

OPEN SOURCE

Tool for CANopen development and testing

(Source: Adobe Stock)

CANopenTerm is an independent, practice-oriented tool designed to address common challenges encountered when working with CANopen networks.

The development, testing, and integration of CANopen devices require suitable diagnostic and configuration tools. Many of the available solutions are commercial products, often tied to specific hardware or license models. CANopenTerm is an independent, practice-oriented tool designed to address common challenges encountered when working with CANopen networks. Developed for regular use in engineering and testing environments, it offers a lightweight and flexible approach without commercial restrictions. The software is open source, available free of charge, and supports multiple hardware platforms and operating systems. This makes it a practical option for smaller companies, educational institutions, and individual developers seeking a functional CANopen tool without the cost or limitations of a proprietary software.

While open-source software is widely adopted in general IT and software development, it is still uncommon in industrial automation and automotive engineering. CANopenTerm demonstrates that open tools can also serve professional use cases in these fields, offering transparency, adaptability, and opportunities for user-driven extensions.

The idea

The idea for CANopenTerm originated from the long-term use of a limited trial version of a commercial CANopen tool.

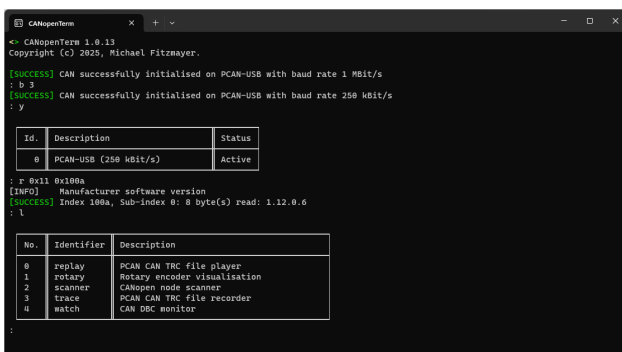


Figure 1: Main window of CANopenTerm application (Source: Michael Fitzmayer)

Although it provided basic functionality, the restrictions motivated the development of an internal tool that simplified the daily work. This experience eventually led to the decision to develop CANopenTerm from the scratch and make it publicly available as an open-source project.

Initially created to support embedded software development, CANopenTerm has since evolved into a more versatile tool. It supports network monitoring and analysis, configuration data access, and automation through built-in scripting interpreters for Python and Lua. The tool can also generate JUnit XML reports for integration into continuous integration (CI) systems. For data visualization, CANopenTerm provides graphical widgets for real-time display of CAN traffic. It can record and replay CAN traces and interpret CANopen messages using CANopen profiles, which simplifies testing and debugging activities.

CANopenTerm is cross-platform and available for Windows and Linux. It can also be integrated into embedded systems via OpenEmbedded (Yocto project), enabling use in diverse development environments.

Future ecosystem development

Building on the core functionality of CANopenTerm, the project now aims to extend its ecosystem. A key planned component is CANvenient, a C library intended to provide a unified interface to different vendor-specific

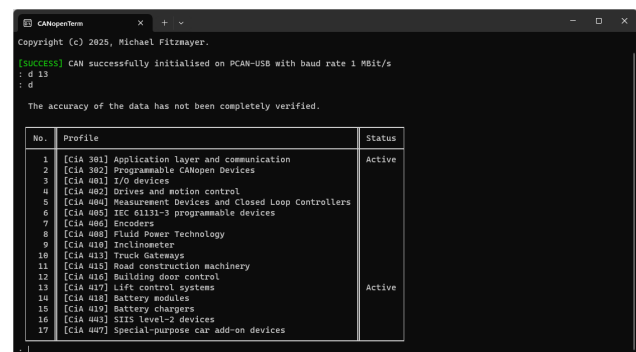


Figure 2: CANopen profile databases for contextual logging (Source: Michael Fitzmayer)

