OneEye_UART_Shell_1 for KIT_AURIX_TC275_LK

Shell over UART using OneEye

AURIX™ TC2xx Microcontroller Training
V1.0.0

Scope of work

Demonstrate how to implement the OneEye shell over the UART (USB) interface. A Shell is used to parse a command line and call the corresponding command execution.

After configuring the OneEye UART interface, a OneEye shell is used to interpret and manage commands like "info" or "help".

Introduction

- **OneEye** is a GUI that enables the creation of interactive Graphical User Interface. Graphical elements can be drag from a toolbox and drop onto the GUI. The behavior of the created GUI can be customized. Different communication interfaces like UART, Ethernet, CAN, DAS can be used to interact with the embedded system

- **SyncProtocol** / **ProtocolBB** is a synchronous protocol that enables data streaming between the target microcontroller and OneEye. It enables to open multiple communication channels, provide packet acknowledge and packet checksum. Data are transported within a message with a message ID and a message payload. See the OneEye help for more information.

Single frame

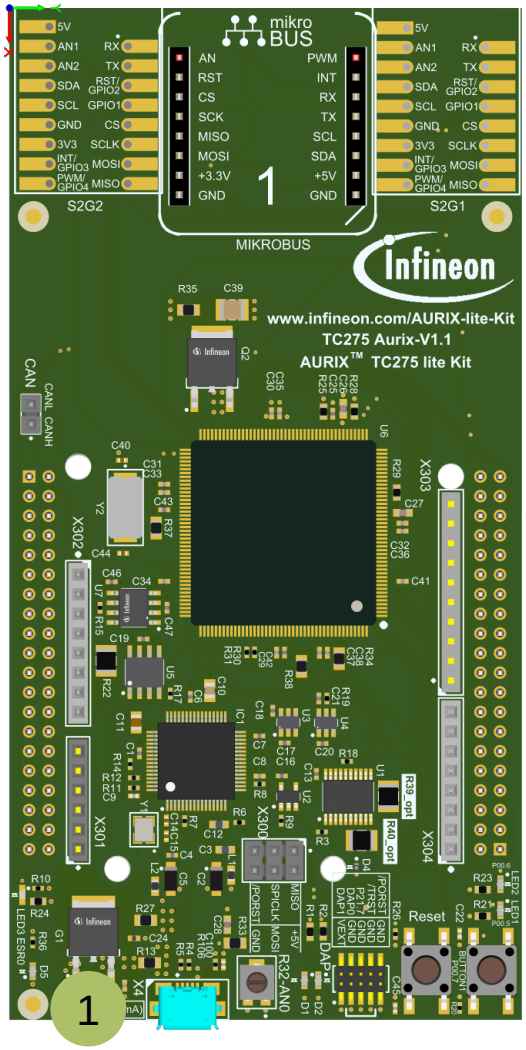
Offset	0	1	2	3
0	Start Byte	Sender	Receiver	Payload length
4	Flags (frameType=data)		Checksum payload	Checksum header
8	Message ID		(Reserved)	
12	Message length			
16	Message payload			
...	... (Message payload)			

- **Note**: It is recommended to go through some of the **basic tutorials** listed in the help embedded in OneEye (Menu: Help -> OneEye help). This enables a quicker ramp-up in the OneEye concept and ensures a nice journey with OneEye

Hardware setup

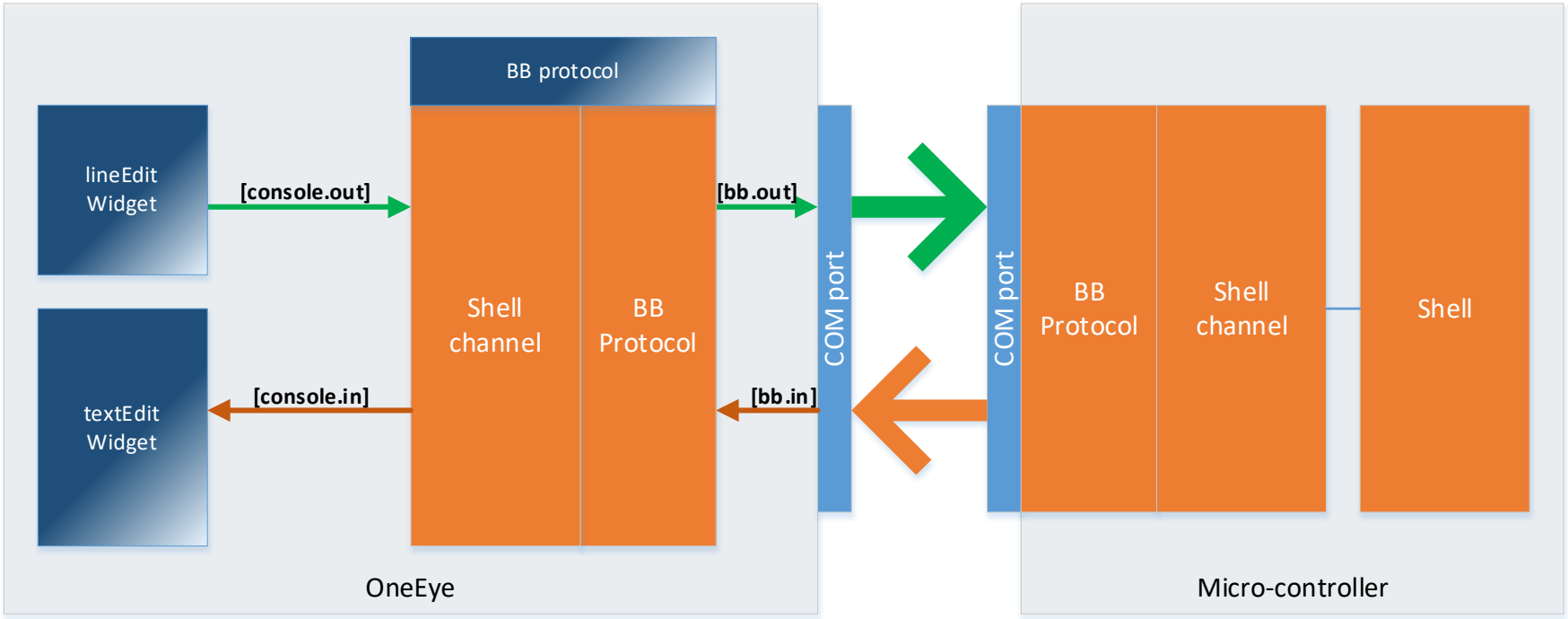
This code example has been developed for the board KIT_AURIX_TC275_LITE.

The board should be connected to the PC through the USB port 1



Configuration overview

In this configuration a shell running on the microcontroller is connected to the COM port.
In OneEye, two signals **bb.in** and **bb.out** are used to connect the COM port data stream to the BB protocol.
The BB protocol is configured to open a channel reserved for the shell. This channel connects to the lineEdit and textEdit with the **console.in** and **console.out** signals.



Implementation - AURIX

Enabling the OneEye library

The OneEye library must be enabled by adding the following line to ***Ifx_Cfg.h***:
#define IFX_OE_AL_USE_AURIX_ILLD

Configuring the UART communication
The UART communication is initialized with the function ***initUart()***, which also initializes the BB protocol.

In the infinite while loop, the function ***processUart()*** executes the SyncProtocol.

Configuring the OneEye shell

A OneEye shell (***Ifx_Oe_Shell***) is an object that enables command line parsing and command execution.

The OneEye shell communication interface (***Ifx_Oe_ShellBb***) enables streaming of data using the BB protocol (***Ifx_Oe_SyncProtocol***).
The OneEye shell is initialized with ***initShell() / Ifx_Oe_Shell_init()***.

