ATA6563 Click Quick Start Guide

Quick Start Guide for ATA6563 Click Using PIC18F66K80 PIM and Automotive Networking Board

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1. ATA6563 Click Board Overview

The ATA6563 Click Board carries Microchip's ATA6563, a high-speed CAN FD transceiver that provides an interface between a Controller Area Network (CAN) protocol controller and the physical two-wire CAN bus. The transceiver is designed for high-speed (up to 5 Mbit/s) CAN applications in the automotive industry, providing differential transmit and receive capability to a microcontroller that has a built-in CAN protocol controller. It is also backward compatible with classic CAN controllers.

1.1 Example Project Overview

The example project is developed for the PIC18F66K80 to work with the ATA6563 Click Board on the Automotive Networking Demo Board (ANDB) platform.

The PIC18F66K80 is programmed as a CAN node to only process incoming classic CAN messages with standard filtered IDs: 0x111, 0x222, 0x333 and extended ID 0xAAAAA. The node echoes what it receives. Except for the Data0 byte, all other data bytes received will be immediately retransmitted (echo) back to the bus. Data0 sent by the PIC18F66K80 always carries the counter value of the number of filtered messages received. The echo message ID sent by this node is 0x400.

Note that per the CAN specification, no two nodes should send out the same CAN message ID on the same CAN bus. If you are using the same code for another CAN node on the same bus, make sure that you change the TX Message ID to a value other than 0x400, 0x111, 0x222, 0x333 and 0xAAAAA.

The K2L OptoLyzer® tool will be used as another CAN node to transmit CAN frames to the PIC18F66K80 node. Both the PIC18F66K80 node and the K2L OptoLyzer node operate with bus speeds of 500 kbps at 75% bit sample point.

1.2 Tools Requirements

- Computer with Windows® 7 or newer
- Two available high-speed USB ports from the computer
- MPLAB® ICD 3 In-Circuit Debugger (Part# DV164035)
- Automotive Networking Development Board (ANDB) (Part#: ADM00716)
- 8-bit solution: PIC18F66K80 Plug-In Module (PIM) (Part#: MA180035)
- CAN Transceiver Click Board: (ATA6563 Click)
- MPLAB X IDE v4.10 (microchip.com/mplabx)
- Compiler XC8 version 1.44 (microchip.com/xc8)
- MCC v3.55.1 (microchip.com/mcc)
- CAN cable with both female and male DE-9 connectors (Order# XK1018)
- CAN analyzer hardware (K2L OptoLyzer® MOCCA FD)
- CAN analyzer software (K2L OptoLyzer® Studio Foundation V1.3.0)
- 12V power supply (PS0019) or 9V power supply (AC002014) for ANDB
- 12V power supply for MOCCA FD (Order# X13167)

1.3 Hardware Setup

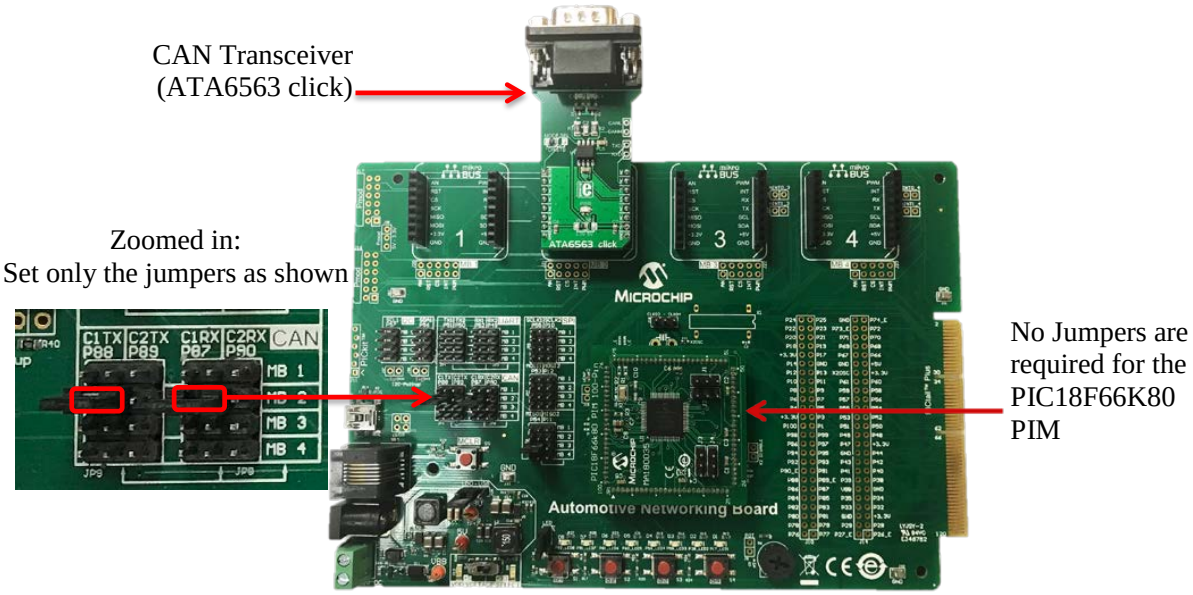
Before applying power to the Automotive Networking Development Board (ANDB), do the following:

