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KB0013440

How to Change the Baud Rate of a CAN bus with CAPL

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Question:

How can I change the baud rate of the CAN bus communication with CAPL?

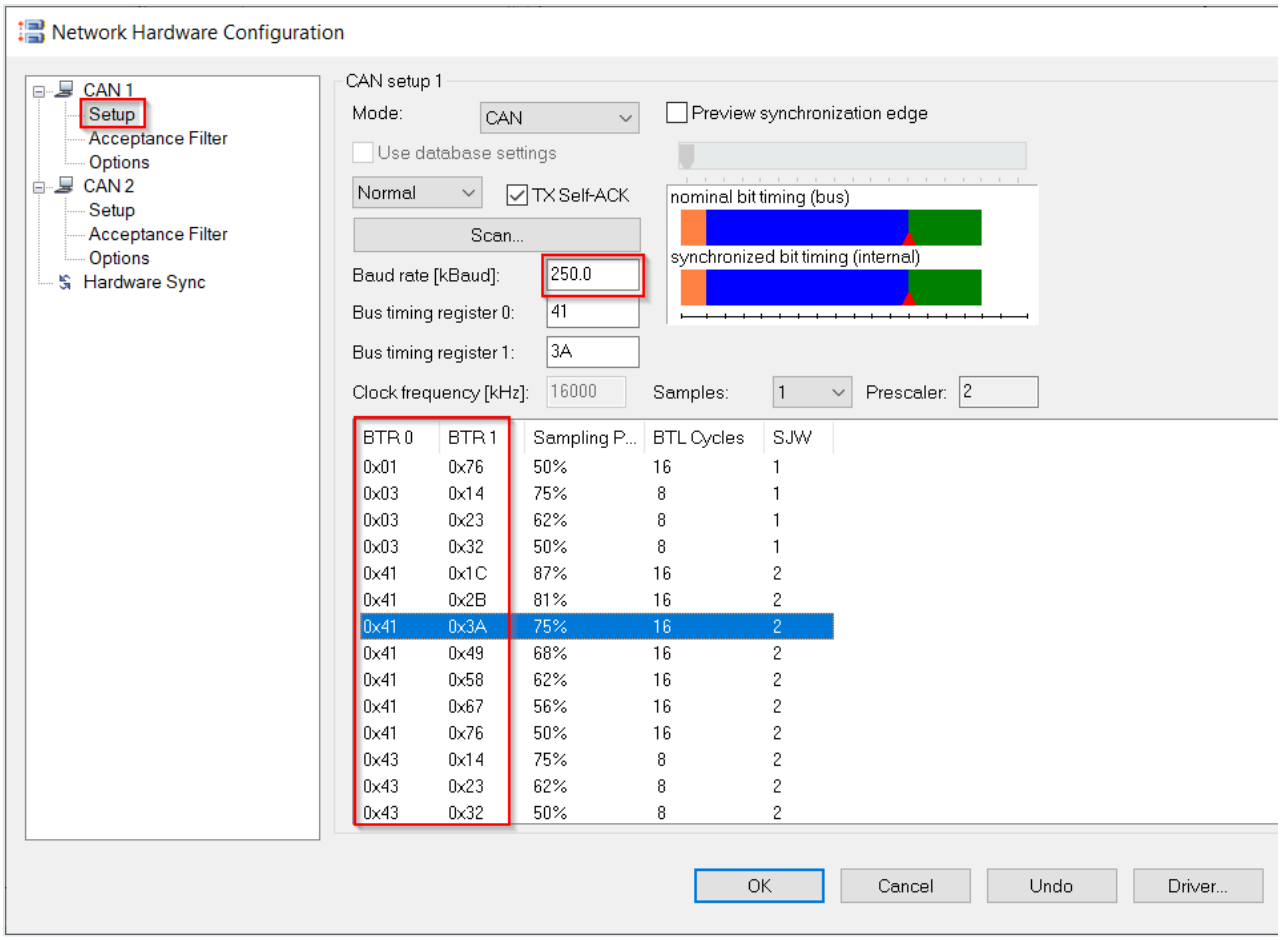
Answer:

There are two ways to change the baud rate with CAPL, either with the function `setBtr` or with `canSetConfiguration/canFdSetConfiguration` .