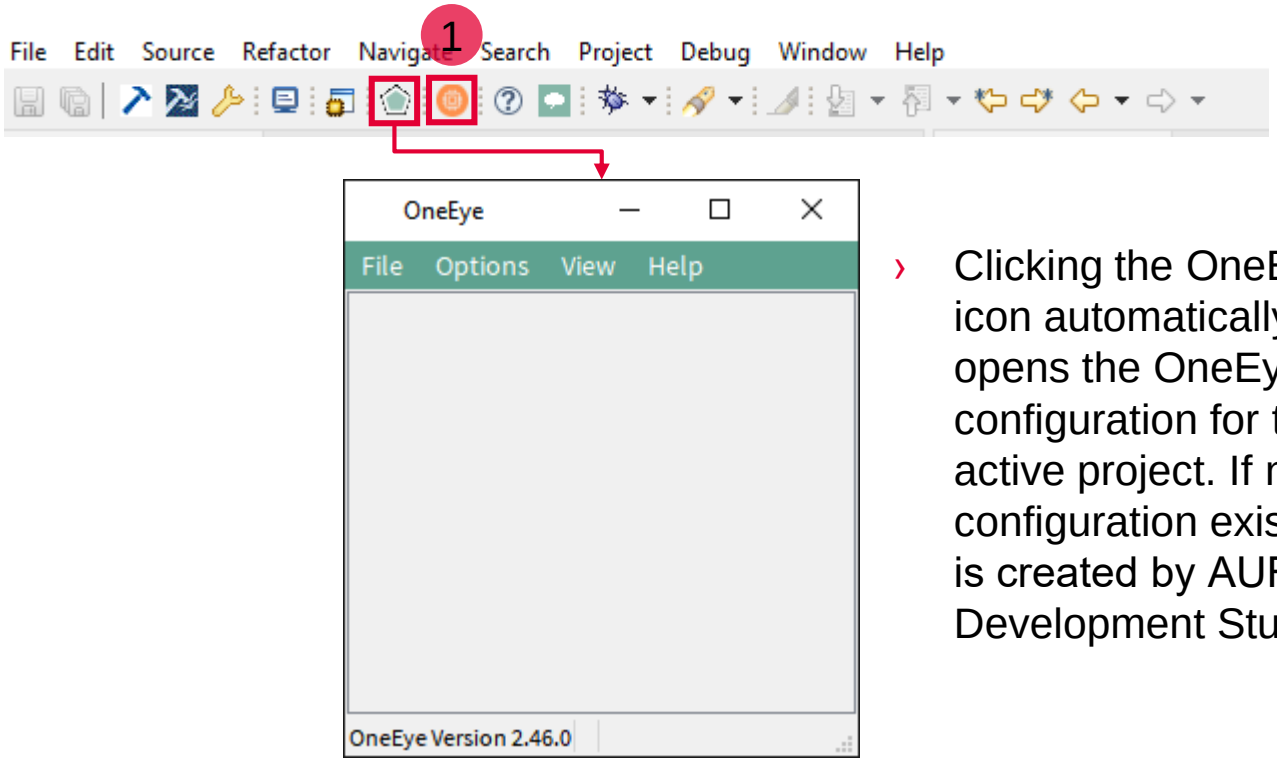
The ***ifx_oe_shell.h*** file can be found in the Libraries\OneEye directory.

Running the shell

The shell is executed in the background loop by calling ***processShell() / Ifx_Oe_Shell_process()***.

Run and Test

- After code compilation, flash the device using the Flash button 1 to ensure that the program is running on the device
- For this training, the OneEye application is required for visualizing the values. OneEye can be opened inside the AURIX™ Development Studio using the following icon:



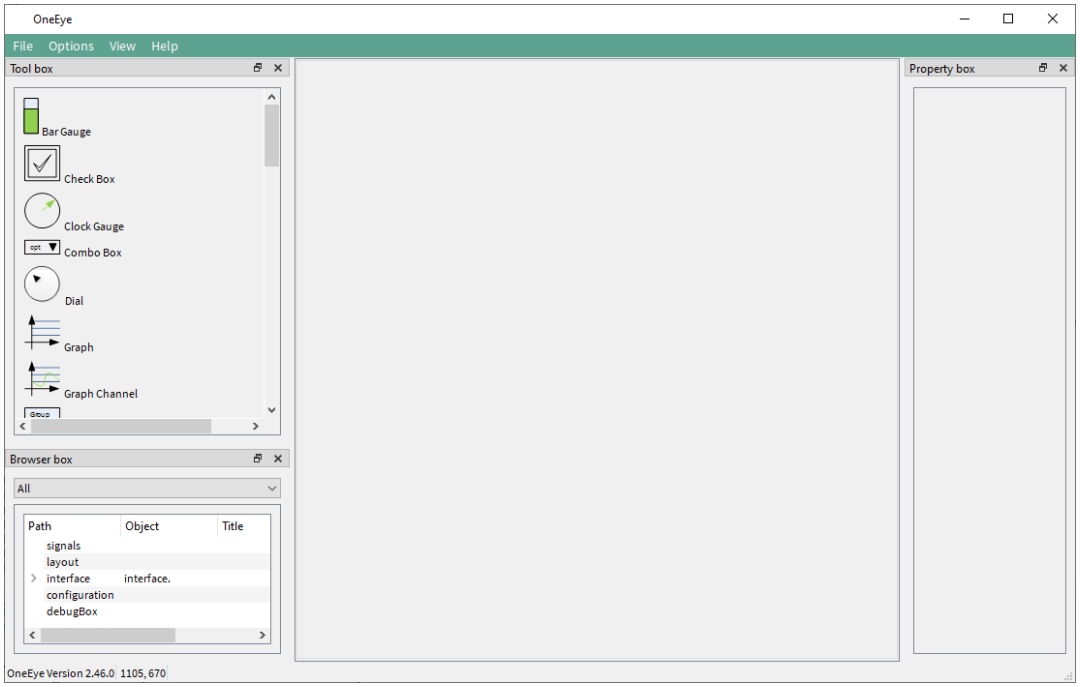
- Clicking the OneEye icon automatically opens the OneEye configuration for the active project. If no configuration exists, it is created by AURIX™ Development Studio

Implementation - OneEye

In this training, the OneEye configuration is provided inside the Libraries folder. The following steps are needed to configure the oscilloscope from a brand-new configuration.

Setup OneEye for editing

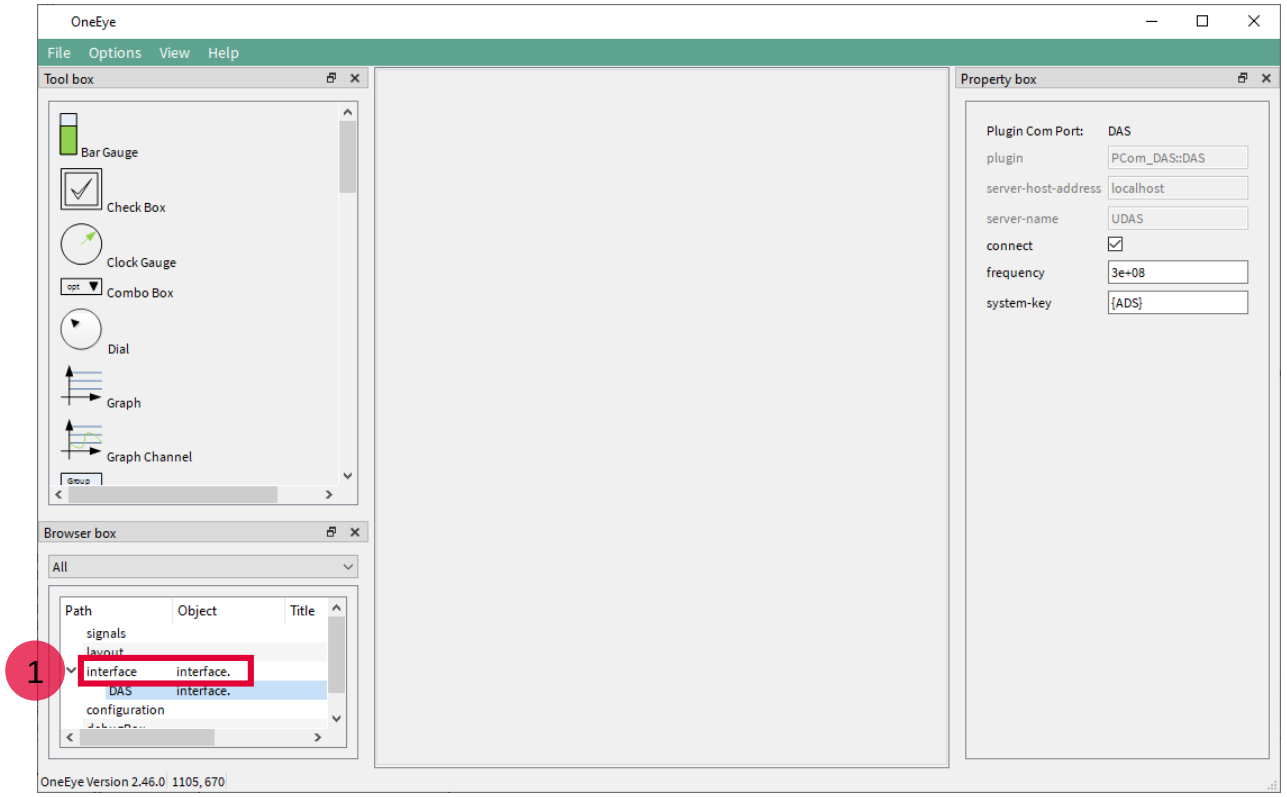
Select the OneEye menu “**Options -> Edit mode**” (if not already checked) to enable the edit mode.
Select the OneEye menu “**View -> Browser box**”, “**View -> Property box**”, “**View -> Tool box**” (if not already checked) to display the browser, property box, and tool box. Note that the box can be moved around.



Implementation - OneEye

Removing the default DAS interface

When the OneEye configuration is created by ADS, it is already setup with a DAS interface.
Select the interface in the Browser box 1 and delete it with “right click and remove” as it is not required in this example.