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CANopenTerm
35288.137 191 7 EC FF FD FF FC FF 80 p001 (tx)
35301.133 191 7 EB FF FD FF FC FF 80 p001 (tx)
35894.129 191 7 EA FF FD FF FC FF 80 p001 (tx)
35977.125 191 7 E9 FF FD FF FC FF 80 p001 (tx)
35780.292 191 7 E8 FF FD FF FC FF 80 p001 (tx)
36835.878 711 1 05 Heartbeat: Operational
36791.893 191 7 E8 FF FD FF FC FF 80 p001 (tx)
36884.116 191 7 E7 FF FD FF FC FF 80 p001 (tx)
36997.112 191 7 E6 FF FD FF FC FF 80 p001 (tx)
37810.279 191 7 E5 FF FD FF FC FF 80 p001 (tx)
37835.921 711 1 05 Heartbeat: Operational
37863.127 191 7 E4 FF FD FF FC FF 80 p001 (tx)
37263.183 191 7 E3 FF FD FF FC FF 80 p001 (tx)
37666.897 191 7 E2 FF FD FF FC FF 80 p001 (tx)
37769.859 191 7 E1 FF FD FF FC FF 80 p001 (tx)
38836.874 711 1 05 Heartbeat: Operational
38563.872 191 7 E8 FF FD FF FC FF 80 p001 (tx)
38666.869 191 7 DF FF FD FF FC FF 80 p001 (tx)
38769.836 191 7 DE FF FD FF FC FF 80 p001 (tx)
38872.831 191 7 DD FF FD FF FC FF 80 p001 (tx)
38976.197 191 7 DC FF FD FF FC FF 80 p001 (tx)
39837.832 711 1 05 Heartbeat: Operational
39878.823 191 7 DB FF FD FF FC FF 80 p001 (tx)
39762.968 191 7 DA FF FD FF FC FF 80 p001 (tx)
39865.963 191 7 D9 FF FD FF FC FF 80 p001 (tx)
39968.959 191 7 D8 FF FD FF FC FF 80 p001 (tx)
40839.716 711 1 05 Heartbeat: Operational
40871.955 191 7 D7 FF FD FF FC FF 80 p001 (tx)
48175.122 191 7 D6 FF FD FF FC FF 80 p001 (tx)
48277.847 191 7 D5 FF FD FF FC FF 80 p001 (tx)

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Figure 3: Logging CAN data with Lua (Source: Michael Fitzmayer)

CAN drivers on Windows. The library's API (application programming interface) will follow the libsocketcan API from Pengutronix, enabling standardized and consistent access to the CAN hardware. The goal of this open library is to reduce the fragmentation caused by proprietary driver interfaces and to simplify the hardware access. CANvenient is expected to extend CANopenTerm's hardware support and to serve as a foundation for additional CAN-related software projects. Currently, it is limited to adapters from Peak-System Technik. A standardized driver interface would allow developers to integrate new CAN adapters more efficiently, automate diagnostics, and design consistent testing workflows without relying on proprietary solutions.

Although CANvenient is still under development, the initiative illustrates the direction in which the CANopenTerm ecosystem is evolving. The further development process is intended to be open and community-driven. User feedback, practical experience, and contributions are explicitly encouraged to ensure that the tools remain technically relevant and applicable in industrial practice. More information, source code, and participation details are available at: <https://canopenterm.de>.

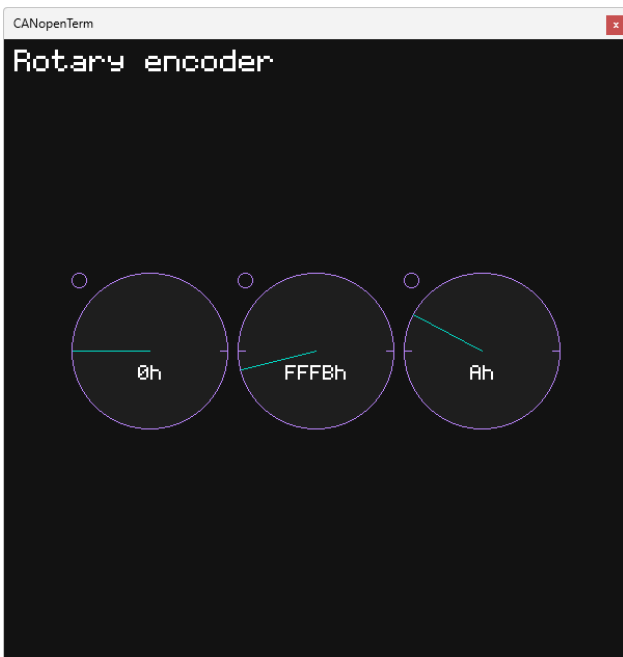


Figure 4: Graphical widgets for visualizing CAN data (Source: Michael Fitzmayer)

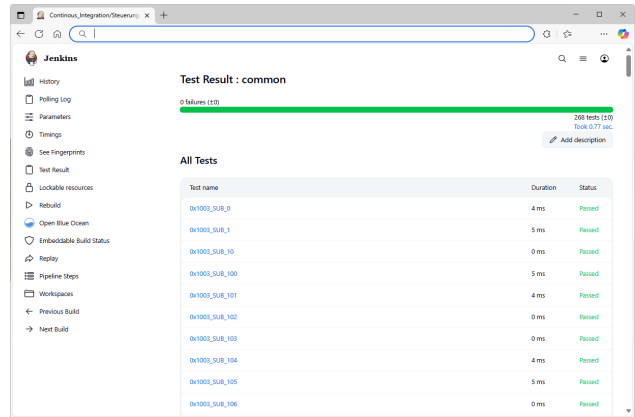


Figure 5: Jenkins test report display using JUnit XML (Source: Michael Fitzmayer)

The development of CANopenTerm is an independent hobby project. Although the author is employed as an embedded software developer at Bucher Automation, a CiA member company, the tool was created independently and is not affiliated with or endorsed by the company. ◀

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