1. Confirm the PIC18F66K80 PIM is plugged in as seen in the figure below. The corner cutout of the PIM must align with the U1 marking on the ANDB.
2. Confirm the CAN Transceiver Click Board (ATA6563 Click Board) is plugged into mikroBUS socket 2 (MB 2) on the ANDB. See the figure below.
3. Configure the jumpers according to the figure below.
4. Connect the CAN BUS cable with the CAN Transceiver Click Board.
5. Connect the CAN BUS cable with the K2L MOCCA FD (high-speed CAN channel 1).
6. Connect the K2L MOCCA FD to the computer with the USB cable.
7. Connect the MPLAB ICD 3 to the computer using the USB cable.
8. Connect the MPLAB ICD 3 to the ANDB's RJ11 connector.

Important: Prior to power up, the switch for the "VDD VOLTAGE SELECT" on the ANDB must be set to +3.3V and not +5.5V to prevent damage to the MCU on the PIM. Although the PIC18F PIM used here may run at 5V, other PIMs sharing the ANDB may only run at +3.3V.

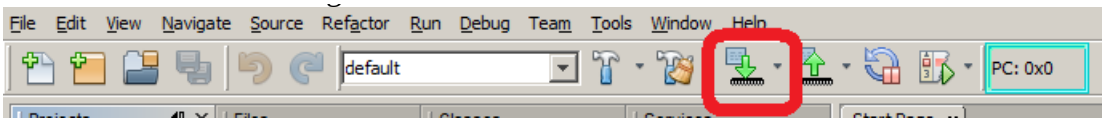
9. Finally, plug the 9V power supply into the barrel connector to apply power to the ANDB.

Figure 1-1. Board Jumper Configuration



2. Programming the Example Project

1. Open MPLAB X IDE.
2. Open the downloaded project from **...\ata6563_pic18f66k80_ANDB.x**
3. From MPLAB X IDE, right click on the project and select ***Set as main project*** to make the current project the main project.
4. Select the "Make and Program Device" button as shown below:



2.1 Running the Example Project

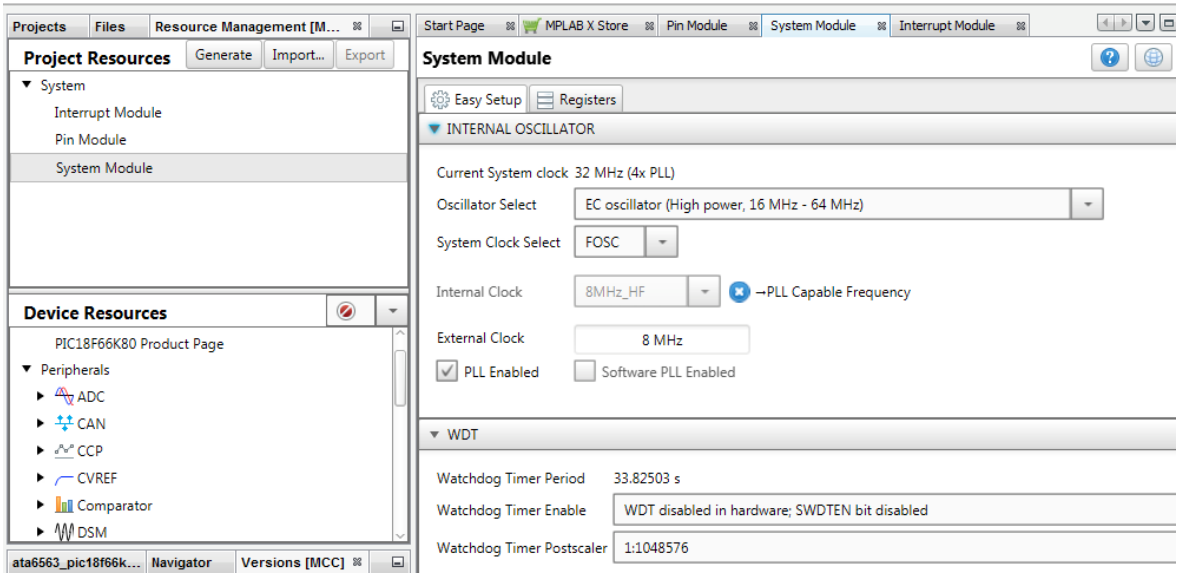
If you do not have experience with OptoLyzer Studio, read the 3. Learning OptoLyzer Studio section that has step-by-step instructions on how to use OptoLyzer Studio for this example demo.

1. Connect the K2L MOCCA FD tool and set it up at 500 Kbps.
2. Send a message with one of the IDs: 0x111, 0x222, 0x333, or 0xAAAAA, with up to 8 data bytes. You will see the echoed message from the PIC18F66K80 node shown in the trace window. Again, the Data0 byte of the echoed message will be a counter, and the data reflection will be from Data1 to Data7 bytes.
3. Send a message with an ID other than 0x111, 0x222, 0x333, or 0xAAAAA. You will not see an echo from the PIM node.