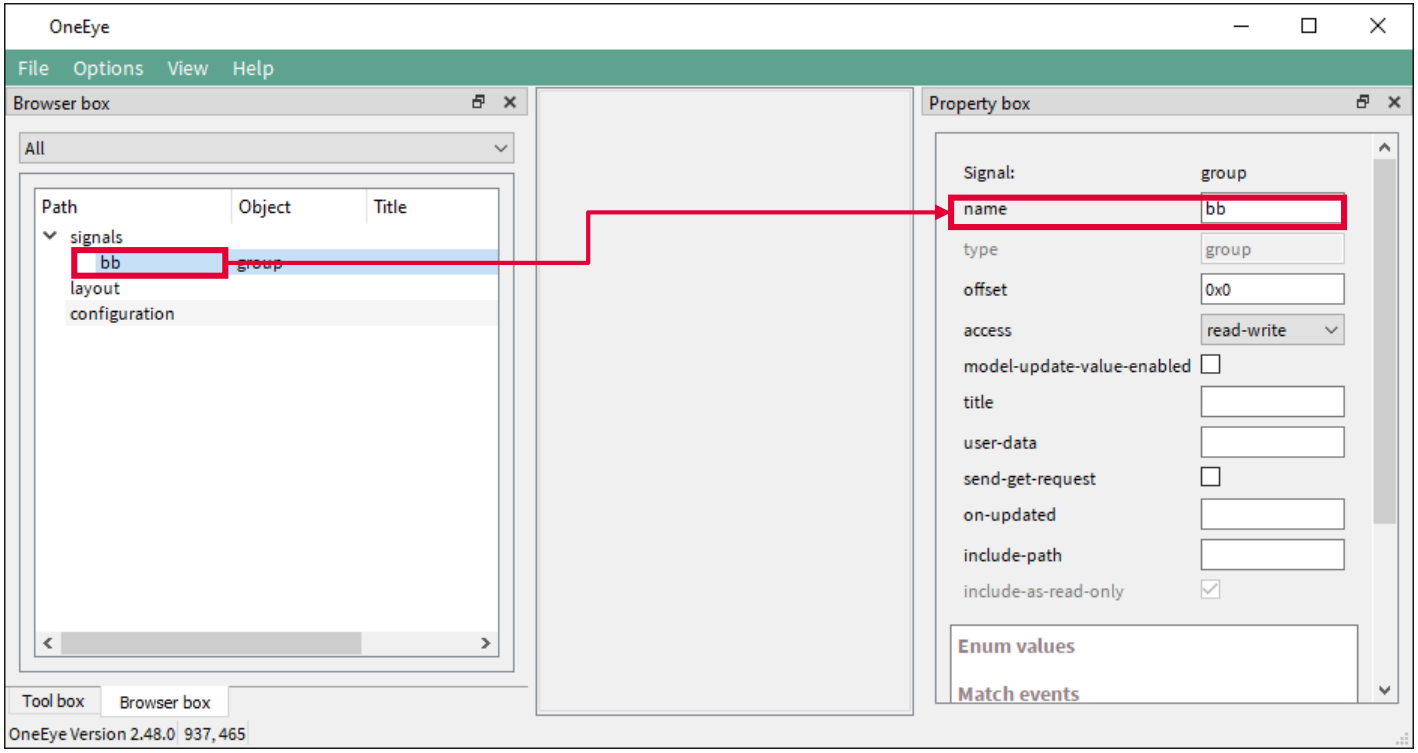


Implementation - OneEye

Configuring the UART interface: Signal creation

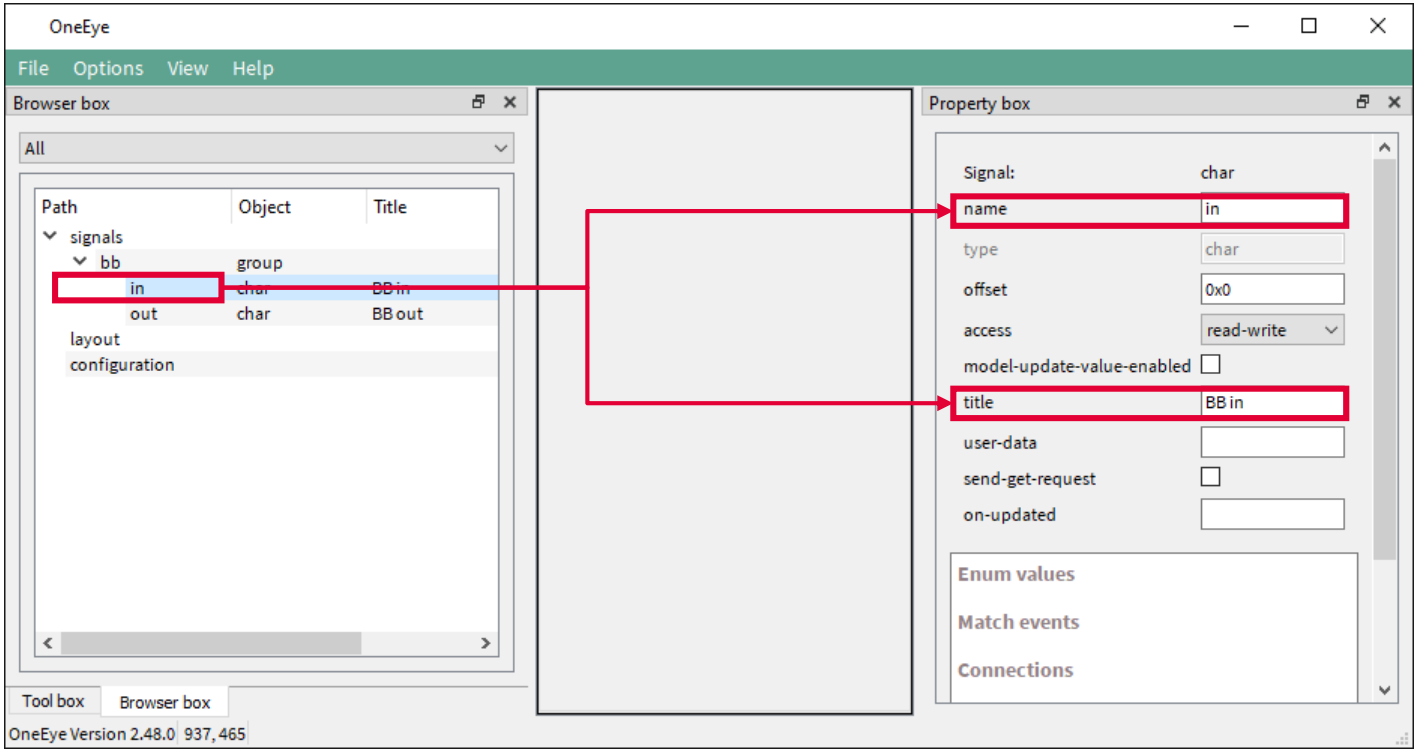
The first step is to create two signals to connect the received and transmit data over the UART.

Create a signal group and set its **name** property to **bb**.



Implementation - OneEye

Add two signals of type **char** into the **bb** group, name them **in** and **out**, and set their **title** property to respectively **BB in** and **BB out**.

