

# AN402 - How to Configure AX1411xx CAN Receive Filtering

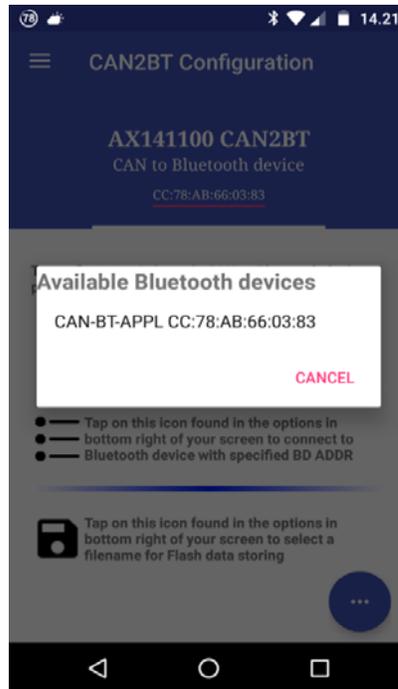
## Introduction

The AX1411xx can be used to forward the received CAN messages over the Bluetooth link to a smart device or to a PC. Depending on which CAN messages need to be forwarded over the link, the device can be configured to work in Bridge Mode (all messages pass) or custom CAN receive filtering can be configured.

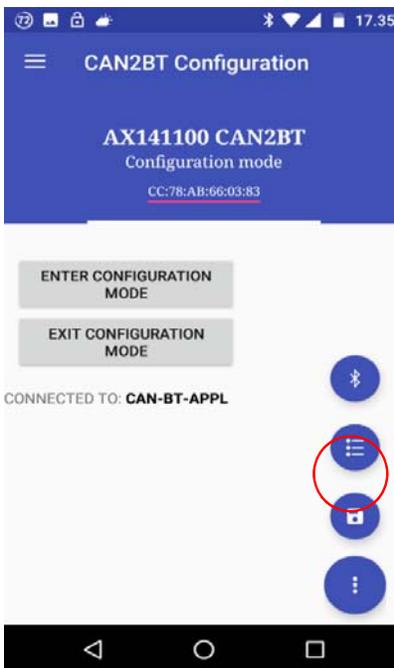


**Configure Master**

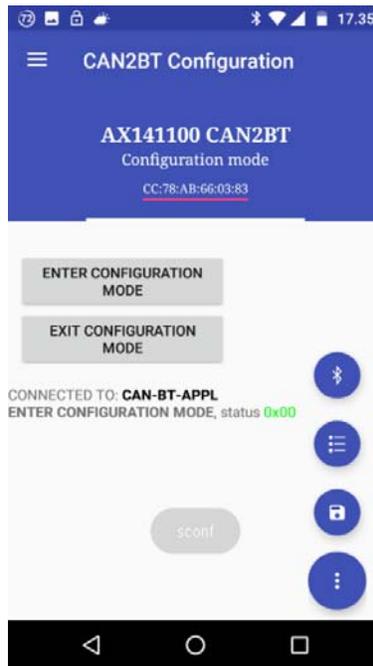
1. Use the CAN2BT Configuration app for scanning the available devices and connect to the AX1411xx device



2. After connecting, the App reports "CONNECTED TO: CAN-BT-APPL". In case this text is not shown, please reconnect by selecting the node from the list of previous scan results (using the button circled with red).

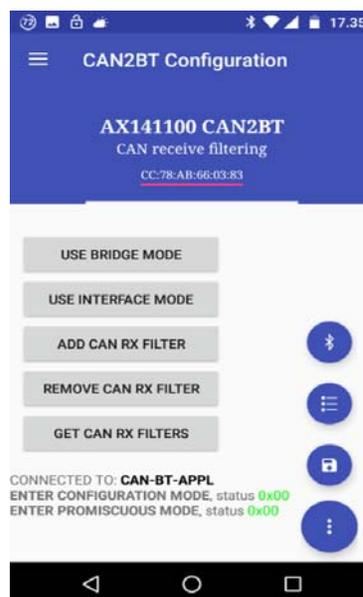


3. If the connection is okay, the App will prompt "ENTER CONFIGURATION MODE, status 0x00" after entering the configuration mode. If this text is not shown, please reconnect. Also cycling AX1411xx power is known to help, especially after the very first connection and pairing process, the AX1411xx is automatically closing the SPP connection.