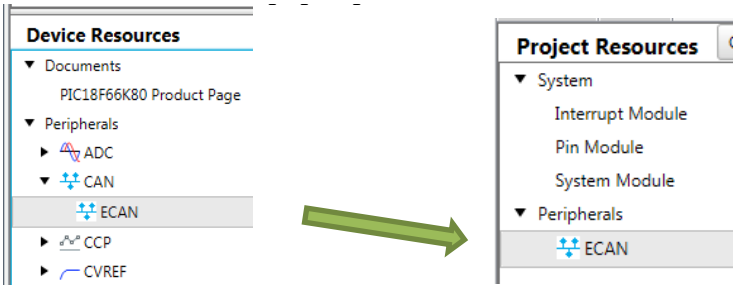
2.2 How to Generate Example Project Software

1. Create a new PIC18F66K80 standalone project from MPLAB X IDE.
2. Click on the MCC icon from MPLAB X IDE to open MCC.

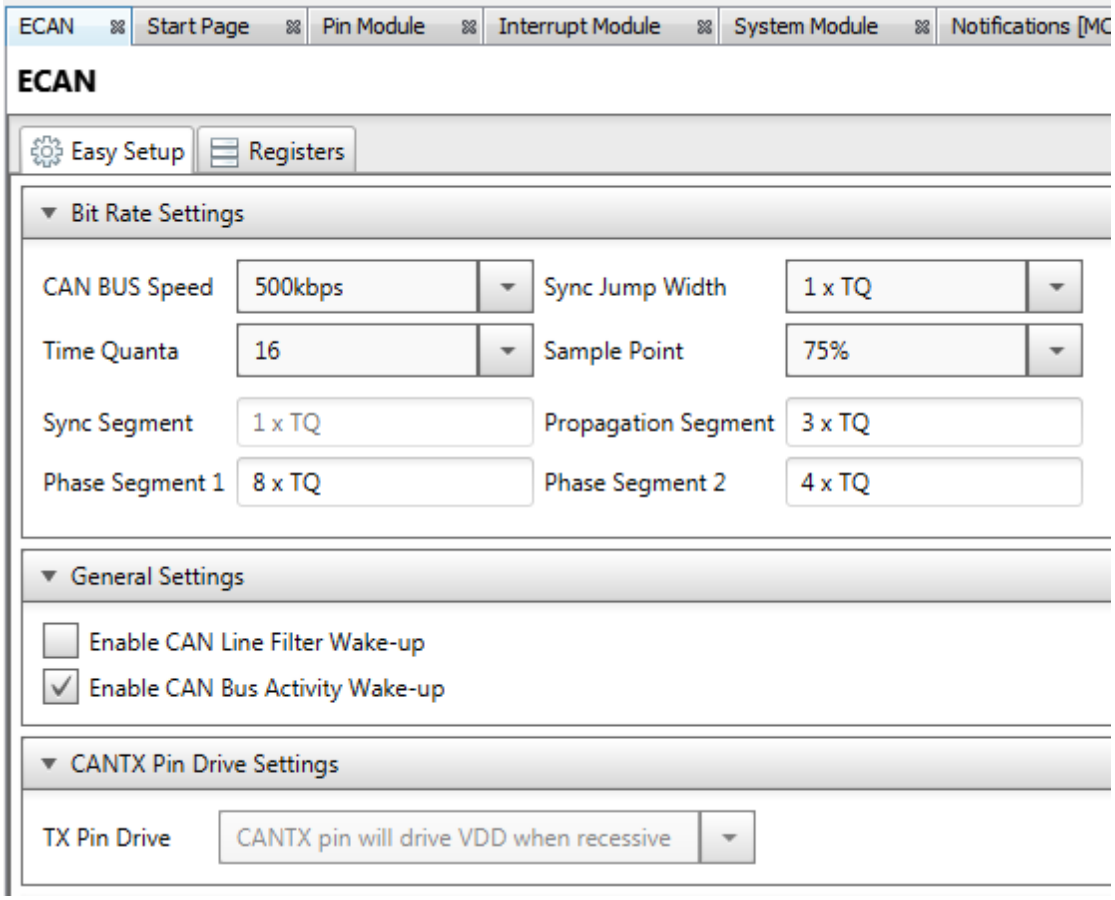
3. Click on System Module under Project Resources and configure as shown below.



4. Double click on ECAN under Device Resources. ECAN then appears under Project Resources and its configuration window pops up.