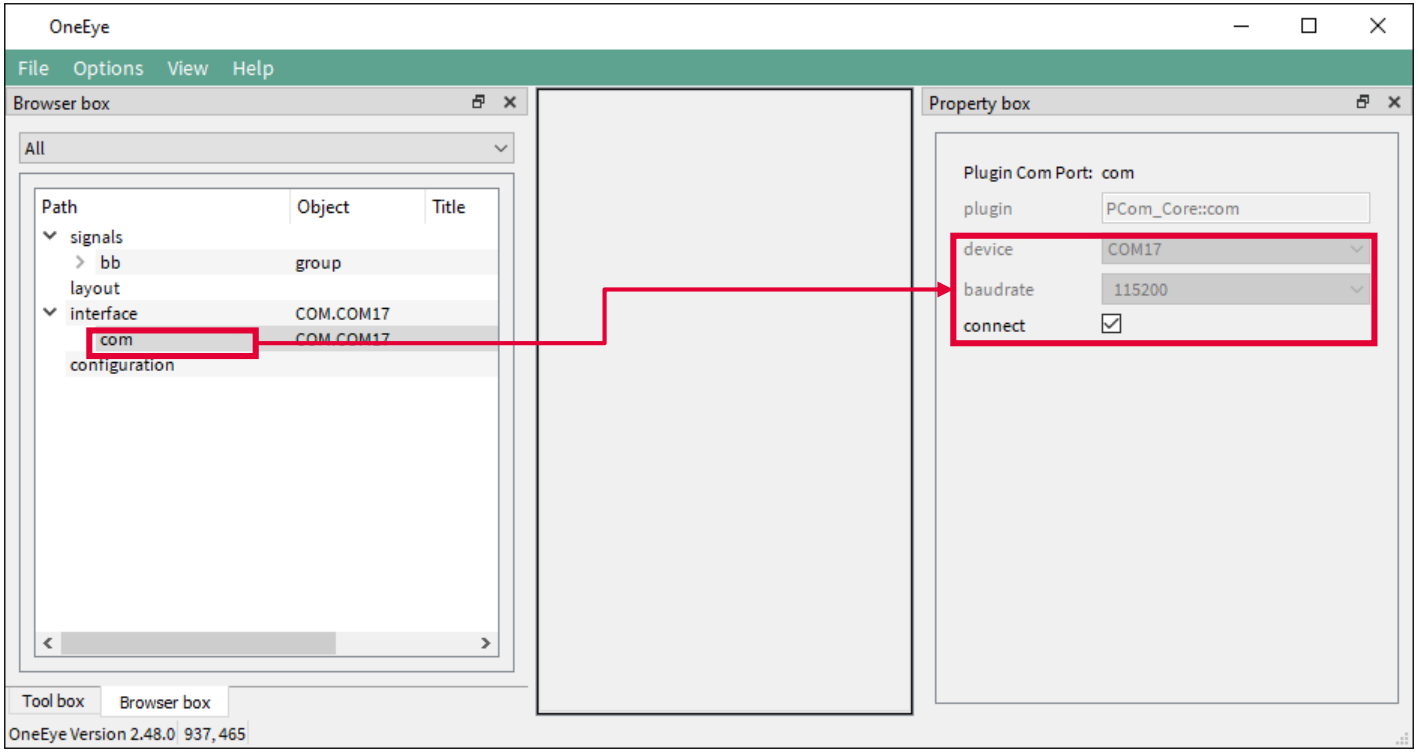


Implementation - OneEye

Configuring the UART interface: COM port

Right click in an empty area of the Browser box, and select **Add child -> Interface**. Then right click on the created interface and select **Add child -> com**. Select the **com** item and set its **device** property to the COM port connected to the AURIX board. Set the **baudrate** property to **115200** and click **connect**.

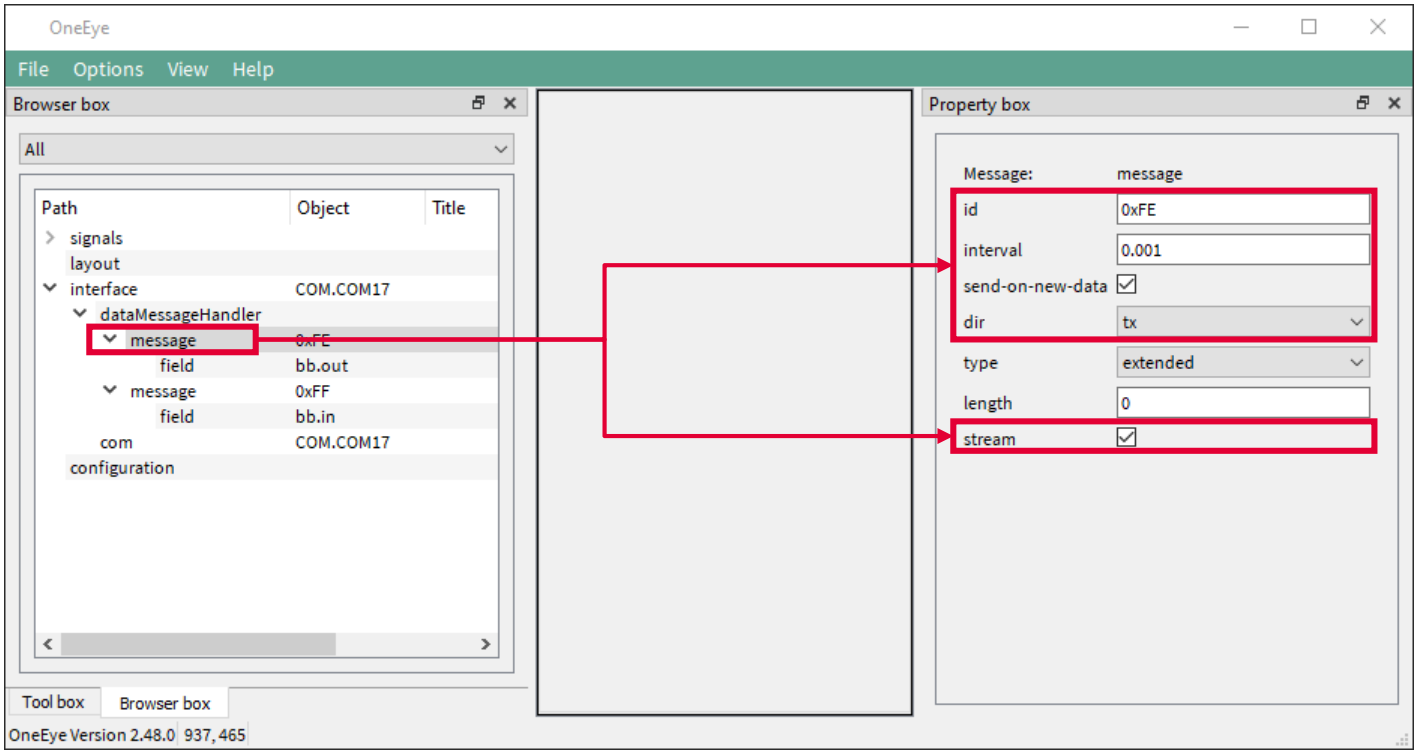
The COM port is now opened and ready for communication.



Implementation - OneEye

Configuring the UART interface: Transmit stream

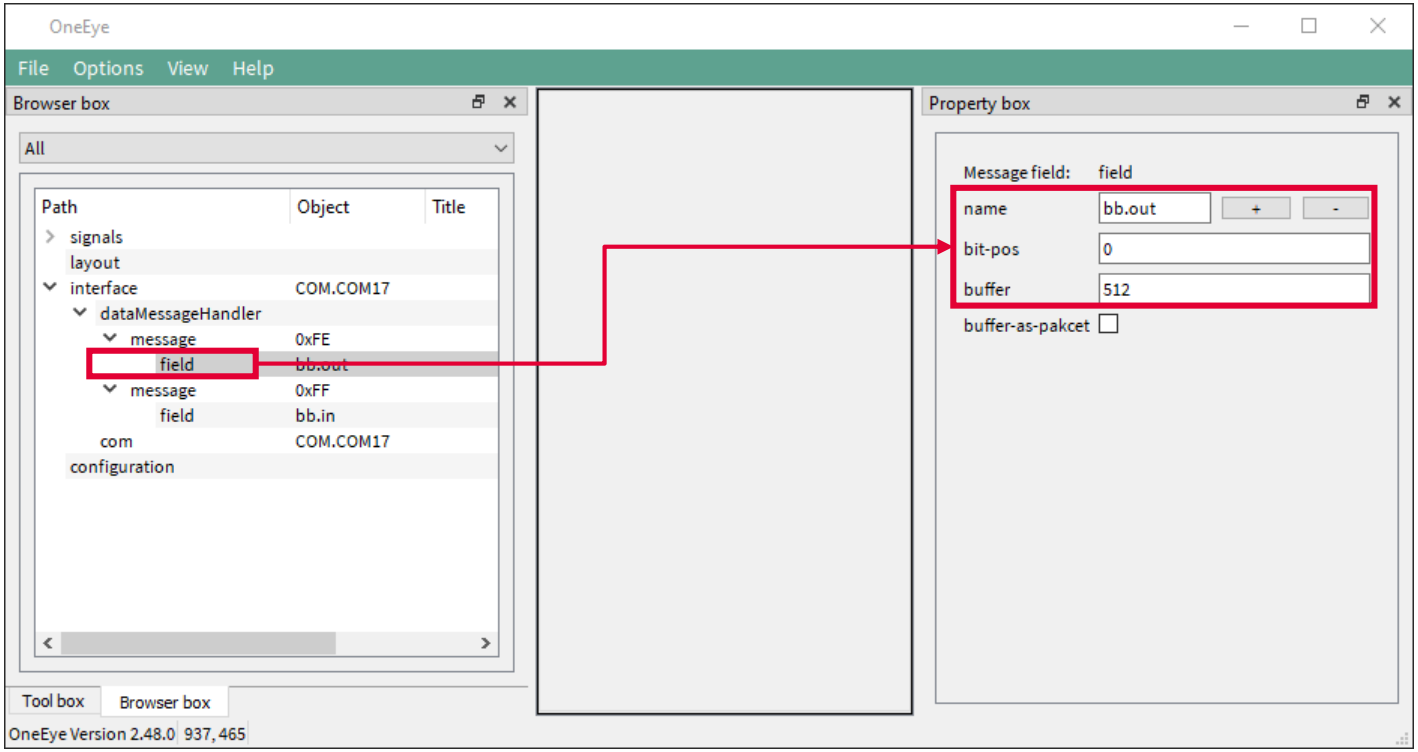
Right click on the **interface** in the Browser box, and select **Add child -> dataMessageHandler**. Then right click on the created **dataMessageHandler** and select **Add child -> message** to create a message item. Configure the **message** with the **id=0xFE**, **interval=0.001**, **send-on-new-data** checked, **dir=tx**, stream checked.



