducing a digital dash on the *ur-quattro* in 1983. It was memorable for the synthesised voice provided by Patrizia Lipp (above). Later, the green illumination would change to orange, following submarine practice.



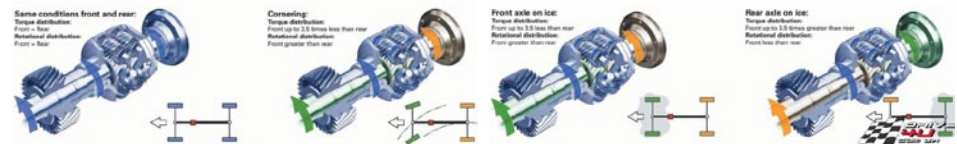
## Ferdinand Piëch

Ferdinand Piëch (above right, pictured in 1974) is a grandson of Ferdinand Porsche, and worked for the family business from 1963 to 1971.

Despite an impressive early career developing among other things the legendary Porsche flat-12 917 race car and the company's road car engines, Piëch was disallowed from working there from 1972, as were all family members, to protect the company from sibling rivalry. At first Piëch set up his own consultancy, before joining Audi in 1972 as chief engineer. He became chairman of Audi in 1988 prior to becoming chairman and CEO of Volkswagen Group in 1993.

His determination to develop new technology and push Audi upmarket would result in a stream of innovations, beginning with the five-cylinder petrol engine in the Audi 100. It was followed by the quattro all-wheel drive system, turbocharged engines, the world lead in low-drag production cars, galvanised bodywork, direct injection diesel (TDI) technology and more.

But the imperative behind all this was both to cement Audi's position as a leading producer of premium cars using a blend of technological development, rising quality and more intelligent design. Piëch's vision and determination demonstrates the effectiveness of *Vorsprung durch Technik*.



## quattro torsen differential

Torsen is short for 'torque sensing', these ingenious differentials able to determine which axle has the most available grip, and direct the engine's torque accordingly. From 1987, this system began replacing the conventional centre differential with lock that featured on earlier models. Its benefit was particularly felt under hard acceleration.

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## 1980

An Audi 80 GTE wins the European touring car championship.

## 1980

An Audi quattro appears as a course car on the Algarve Rally. Finnish rally driver Hannu Mikkola unofficially finishes the course almost half an hour earlier than the winner.

## 1981

The quattro wins at its first attempt on the January Austrian Rally. Mikkola wins the car its first World Rally Championship event in Sweden, as well as the San Remo and British RAC Rallies.



## 1981

Audi quattro-driving Michèle Mouton (left) is the first-ever woman to win a World Rally Championship event, with victory on the San Remo rally.

## 1982

Audi wins the World Rally Championship manufacturer's title outright, with Michèle Mouton (Audi) runner-up to Walter Röhrl in the Drivers' Championship and Hannu Mikkola (Audi) third.

## 1983

Mikkola wins the Drivers' title in the World Rally Championship; Audi is the runner-up for the Manufacturers' title. Stig Blomqvist wins the RAC Rally in an Audi quattro.

## 1984

Audi wins both the drivers' and manufacturers title with Stig Blomqvist. The team takes a 1-2-3 in the Monte Carlo rally, Walter Röhrl driving the winning car. This is Audi's most successful year in rallying.

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## 1985

North America's notorious Pike's Peak hillclimb is won by Michèle Mouton in an Audi Sport quattro S1.

## 1986

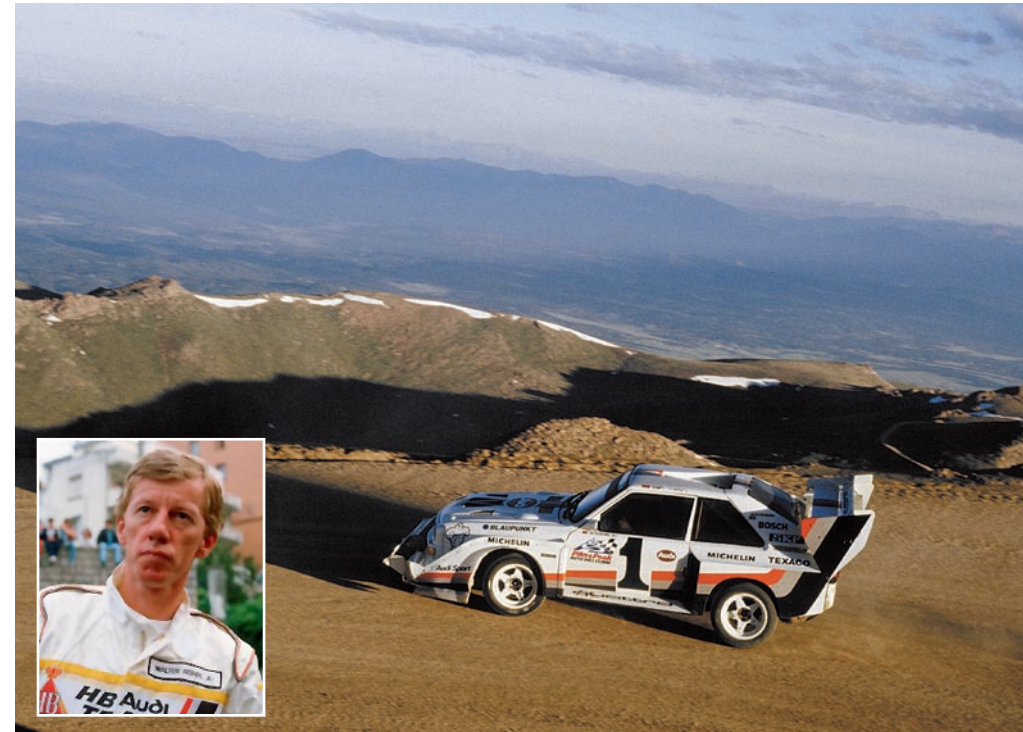
A serious accident involving another competitor in the Portuguese Rally leads to Audi pulling out of the World Championship.

## 1986

Bobby Unser wins Pike's Peak in an Audi Sport quattro S1.

## 1987

Audi returns to the World Rally Championship following the ban of Group B cars, and Mikkola wins the testing Safari Rally in Kenya with an Audi 200 quattro saloon (below).



## 1987

Water Röhrl (above) wins Pike's Peak in a record time in an Audi Sport S1 quattro.

## 1988

Audi enters North America's TransAm championship with the Audi 200 quattro. Hurley Haywood, Hans-Joachim Stuck and Walter Röhrl collect eight wins and the Manufacturer's title for Ingolstadt.

## 1989

The more highly regarded US IMSA-GTO championship is entered, this time with

the Audi 90 (below). Hans-Joachim Stuck wins multiple races, Audi failing to win the driver's and manufacturer's titles only because it does not enter the two long-distance races that season.