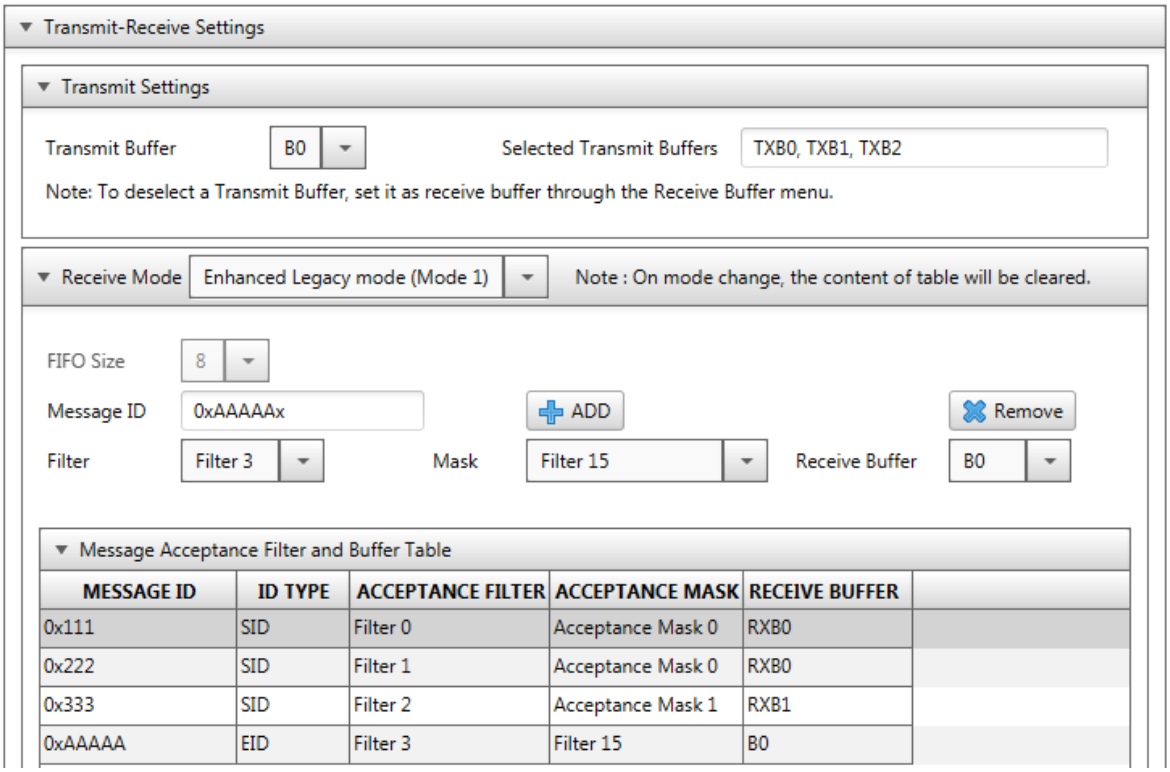


5. Configure the ECAN module as shown below:

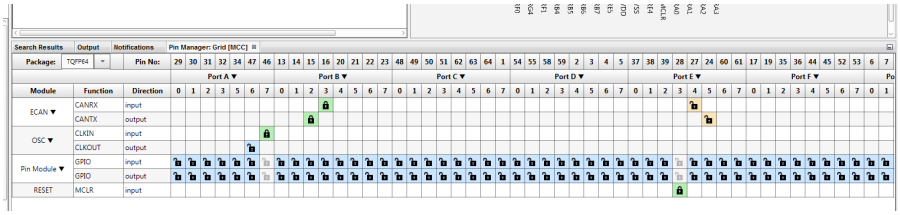


Note: MCC preselects “CANTX pin will drive VDD when recessive”, which generates code to set the CIOCON_ENDRHI bit to '1'. This is required for the CANTX pin to drive properly. MCC versions older than v3.55.1 do not have this and require manually adding code to set the CIOCON_ENDRHI bit to '1'. Refer to Step 11.

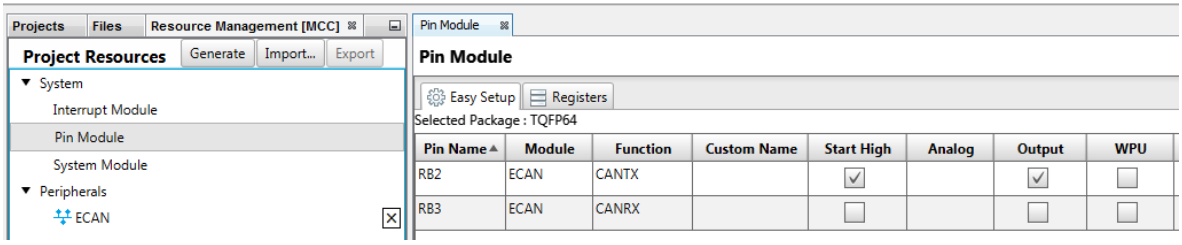
6. In the same ECAN configurator window, scroll down, select Enhanced Legacy Mode (Mode 1) and add the Message ID as shown below:
   Note: To add extended ID (EID), append an "x" to the end of the ID. For example, 0xAAAAAx.