Implementation - OneEye

Right click on the **message**, and select **Add child -> field**.
Configure the field with **name=bb.out**, **bit-pos=0**, **buffer=512**.

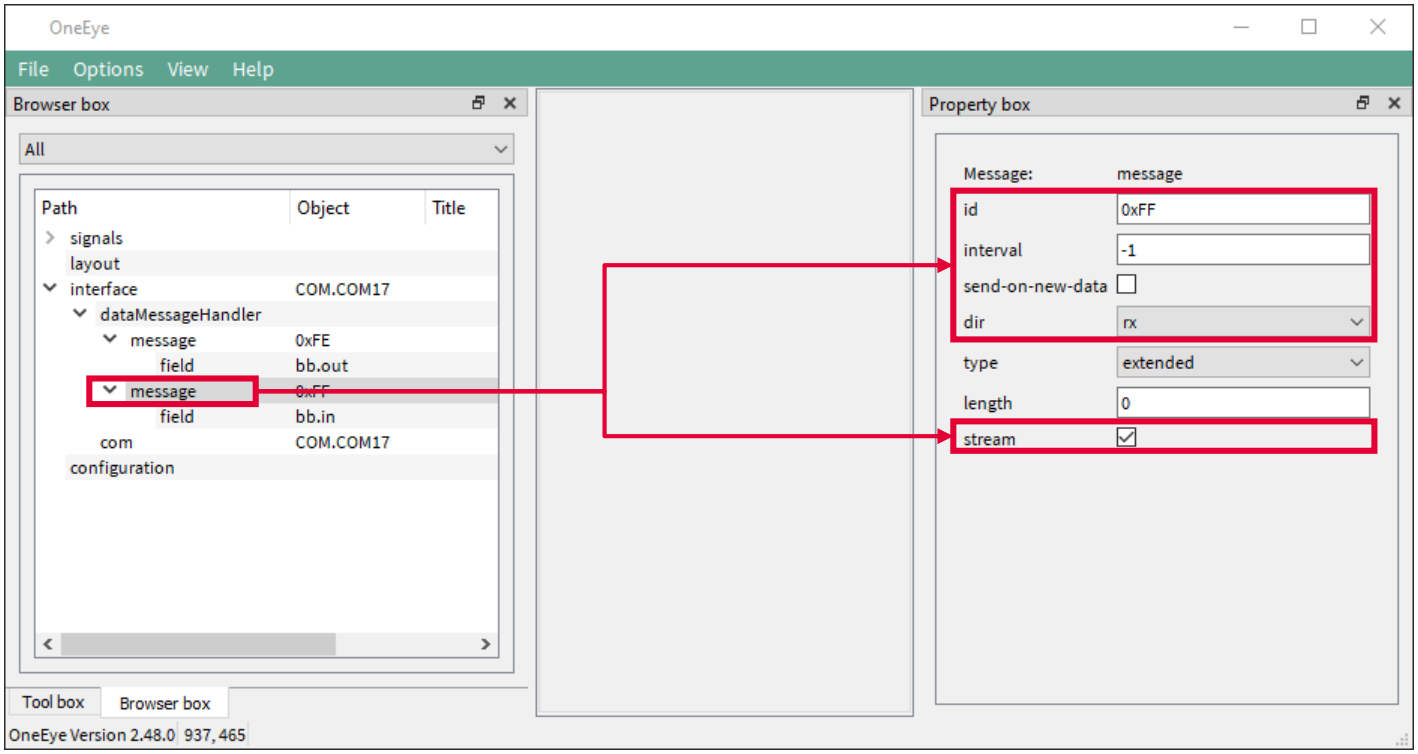
Now, data will be transmitted over the UART each time the **bb.out** signal is written with some data.



Implementation - OneEye

Configuring the UART interface: Receive stream

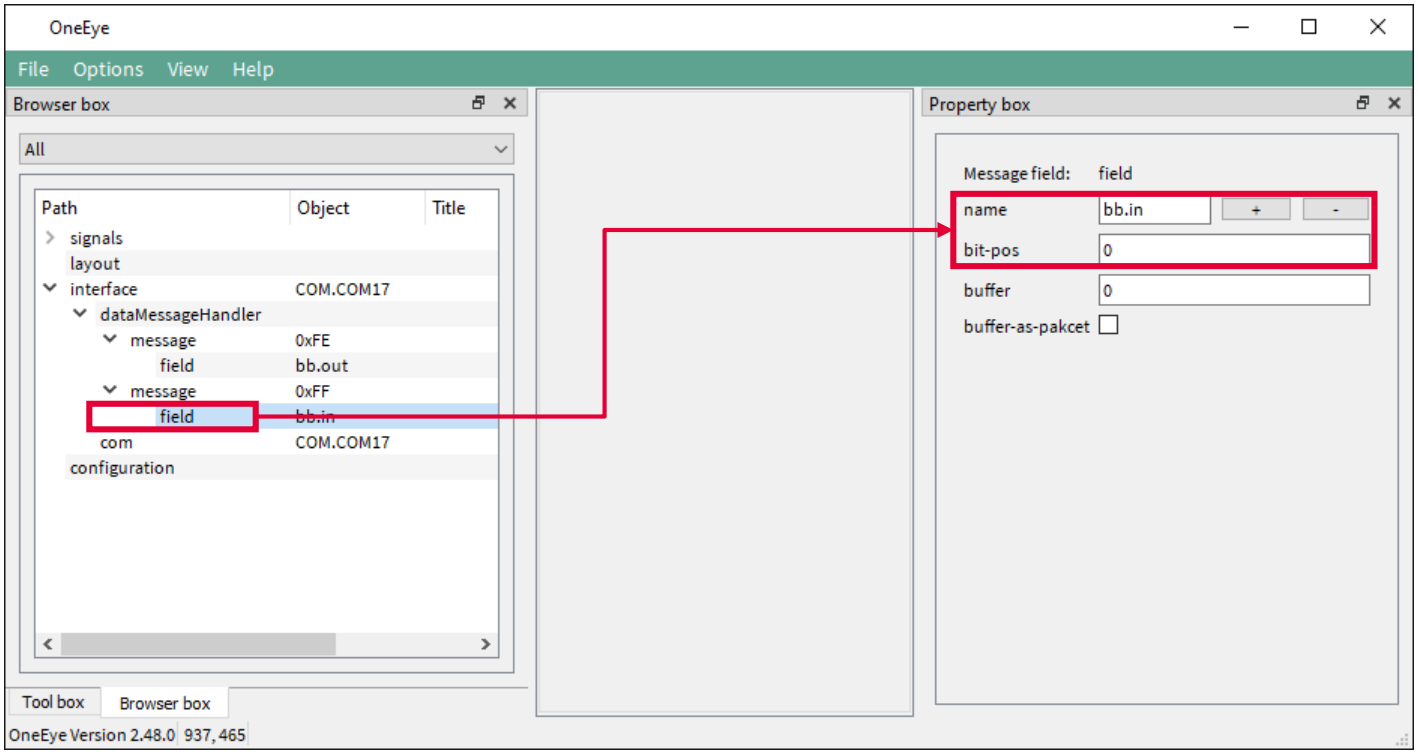
Right click on the **dataMessageHandler** and select **Add child -> message** to create a second message item. Configure the message with the **id=0xFF**, **interval=-1**, **dir=rx**, stream checked.



Implementation - OneEye

Right click on the **message**, and select **Add child -> field**.
Configure the field with **name=bb.in**, **bit-pos=0**.

Now each time data are received over the UART, the **bb.in** signal will be updated.

