Fetch_CAN.c Report

Usage

The CAN bus functionality of the marionette board mirrors the flow of the other fetch commands and has the following options:

- Config
- Transmit
- Receive
- Reset
- Help

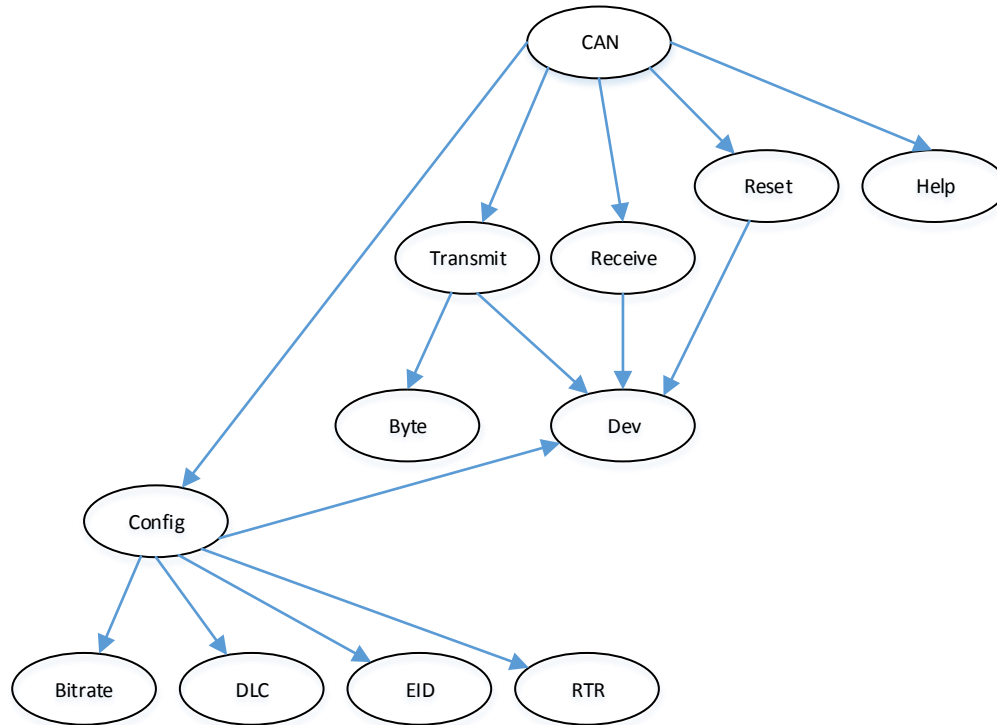These functions and their parameters are shown in figure 1 below.

Figure 1: Fetch_CAN Flow Chart

The end user can configure CAN by selecting a device, bitrate, the Data Length Code (DLC), an Extended Identifier (EID), and a Remote Transmission Request (RTR). Currently there is only one CAN bus physically enabled on the marionette (CAN 1) but if used on the Waveshare board the end user can use CAN 2 as well. The second CAN bus is the slave of CAN 1 and cannot be used unless CAN 1 is configured first. The DLC controls the number of bytes that the CAN bus will transmit and can be anywhere from 0

to 8 bytes. The EID allows the end user to set the Enhancement mode ID. When selecting an RTR the user has the option of 0 for no or 1 for yes.

The transmit functionality allows the end user to select the device (CAN 1 only on the Marionette board, but the Waveshare board can use both), and the desired data to be transmitted. The length of the data to be sent is determined by the DLC parameter in the configuration section. A minimum of one byte needs to be transmitted.

When using the receive functionality, the end user only needs to configure the device and specify which device is to be used to receive information. This creates a separate thread that will continuously listen for incoming data until the device is reset.

The reset function for CAN only requires the device to be reset. When this function is called all can drivers will be stopped and the pins will be set to their default states (input floating). Once reset the device will need to be configured again in order to use the transmit and receive functions.

The help function prints all of the CAN functions listed above with their required and optional parameters

Registers

Fetch_CAN uses the MCR and BTR registers for configuration prior to use. These are the master control register and the bit timing register respectively. In the MCR register the bits 2, 5, and 6 are set. These are the Transmit FIFO priority (TXFP), Automatic wakeup mode (AWUM), and Automatic bus-off management (ABOM). These registers are set by default and the user is unable to configure them. In the BTR register the bits 9:0, 19:16, 22:20, and 25:24 are set. These are the Baud Rate Prescaler (BRP), Time Segment 1 (TS1), Time Segment 2 (TS2), and the Resynchronization Jump Width (SJW) respectively. Only BRP, TS1, and TS2 can be set by the end user based on the baud rate that they set in the CAN configuration section. By default these registers are set to give a baud rate of 500kbps.

Additional Functions

Besides the standard fetch functions fetch_can uses the following functions:

- parse_can_dev – parses the CAN device select and returns the correct CAN driver
- can_rx – runs in a separate thread when the CAN bus is in receive mode.

Updates for Future Revisions

The code for the CAN bus needs to be revised to allow for the end user to select between standard mode and enhanced mode (set to enhanced mode by default). The code should be adjusted to remove the choice of a device for config, transmit, receive, and reset as there is only one CAN bus usable on the Marionette board.