

# Drive-by-Wire

## Team Last Pick

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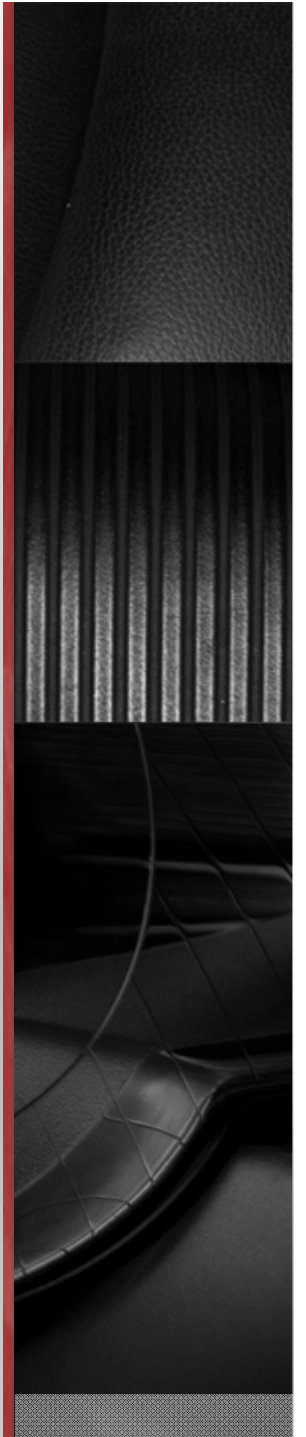
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# Introduction

*“a computer network with a car wrapped round it”.*

- Advent of the microchip- Jack Kilby and Robert Noyce
- Computers in cars- 50 microprocessors
- Acceleration-by-wire
- Braking-by-wire
- Steering-by-wire
- Potential to increase comfort, functionality, and safety



# Overview

- Pre-Drive-by-Wire
- How It Works
- Fly-by-Wire
- Automobile Applications
- Advantages and Disadvantages
- The Road Ahead
- Conclusion



[http://www.emercedesbenz.com/Nov07/26\\_The\\_Research\\_Cars\\_Of\\_Mercedes\\_Benz\\_1.html](http://www.emercedesbenz.com/Nov07/26_The_Research_Cars_Of_Mercedes_Benz_1.html)

# Pre-Drive-by-Wire

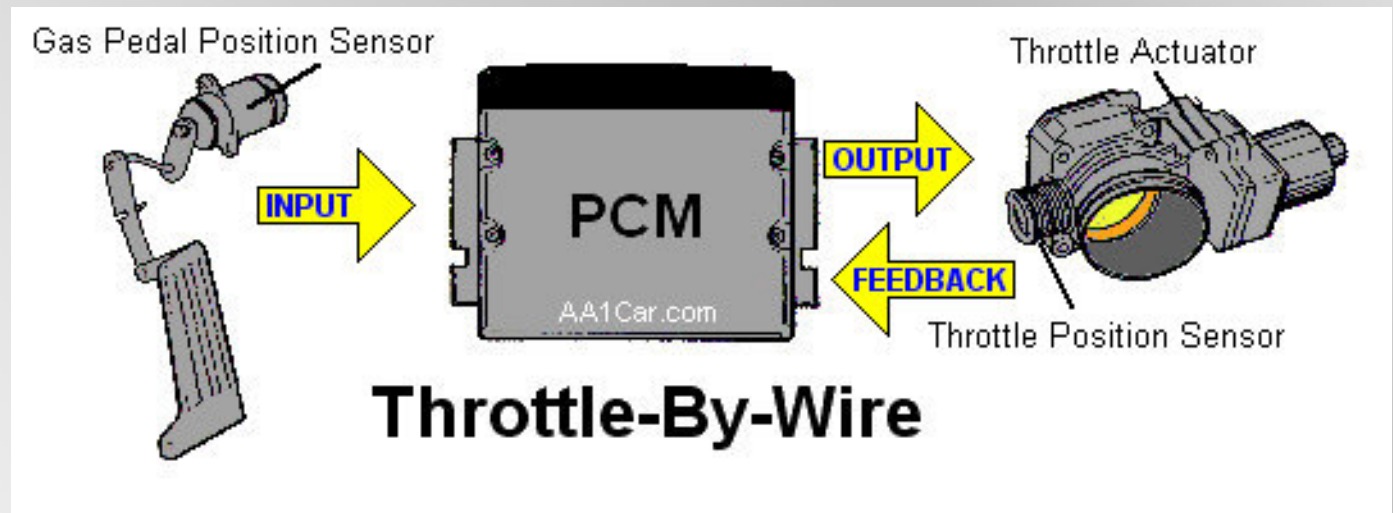
- Cables (Throttle for example)
- Hydraulics (Brakes for example)
- Gears (Steering for example)
  - Rack-and-Pinion
  - Reticulating ball



<http://muscleamerica.blogspot.com/2009/12/1969-dodge-charger-dukes-of-hazzard.html>

# How It Works

- Electronic Impulse
- Computer tracks pedal location
- Electronic Signals determines gauge readings



# Fly-by-Wire

- Used since 1969 (Concorde)
- Increasing complexity
- Light weight
- Redundancies
  - Expensive
  - Necessary
- Autopilot



[http://www.concordesst.com/latestnews\\_03\\_4.html](http://www.concordesst.com/latestnews_03_4.html)

# Automobile Applications

- Electronic Throttle Control (ETC)
  - Spark plug timing
  - Cruise Control
  - Traction Control
- Brake-by-wire
  - Anti-lock Braking (ABS)
- Steer-by-wire



[http://www.autofieldguide.com/mag\\_images/090602b.jpg](http://www.autofieldguide.com/mag_images/090602b.jpg)

[http://www.zf.com/sso/content/media/import/zf\\_netherlands/producten/stuurinrichting/Steer-by-wire.jpg](http://www.zf.com/sso/content/media/import/zf_netherlands/producten/stuurinrichting/Steer-by-wire.jpg)

# Disadvantages

- Visibility
- “Old School”
- Safety



<http://jeffwise.wordpress.com/category/panic/>



# Advantages

- Fewer moving parts
- Easier
- Weight reduction
- Fuel conservation
- Safety
  - Automatic Braking System (ABS)
  - Traction Control System (TCS)
  - Airbags
- Adjustable/Personal
  - Seat positions, mirror positions, blue tooth, navigation, driving habits, cruise control, automatic headlights, etc...
- Marketing



<http://www.coolhunting.com/tech/lexus-lfa.php>

<http://carscoop.blogspot.com/2009/10/live-photos-of-bad-boy-lotus-exige.html>

# The Road Ahead

- Steer by wire
- General Motors Hy-Wire
  - Chassis Integration
  - Video Games
- Smart traffic control (Death of the Traffic Jam)
  - BMW and Siemens
  - less time at intersections
- No more driving



<http://auto.howstuffworks.com/hy-wire3.htm>

# Conclusion

- Computer controlled processes change the automotive industry
- Simplicity
- Cost
- Safety



<http://damp-dry.com/wp-content/uploads/2009/03/2003-gm-hy-wire.jpg>

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# Questions