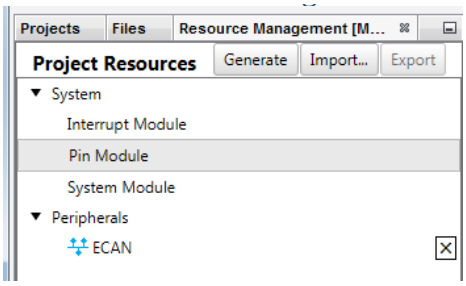
7. Verify or configure the Pin Manager as shown below:



8. Click on Pin Module from Project Resources and configure as shown below:

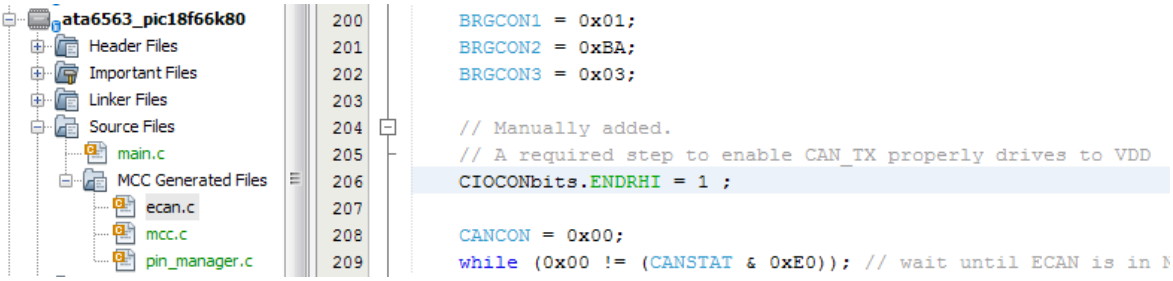


9. Click on Generate to generate the code.



10. Open the pregenerated project and copy the pasted code from main.c to your self-created main.c

11. Optional: For older MCC versions, add the code `CIOCONbits.ENDRHI = 1` to the ECAN_Initialize function in ecan.c as shown below:



Note:

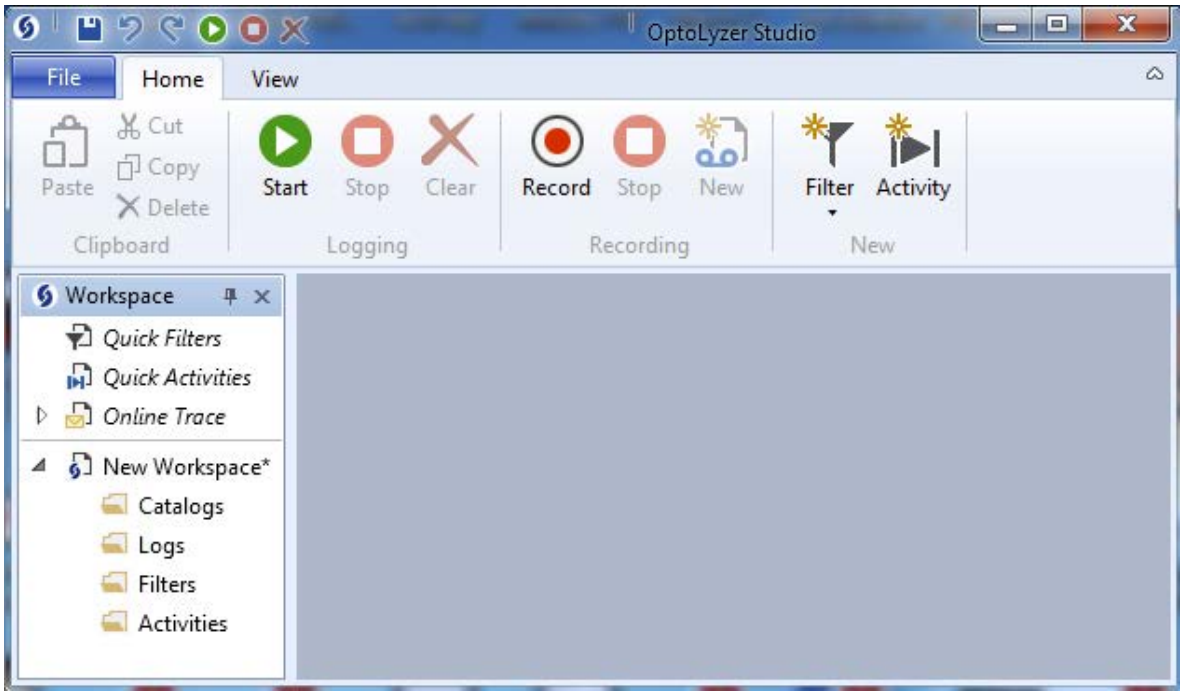
1. Make sure to manually add this code back every time you regenerate MCC code.
2. MCC v3.55.1 or newer will generate this code instead of requiring it to be manually added as shown above.

12. Follow earlier sections to program and run the project.

3. Learning OptoLyzer Studio

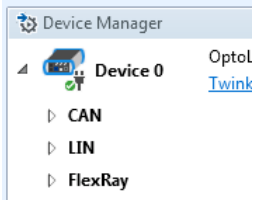
1. Click on the icon on the desktop to open OptoLyzer Studio

