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ECEN 5813 Principles of Embedded Systems
Project II Software Architecture Diagram

NOTE: All of these descriptions relate to the diagram on the next page.

Files Read in: A string of characters will be stored in a file and read through the USB cable into the UART.

Terminal Output: The MCU will send readable data out to an external peripheral that contains a terminal application using the UART module and a USB cable.

UART: The UART module will be transferring data between the host device and external peripherals/files.

UART HAL: This layer abstracts the register level configurations for setting up UART communication, including baud-rate, clock, RX/TX interrupts, etc. The user can call various functions to setup UART communication to peripherals.

CIRCULAR BUFFER: The circular buffer is an abstract data type that will be populated with data coming in from the file read in. When the buffer reaches its data capacity, the buffer will dump the data and refresh itself to allow more data to be read into the buffer.

MCU: The central processing unit/the user control of the peripherals.

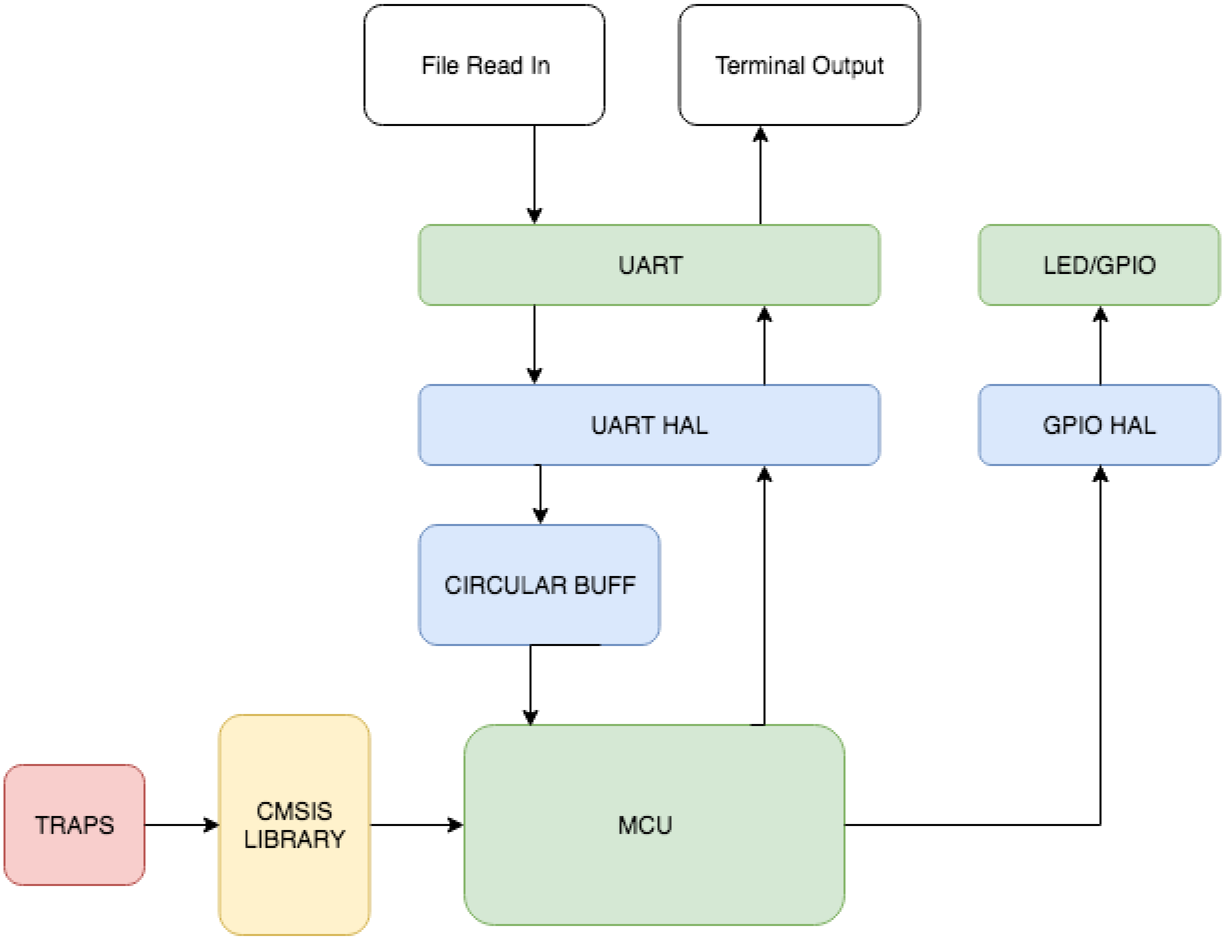
GPIO HAL: This layer abstracts the register level configurations for controlling the GPIO ports from the MCU. The user can call various functions, in their code, to configure and utilize the peripheral IO.

LED/GPIO: The onboard LEDs are tied to GPIO pins on the MCU. The HAL layer implementation is used to configure and toggle these LED ports.

UART HAL: This layer of abstraction sits between the user and the UART module hardware. It is used by the programmer to configure the serial communication protocol. The layer deals with both receive (RX) and transmit (TX) events

TRAP: The traps/exceptions are unusual events that cause some edge case. These are handled. This includes such exceptions as dividing by zero, unaligned stack, etc..

CMSIS: The CMSIS adds an abstraction for various cortexes. It is used for interrupt, peripheral, and exception handling.


File Read In
Terminal Output
UART
LED/GPIO
UART HAL
GPIO HAL
CIRCULAR BUFF
TRAPS
CMSIS
LIBRARY
MCU