**Configure Slave**

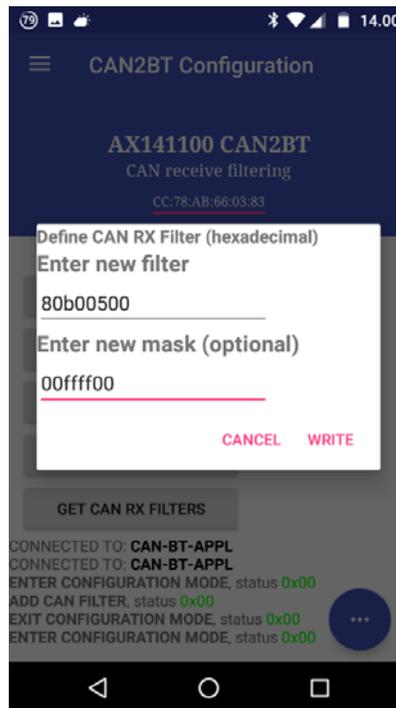
4. The next step is to configure the CAN receive filtering. In case all CAN messages should pass from AX1411xx to the smart device / PC, please select "USE BRIDGE MODE". If all messages should not pass, configure the required CAN RX filtering using the "ADD CAN RX FILTER" function.



5. **Note**, that in order to enable the AX1411xx to forward any Bluetooth frames containing CAN data, the **Configuration Mode needs to be disabled**. When in Configuration Mode, the AX1411xx won't forward any CAN messages for saving the Bluetooth bandwidth for configuration messaging.

It is also a good idea to cycle AX1411xx's power after CAN receive filter configuration. This will make sure that the latest CAN receive filter configuration is set to the CAN filter configuration registers.

- a. Custom CAN receive filtering can be configured using the "ADD CAN RX FILTER" function. The filter ID and optionally the mask to use can be entered to the configuration dialog. The configuration shown in the screen shot below configures filter ID 0x00B00500 with mask 0x00FFFF00. In practice this makes PGN 0xB005 pass, all priority bits and all source addresses are accepted. **Note, that in order to configure an Ext ID filter (29 bit identifier), the bit 31 of the filter definition needs to be set. That is why the filter id is 0x80B00500.** If the bit 31 is not set, the filter id is handled as an 11bit identifier.



Sending the following frames to the CAN bus:

Number	Diff. Time [ms]	ID	E	R	Len	D0	D1	D2	D3	D4	D5	D6	D7	Text
CAN 1	7191	0CB00500	+		8	FF	00	FF	11	00	FF	FF	FF	y.y_yyy
CAN 2	937	0CB00500	+		8	FF	00	FF	11	00	FF	FF	FF	y.y_yyy
CAN 3	2944	0CB00600	+		8	FF	00	FF	11	00	FF	FF	FF	y.y_yyy
CAN 4	664	0CB00600	+		8	FF	00	FF	11	00	FF	FF	FF	y.y_yyy
CAN 5	5815	0CB10500	+		8	FF	00	FF	11	00	FF	FF	FF	y.y_yyy
CAN 6	168	0CB10500	+		8	FF	00	FF	11	00	FF	FF	FF	y.y_yyy
CAN 7	3280	0CB00500	+		8	FF	00	FF	11	00	FF	FF	FF	y.y_yyy
CAN 8	704	0CB00500	+		8	FF	00	FF	11	00	FF	FF	FF	y.y_yyy

