Observing CAN Message Timestamps on Automotive Testbeds

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Abstract

Many recent cybersecurity countermeasures for automotive systems, such as Intrusion Detection Systems, rely on measurements of the arrival timestamp of Controller Area Network (CAN) messages. However, those technologies are still imperfect because of various unknown factors. Using an automotive testbed which we independently developed, we observed the properties of CAN message arrival timestamps for different network configurations. We concluded that cybersecurity countermeasures relying on those timestamps can be improved by considering the standard deviation of the arrival timestamp of periodic messages as a dynamic source of information, rather than a random noise.

This report is a summary of two papers. First, we introduce the testbed RAMN [1] [2], shown on figure 1, which can be used for research and education in automotive systems. Then, we introduce a paper that is planned to be published in March 2022 [3], in which the testbed was used for the evaluation part. Please consult references for details.
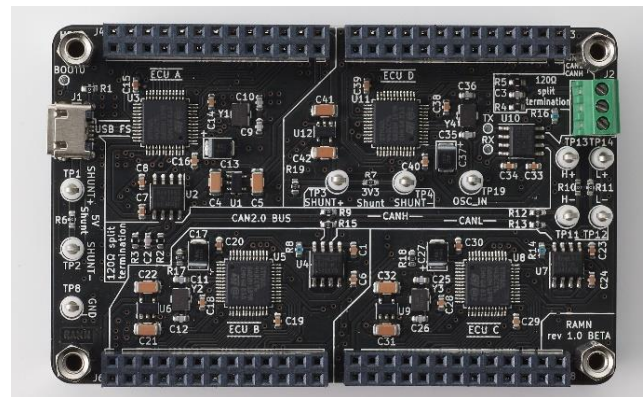

Figure 1: Picture of RAMN testbed, with four ECUs connected through a common CAN/CAN-FD bus.

References

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