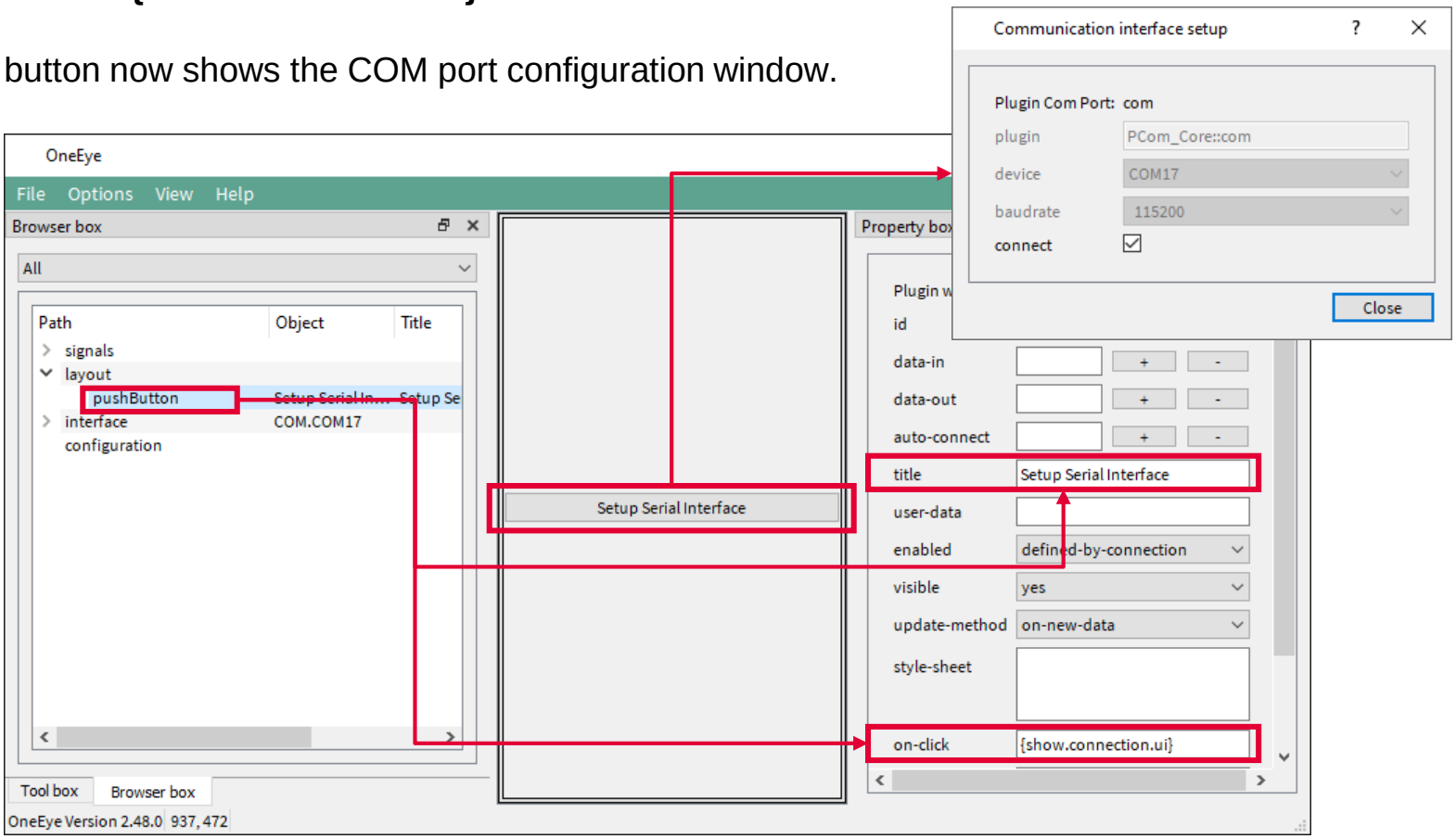


Implementation - OneEye

Configuring the UART interface: Push button

Drag and drop a **pushButton** widget from the toolbox onto the layout, configure it with **title=Setup Serial Interface**, **on-click={show.connection.ui}**.

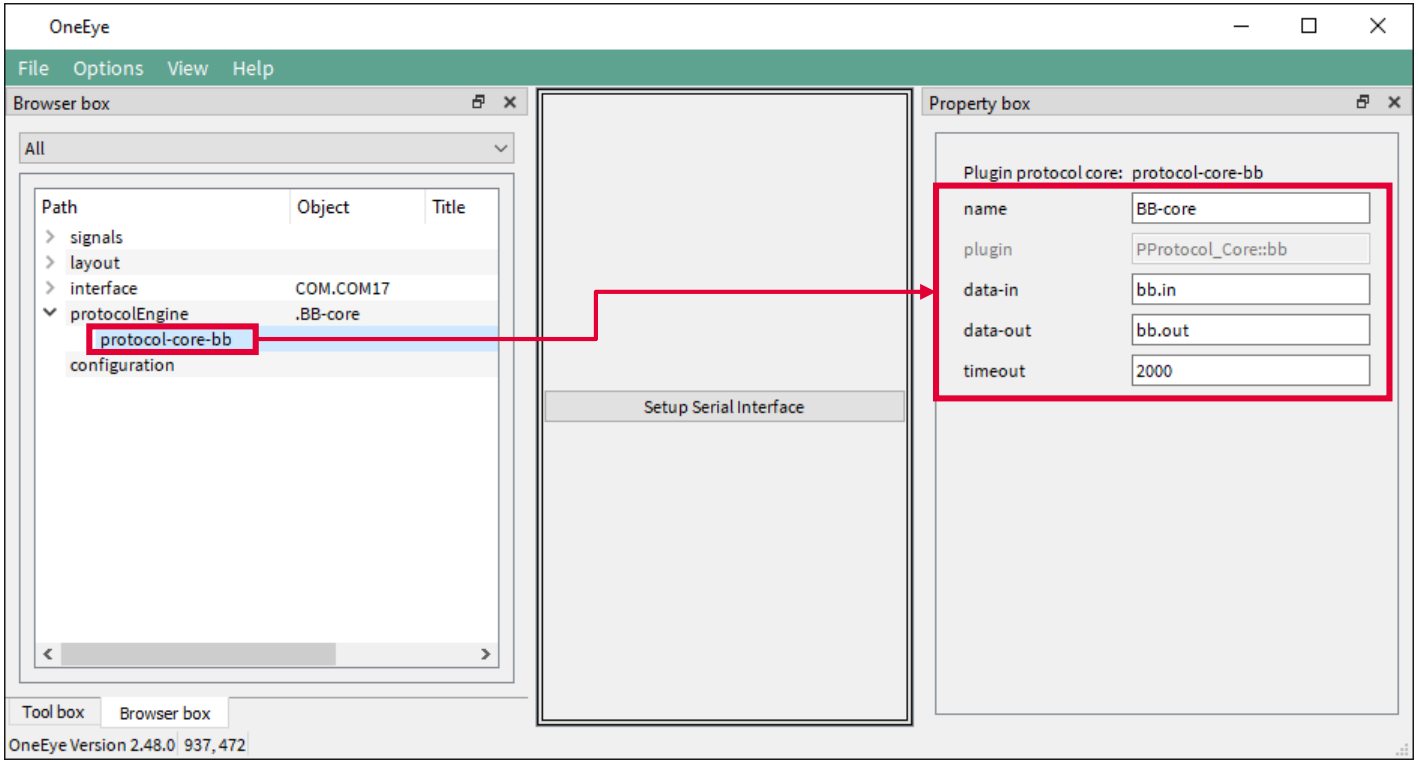
Clicking the button now shows the COM port configuration window.