2. The following screen will appear:

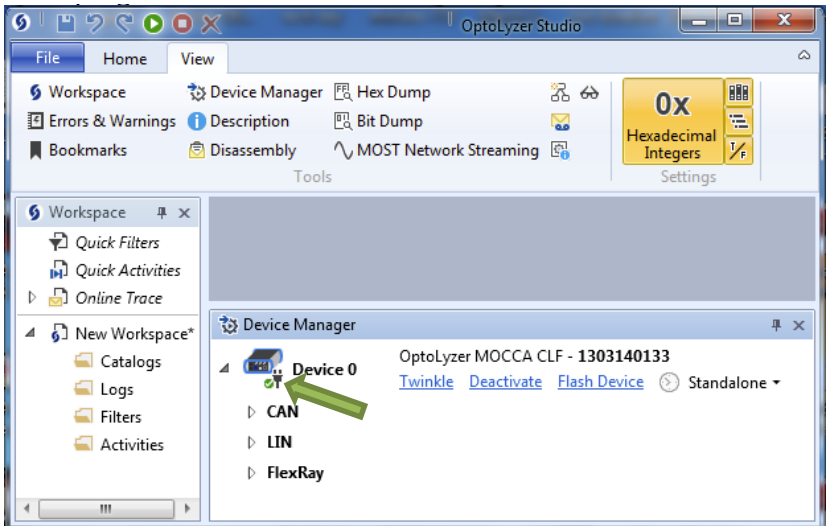


3. From the View tab, select Device Manager:

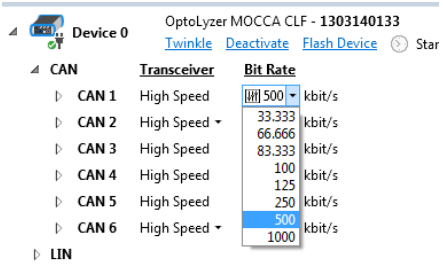
4. The Device Manager window is a central point to configure and maintain connected devices. Expand Device 0 to see a list of all supported protocols:



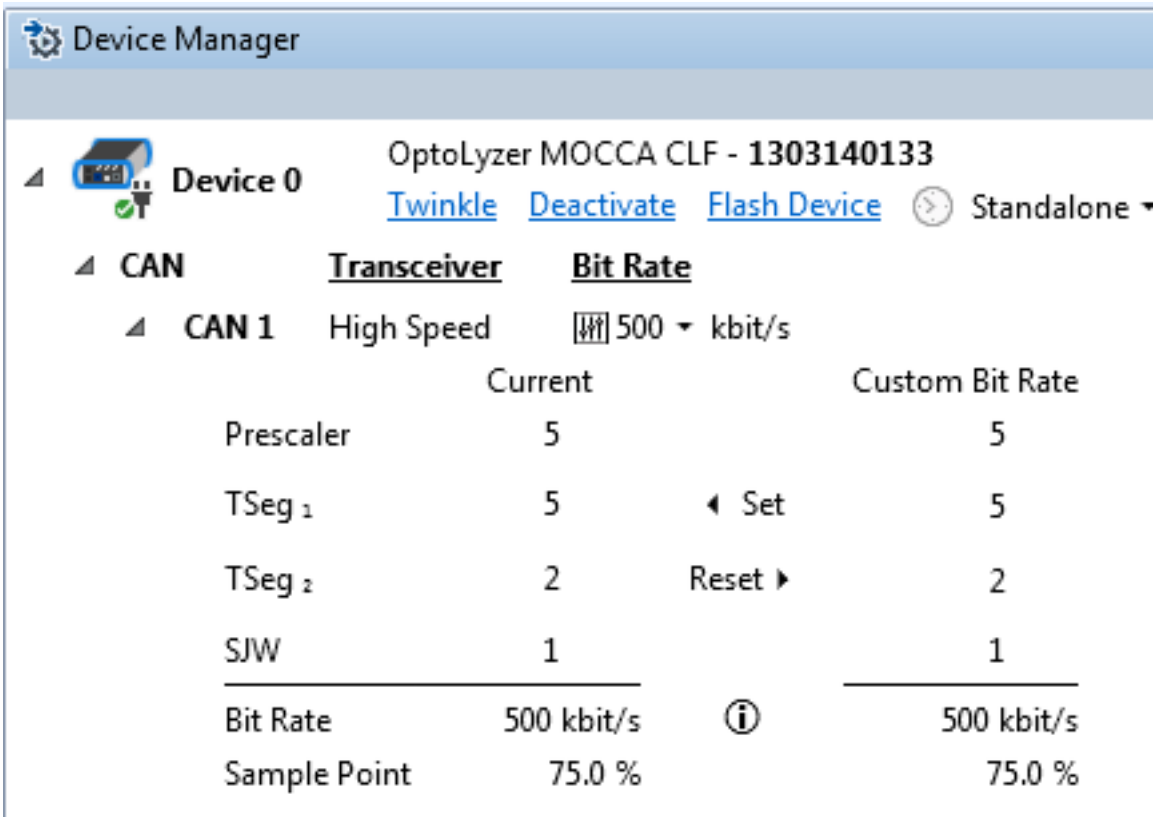
5. Make sure that the OptoLyzer MOCCA FD tool is connected to the computer. The green tick mark at the bottom of the device should be green. Otherwise, power cycle the MOCCA FD tool or re-plug the USB cable from the PC.