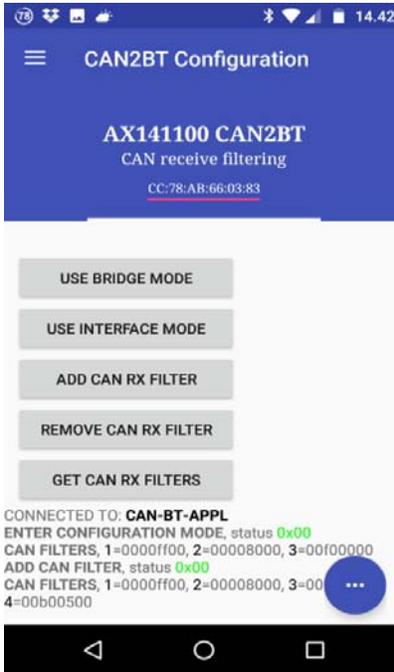
Will result in only the frames having PGN bytes equivalent to 0xB005 pass over the Bluetooth link to the smart device:



- After configuring the slave device's CAN RX filtering, its power can be cycled. Cycling the power will make sure that the proper CAN receive filtering is applied to the CAN interface's filter configuration registers.

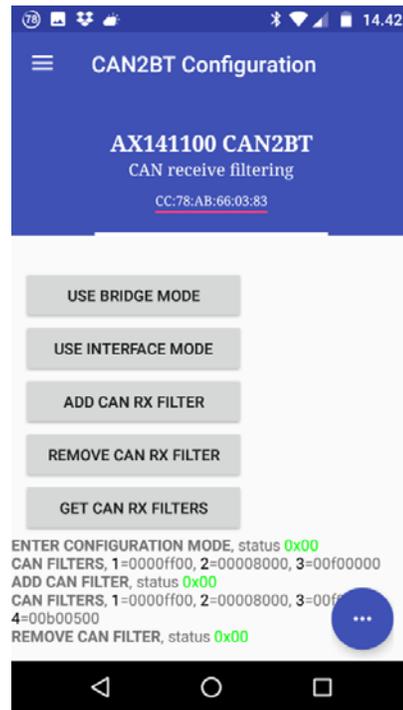
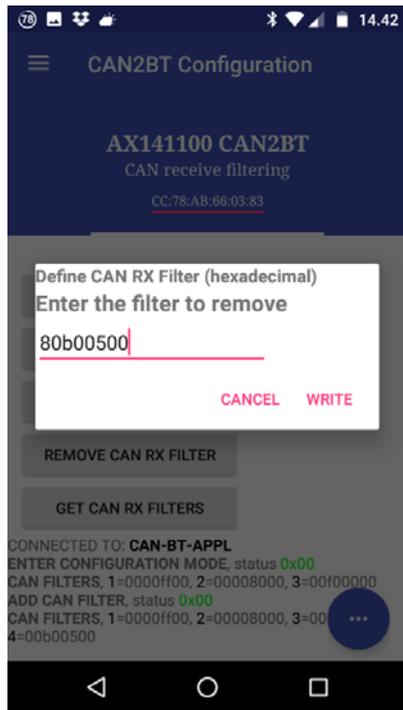
**Testing**

7. **Optional step:** In case the list of currently configured filters is needed, the "GET CAN RX FILTERS" function can be used. It will return a list of currently configured filter ids. Please note, that the first three filters are built in filters that are required for the Interface Mode to work. These three filters will make sure that the standard J1939 messages (frames sent to Global Address, frames targeted to AX1411xx itself and all PDU2 frames) will be received by the AX1411xx. The filter #4 in the list is the one that was configured in this example.



**Optional step:** In order to remove a filter definition from the list, the "REMOVE CAN RX FILTER" function can be used. For properly removing a filter, its full id needs to be defined.

After successful removal, the CAN2BT app will report "REMOVE CAN FILTER, status 0x00"



Version	Date	Author	Comments
1.00	December 21, 2018	Antti Keränen	