1. setBtr(long channel, byte btr0, byte btr1)

This function is only available for CAN and not for CAN FD. The parameters of this function are the CAN channel number and two Bus Timing Registers: BTR0 and BTR1. Depending on the used CAN controller they take on different values to determine the baud rate, the sample point, the number of samples and the synchronization jump width. Therefore the baud rate cannot be entered directly into this function.

To obtain the correct parameters for the function you can use CANoe: Go in the ribbon to **Hardware** and select the button **Network Hardware**. The **Network Hardware Configuration** opens. Choose the desired CAN channel and click on **Setup**. If you change the **Baud rate** you see in the table below all valid values for both BTRs. Now you can choose among the listed combinations the BTR values as input for the function `setBtr` :



Please make sure to perform a reset of the CAN controller after the function call with the CAPL function `resetCAN()`.

2. canSetConfiguration(long channel, canSettings settings) and canFdSetConfiguration(long channel, canSettings abrSettings, canSettings dbrSettings)

As two different functions are available, this works for both CAN and CAN FD. For each function, you can directly enter the desired baud rate. Please keep in mind that, as with the function `setBdr`, you have to make sure that the baud rate is a value that can be set with the current CAN controller configuration. If you are only changing the baud rate and not the other CAN controller settings you cannot guarantee that the correct baud rate is actually set. As best practice, it is advised to change all available members of the struct `canSettings` at once to a combination that is valid. Those members are:

`baudrate`

`tseg1` and `tseg2`: length of the time segments 1 and 2 in time quanta

`sjw`: sync jump width in time quanta

`sam`: number of sampling points (1 or 3)

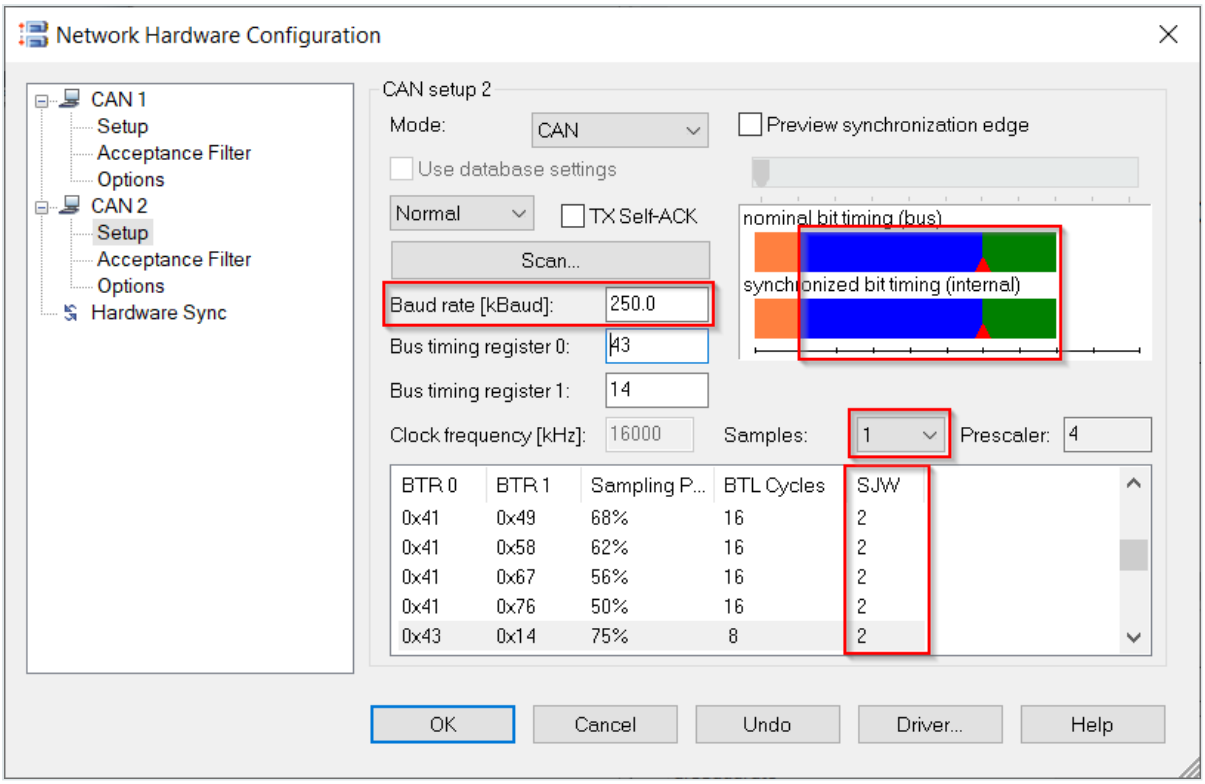
`flags`

For a description of these settings please refer to the CANoe help of the functions `canSetConfiguration` or `canFdSetConfiguration`.