6. To set the Bit Rate of the CAN channel, click on the arrow next to the CAN menu to show a list of available CAN channels on the MOCCA FD tool. CAN1 channel is used. Select the bit rate as shown below:

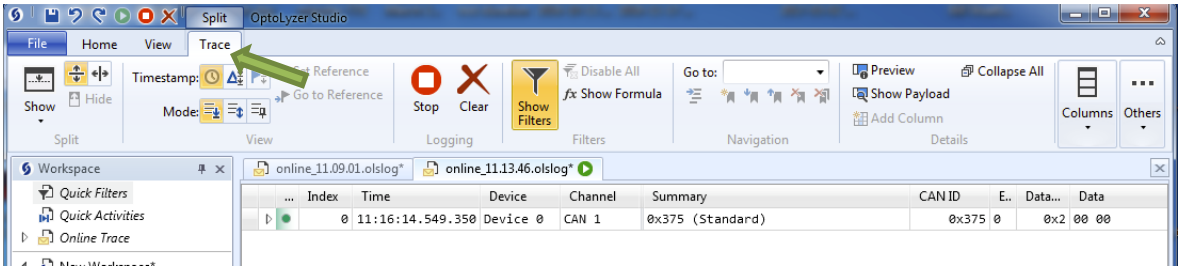


7. Click on the arrow next to CAN1. Then set the OptyLyzer Node sample point to be the same as the PIC18F66K80 node at 75% as shown below:

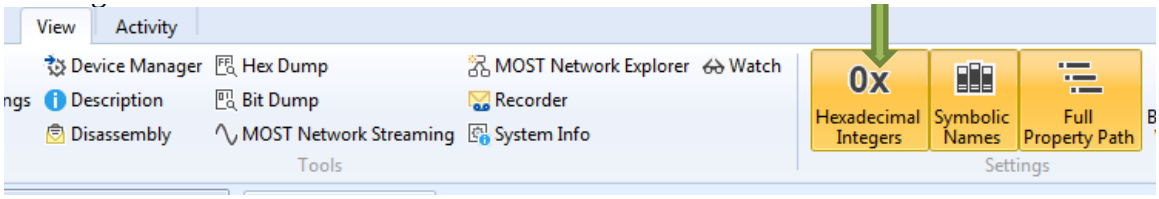


8. From the top menu bar, click on the green start button to start monitoring the bus. To stop, click on the red stop button. To clear the trace window, click on the red X button.

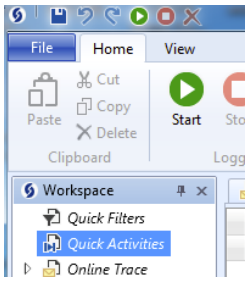
9. A Trace tab window as shown below will appear. The sub tab name with “online_xx.xx.xx.olslog” is where you monitor the CAN bus data. If you have started multiple “online_...” tabs, make sure you are monitoring the active one. The active tab should be the one where you started with the green start button.



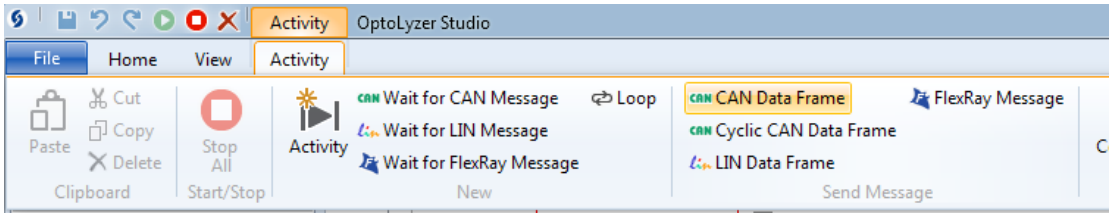
10. Under the View tab, make sure “Hexadecimal Integers” is selected. This allows easy viewing and CAN data entries in hex format.



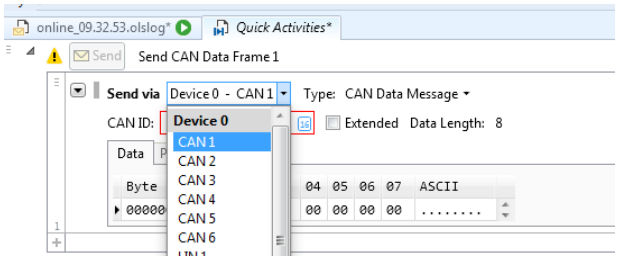
11. To transmit a CAN message from the OptoLyzer MOCCA FD tool, click on “Quick Activities” under the Workspace panel.



