SAE Formula 1 Multifunction Display Project: Patents, Standards, & Bibliography

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Patents

To obtain a list of patents that relate to the design of the multifunction display system, two sites on the internet were used. Using the keywords "display," "vehicle," "car," and "dashboard," searches were conducted on IBM's website (www.patents.ibm.com) and on the United States Patent and Trademark Office's website (www.uspto.gov). The IBM site was consulted first, and a subsequent search of the US P.T.O. site yielded identical results. Hardcopies of the patent summaries from the IBM web pages were obtained and are included in this document. The patents are as follows:

- **US4293843 - Motorcar Dashboard:**
  Pushbutton-controlled electronic dashboard display

- **US4109235 - Electronic-Display Instrument Panels for Automotive Vehicles:**
  Dashboard with sensor input signal manipulation

- **US3866166 - Digital Multigage for Motor Vehicle**
  Monitoring and display of vehicle warnings

Standards

To obtain a list of standards that relate to the design of the multifunction display system, a web search similar to the patent search was conducted. The same keywords for the patent search were used for the standards search. Although the majority of the standards found on the web were obtained from the SAE website, each of the following sites were searched:

- American National Standards Institute – www.ansi.org
- NSSN – www.nssn.org
- American Society for Testing and Materials – www.astm.org
- Institute of Electrical and Electronics Engineers – www.ieee.org
- International Organization for Standards – www.iso.ch
- International Society for Measurement and Control – www.isa.org
- National Institute of Standards and Technology – www.nist.gov
- Society of Automotive Engineers – www.sae.org

The following is a list of the standards obtained along with a brief description of each:

- **981105:**
  Performance evaluation of Multiplexing Protocols

- **ISO11898:**
  Interchange of digital information (CAN)

- **J1583:**
  CAN vehicle serial communication protocol

- **ISO11519/2:**
  Low-speed serial data communication (CAN)

- **J2217:**
  Instrument display panel visibility

- **ARP4256:**
  Design objectives for LCDs

- **ANSI/EIA 498AAAA-1992:**
  Short stroke keypad specifications

- **ARP4102/8:**
  Head-up display design recommendations

- **AS8005:**
  Temperature sensor performance specifications

References

The following sources were referenced in the initial design stage of the multifunction display system:

Buchholz, Kami. "Electroluminescent Displays Permit Custom Gauges." *Automotive Engineering*. v.105 (1997): 55-6.

Cena, Gianluca and Adriano Valenzano. "An Improved CAN Fieldbus for Industrial Applications." *IEEE Transactions on Industrial Electronics*. v.44 (1997): 553-64.

Nayer, Ritu and Mark Talbot. "CAN and USB – The Serial Future." *Electronic Engineering*. v.69 (1997): 63-4.

Tufano, Daniel R. "Automotive HUDs: The Overlooked Safety Issues." *Human Factors*. v.39 (1997): 303-11.

Weiss, Ray. "Motorola 68HC08 boosts 68HC05 Speed, Performance." *EDN*. v.38 (1998): 88.