MASTER‘S THESIS ASSIGNMENT

I. Personal and study details

Student's name: **Charvát Jan** Personal ID number: **478159**

Faculty / Institute: **Faculty of Electrical Engineering**

Department / Institute: **Department of Measurement**

Study program: **Open Informatics**

Specialisation: **Computer Engineering**

II. Master’s thesis details

Master’s thesis title in English:

NuttX RTOS CAN Bus Driver for Espressif ESP32C3

Master’s thesis title in Czech:

Driver sběrnice CAN pro systém NuttX na mikrokontroléru ESP32C3

Guidelines:

CAN bus and CAN FD are still dominant technology for interconnection of electronic control units and peripherals in automotive for channels requiring moderate data rates and reliability (BroadR-Reach and ETHERNET is used for demanding communications, LIN for low cost ones). Teams of our faculty participate on CAN technology support and development with industry and carmakers for decades and this topic is related to the continuation and extension of these projects as well as to their connection to the Rapid Control Applications Development tools.
1. Familiarize with CAN bus technology, NuttX RTOS and ESP32C3 RISC-V base microcontrollers.
2. Implement CAN/TWAI driver for ESP32C3 RISC-V architecture based chip which follows requirements for inclusion into NuttX operating systems.
3. Prepare project for submission of the developed drivers to the NuttX operating system mainline.
4. Prepare documentation and demonstration of the CAN driver function (for example use driver for pysimCoder based control application, On Board Diagnostic protocol and or to run it in QEMU emulator).

Bibliography / sources:

1. Patterson, D. A., and J. L.: Computer Organization and Design RISC-V Edition, The Hardware Software Interface, 2nd ed. Morgan Kaufman, 2021, ISBN: 9780128203316
2. CAN bus CTU FEE Projects page https://canbus.pages.fel.cvut.cz/
3. NuttX operating system project https://github.com/apache/incubator-nuttx
4. OCERA Real-Time CAN project http://ortcan.sourceforge.net/
5. QEMU CAN bus support https://github.com/qemu/qemu/blob/master/docs/can.txt
6. Open Technologies Research Education and Exchange Services ORG Wiki https://gitlab.fel.cvut.cz/otrees/org/-/wikis/home

Name and workplace of master’s thesis supervisor:

Ing. Pavel Píša, Ph.D. Department of Control Engineering FEE

Name and workplace of second master’s thesis supervisor or consultant:

Date of master’s thesis assignment: **03.02.2022** Deadline for master's thesis submission: _____

Assignment valid until:
by the end of summer semester 2022/2023

Ing. Pavel Píša, Ph.D. Supervisor’s signature	Head of department’s signature	prof. Mgr. Petr Páta, Ph.D. Dean’s signature

III. Assignment receipt

The student acknowledges that the master's thesis is an individual work. The student must produce his thesis without the assistance of others, with the exception of provided consultations. Within the master's thesis, the author must state the names of consultants and include a list of references.

Date of assignment receipt	Student's signature
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