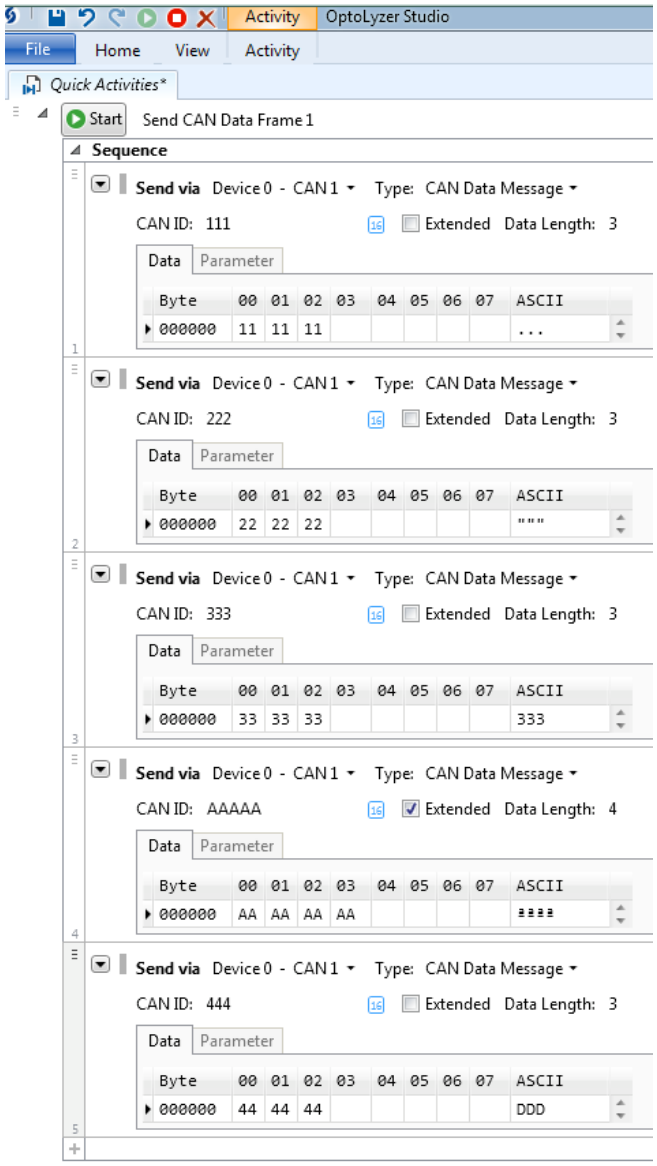
12. Under the Activity tab, click on the “CAN Data Frame” button to create a CAN frame message.



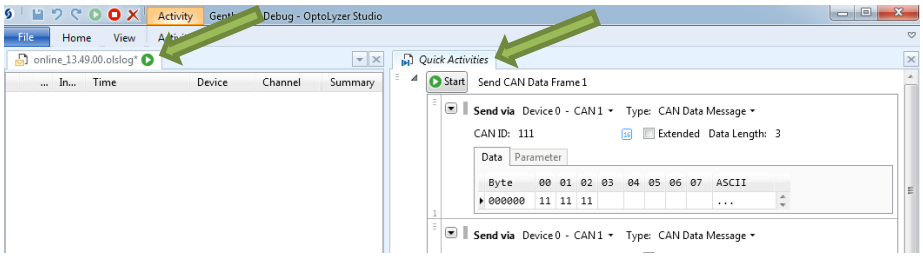
13. Select the corresponding **CAN 1** Channel that is currently connected to the MOCCA FD tool.



14. Configure the frame’s ID to be one of the filtered IDs described in the example project. The message data length is arbitrary in this example project. Enter any values for the data bytes. Or follow the figure below:



15. Arrange the windows by dragging tabs for “online_xxxx.olslog” and “Quick Activities” so they are side by side. Drag by holding the tab as indicated by the green arrow below. This will make it easier for us to see ongoing messages as we send messages from the MOCCA FD tool instead.



16. When done, click "Send" or "Start" in the Quick Activities window. Note that the PIC18F node only retransmits messages received from filtered IDs. It ignores message IDs that are not configured for the node. See below:

online_15.30.27.olslog*

...	Index	Time	Device	Channel	Summary	ID	Data Length	Data	
	0	17:09:52.833.407	Device 0	CAN 1	0x111 (Standard)	0x111	0x3	11 11 11	← Sent filtered ID from OptoLyzer
	1	17:09:52.833.615	Device 0	CAN 1	0x400 (Standard)	0x400	0x3	01 11 11	← Echo from ANDB
	2	17:09:52.834.969	Device 0	CAN 1	0x222 (Standard)	0x222	0x3	22 22 22	← Sent filtered ID from OptoLyzer
	3	17:09:52.835.177	Device 0	CAN 1	0x400 (Standard)	0x400	0x3	02 22 22	← Echo from ANDB
	4	17:09:52.836.563	Device 0	CAN 1	0x333 (Standard)	0x333	0x3	33 33 33	← Sent filtered ID from OptoLyzer
	5	17:09:52.836.769	Device 0	CAN 1	0x400 (Standard)	0x400	0x3	03 33 33	← Echo from ANDB
	6	17:09:52.838.147	Device 0	CAN 1	0x000AAAAA (Extended)	0x000AAAAA	0x4	AA AA AA AA	← Sent filtered ID from OptoLyzer
	7	17:09:52.838.425	Device 0	CAN 1	0x00000400 (Extended)	0x00000400	0x4	04 AA AA AA	← Echo from ANDB
	8	17:09:52.839.543	Device 0	CAN 1	0x444 (Standard)	0x444	0x3	44 44 44	← Not filtered ID. No Echo.

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ISBN: 978-1-5224-3160-2

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