Implementation - OneEye

Configuring the BB protocol

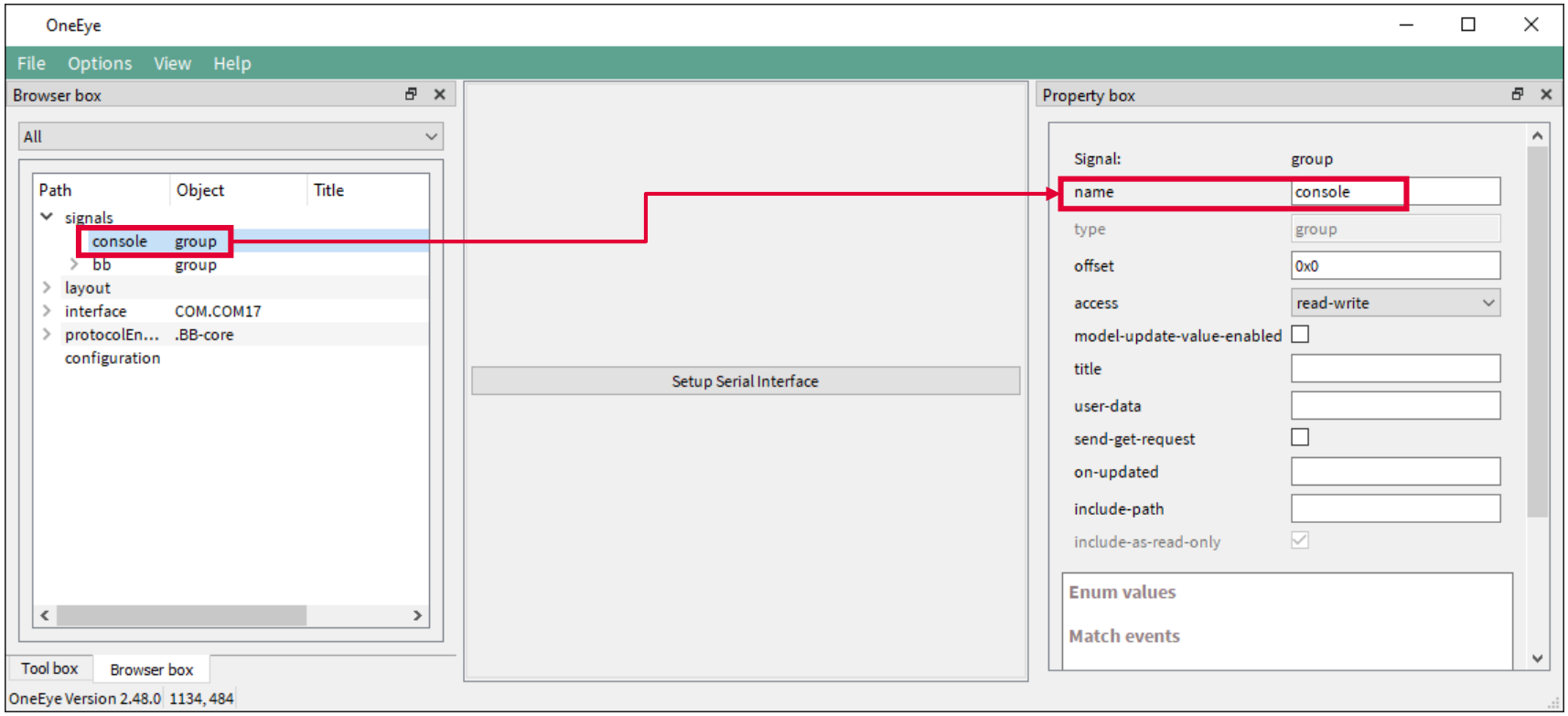
Right click in an empty area of the Browser box, and select **Add child -> protocolEngine**. Then right click on the created **protocolEngine** and select **Add child -> protocol-core-bb**. Connect the BB protocol stream to the **bb.in** and **bb.out** signals by setting respectively the **data-in** and **data-out** properties. Set the **name** property to **BB-core**. And set the **timeout** to **2000** ms so that frames are dropped after 2 seconds in case the microcontroller is not answering.



Implementation - OneEye

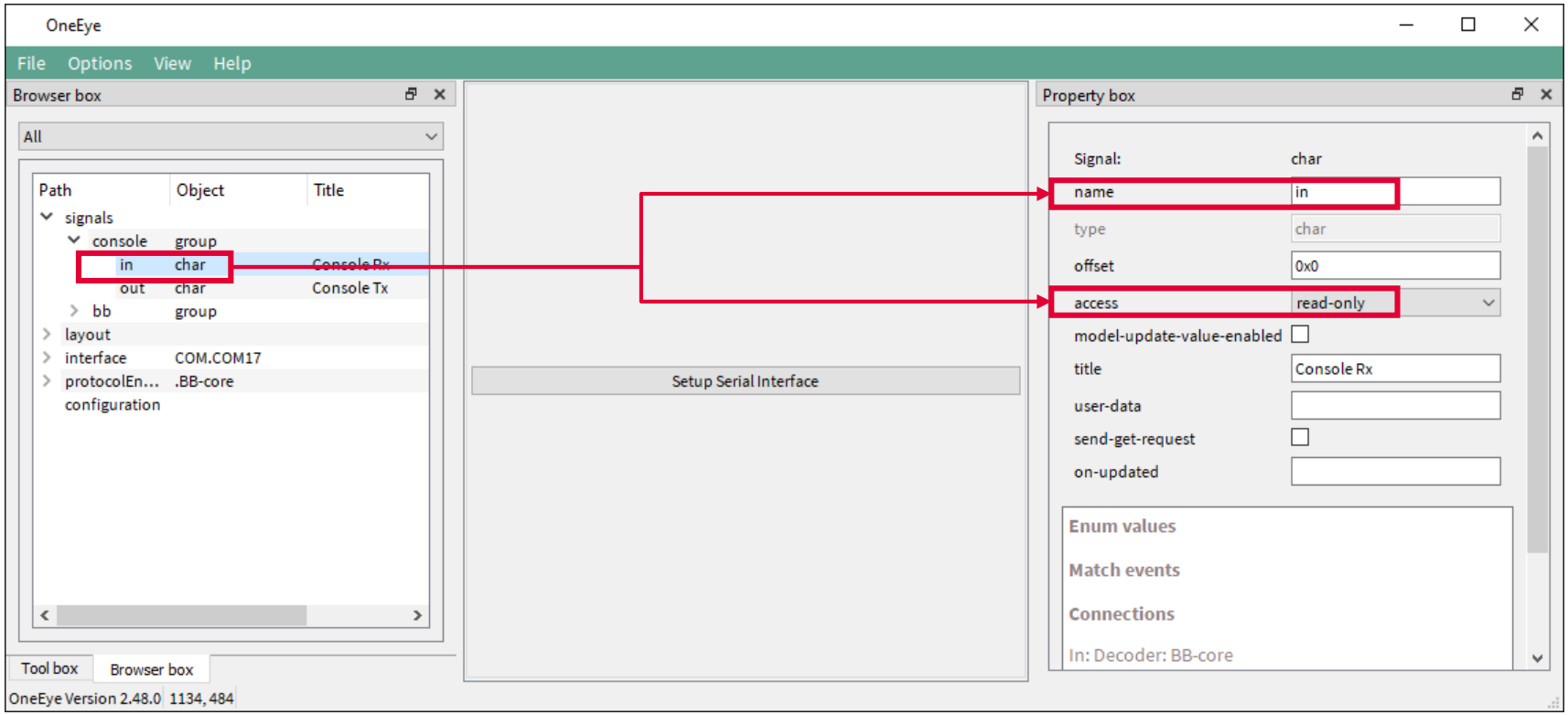
Configuring the Shell: signals creation

Create a signal group and set its **name** property to **console**.



Implementation - OneEye

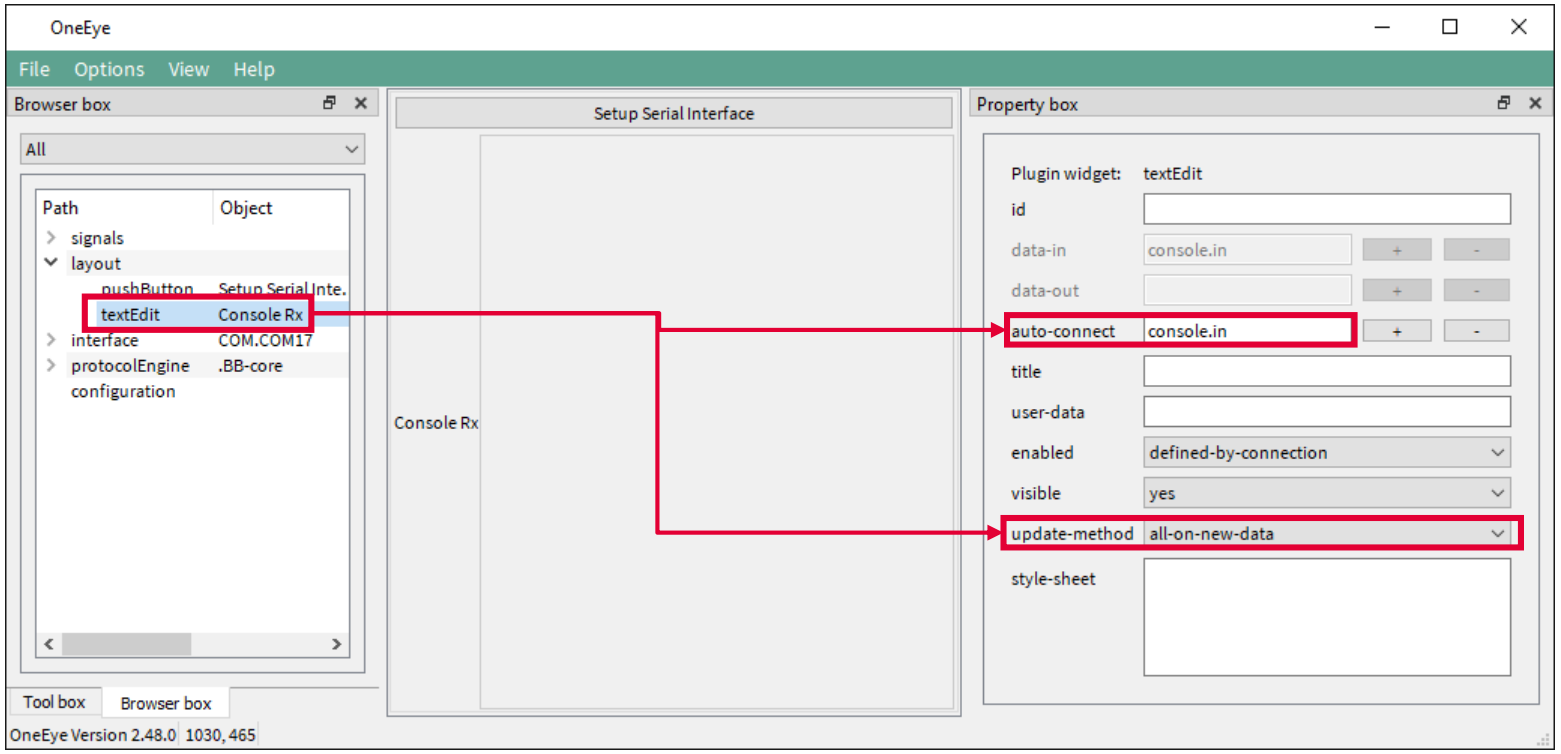
Add two signals of type **char** into the **console** group, name them **in** and **out**, and set their **title** property to respectively **Console Rx** and **Console Tx**. Set the **access** property of the **in** signal to **read-only** and the **access** property of the **out** signal to **write-only**.