The approach to obtain these values is slightly different between CAN and CAN FD:

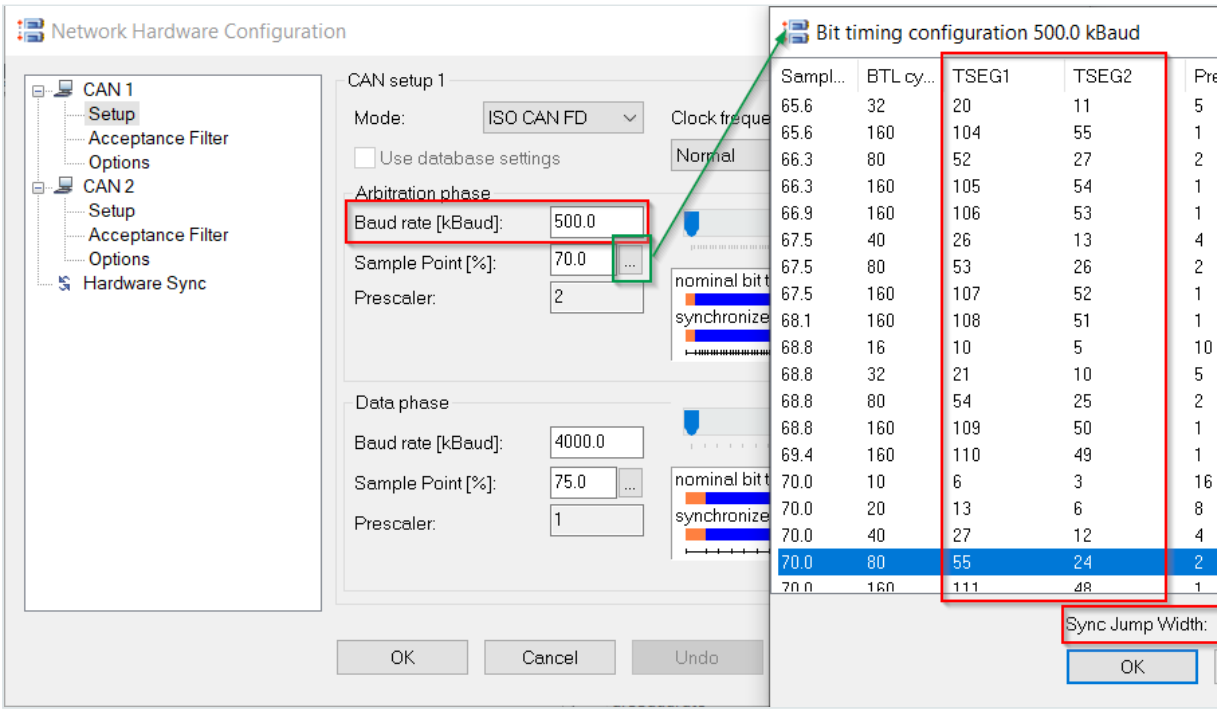
CAN:

Enter the desired baud rate in the same dialog as mentioned above. The values for `tseg1` and `tseg2` are shown in the preview and can be obtained by counting the time quantas for each section. In the example below it is `tseg1 = 5` and `tseg2 = 2`. The `flags` value is `0` for normal mode.



CAN FD:

This step has to be performed both for the arbitration phase and the data phase. Enter the desired baud rate in the entry field. When clicking on the three dots the **Bit timing configuration** dialog opens. Here you can obtain the values for `tseg1`, `tseg2` and `sjw`. The number of sampling points is always `1` for CAN FD. The `flags` value is `0` for normal mode.



A reset of the CAN controller happens automatically after setting the values with these functions.

Important:

After changing the baud rate the correct value should be verified. This can be done using the functions `canGetConfiguration` and `canFdGetConfigurations`. An example can be found in the CANoe help of the functions `canGetConfiguration` and `canSetConfiguration`.

Please note that the change in the bus configuration only happens during runtime. After stopping the measurement no change is visible in the **Network Hardware Configuration** dialog. When restarting the measurement the values from this dialog are taken again.

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