SAE J1939 ECU Programming & Vehicle Bus Simulation With Arduino

Synopsis

This book, written by a leading expert in the field of Controller Area Network (CAN) technologies, represents the perfect guide to implementing an SAE J1939 protocol stack for embedded systems. The book is filled with numerous C/C++ code examples and valuable documentation of the resulting J1939 vehicle network data traffic. It explains in great detail the inner workings of the protocol through designing and transmitting J1939 data frames, receiving and processing J1939 data frames, and simulating J1939 ECUs (Electronic Control Units). Other Arduino sketches (software projects) include a J1939 network scanner, and a simple SAE J1939 to USB Gateway application with associated Windows GUI (Visual Studio C# project). The collection of sketches is concluded by the ARD1939 project, a fully functional SAE J1939 protocol stack for the Arduino Uno and Mega 2560. As an added value, the included proof of concept explains (by means of code examples and bus traffic recordings) the details of the Transport Protocol (TP) according to SAE J1939/21 (BAM Session, RTS/CTS Session) and the Address Claim Procedure according to SAE J1939/81. In combination with the low-cost and high-level user-friendliness approach of the Arduino environment, this book represents the ideal platform to learning and implementing embedded applications with the SAE J1939 protocol stack.

Book Information

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Customer Reviews

An important except from the book clarifying the source vs. object nature of the J1939 library:"I had

contemplated releasing ARD1939 in form of the original source code but ultimately decided against it, mostly out of respect for those small businesses that make a living from selling SAE J1939 devices and software tools. Instead, I provide a pre-compiled code."My viewpoint? They can make money on service and customization rather than licensing shoddy and easy-to-replicate code. J1939 suffers from a lack of implementation verifiability, and some open source tools would start changing that. It’s certainly the author’s right to release as object code only, it just needs to be more upfront.The summaries of the transport protocol and address claiming can be found just as easily in "A Comprehensible Guide to J1939" by the same author, although there is some new material in this book on the details of address claiming, a new diagram for RTS/CTS, and some other little bits. Large parts are wholly duplicated. The most useful parts for me were the CAN logs for various situations near the end of the book.My recommendation: buy this book if you haven’t gotten too deep into implementing a J1939 stack yet, and want a good high level framework before you get into the SAE publications (which are often contradictory and unfinished). If you want a J1939 or CAN overview as a user (not a stack writer), start with "A Comprehensible Guide..." by the same author. I can’t speak to its usefulness as an arduino book (not why I bought it) except to say the examples look pretty well abstracted and should be easy to use.

If you are actually working with J1939 in a vehicle, this book is not of much value. It might be ok for those that can use its object code. The author did not release source code, so check into if the object code will work in your system before getting the book. The book concentrates on the J1939 Data Link messaging and Network messaging (i.e. NAME/Address Claim procedure). For my purposes, I read the book and then never looked at it again. I found more helpful information with google and the SAE Docs. I have coded a simple Engine ECU simulator which includes an Engine CA and an Engine Retarder CA. I stopped in my development to read this book thinking that I would learn something. I got a couple of things in the book, but for me, the vast majority of it was of little value.If the object code fits your environment, then this book might be of value. However, it does not really address what an ECU does nor how it operates other than Data Link and Address Claim procedures from my point of view.

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