Implementation - OneEye

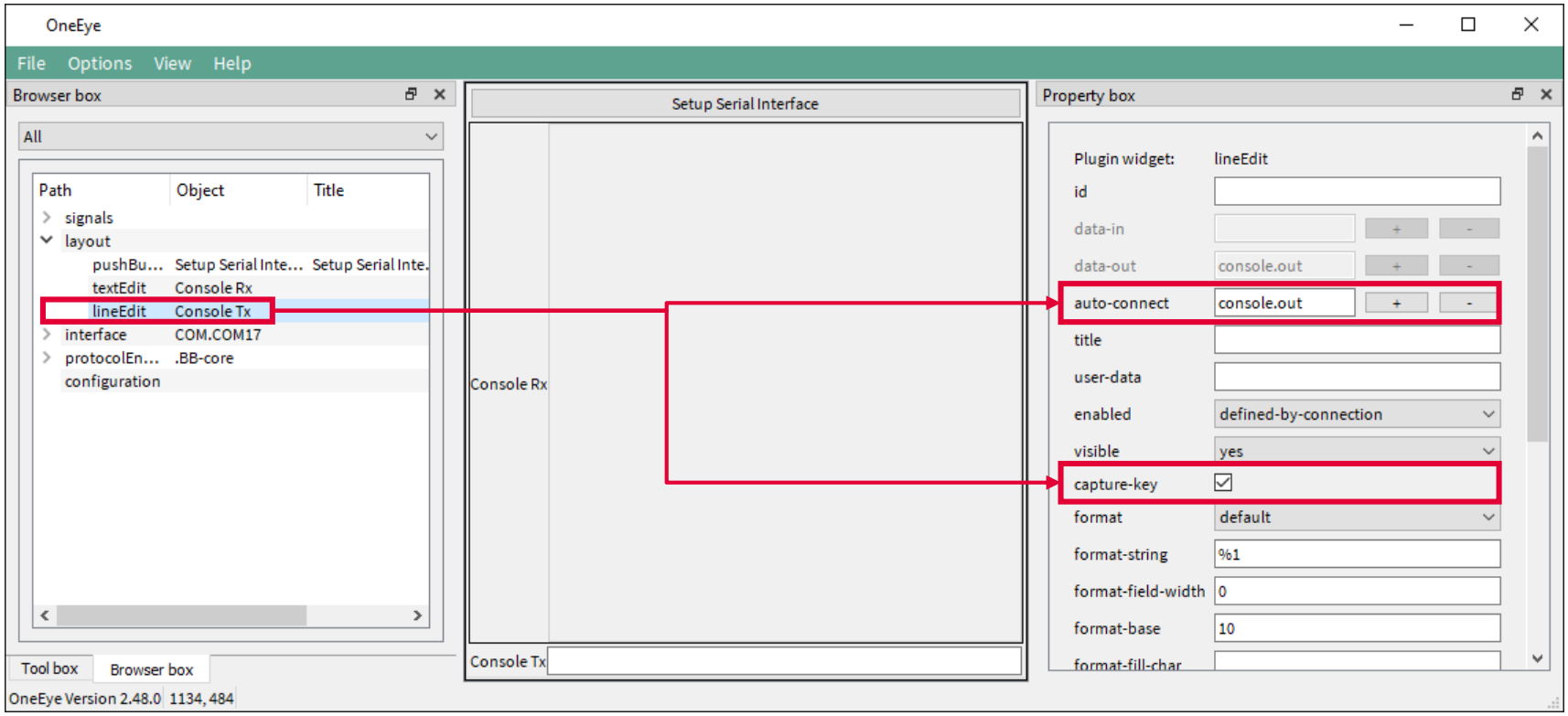
Create the Shell widgets

Drag and drop a **textEdit** widget from the toolbox onto the layout, set the **textEdit** properties **auto-connect** to **console.in**. Set the **update-method** to **all-on-new-data**.



Implementation - OneEye

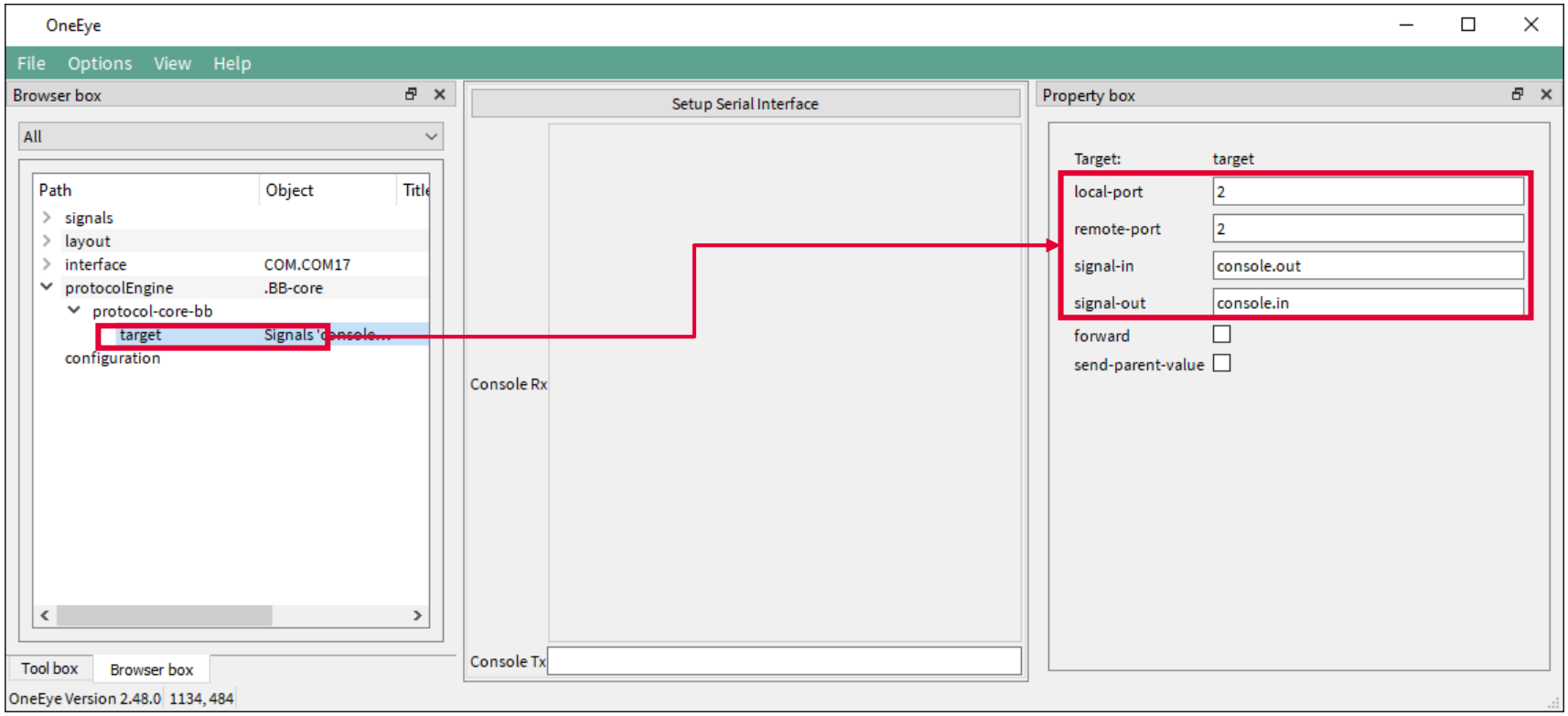
Drag and drop a **lineEdit** widget from the toolbox onto the layout, set the **lineEdit** properties **auto-connect** to **console.out**. **Check** the **capture-key** property to enable each key stroke to be send.



Implementation - OneEye

Connect the lineEdit and textEdit widget to the BB protocol

Right click on the **protocol-core-bb** and select **Add child -> target**. Select the **target** item and set **local-port** and **remote-port** to **2** to match the AURIX settings**, set signal-in=console.out, signal-out=console.in**.

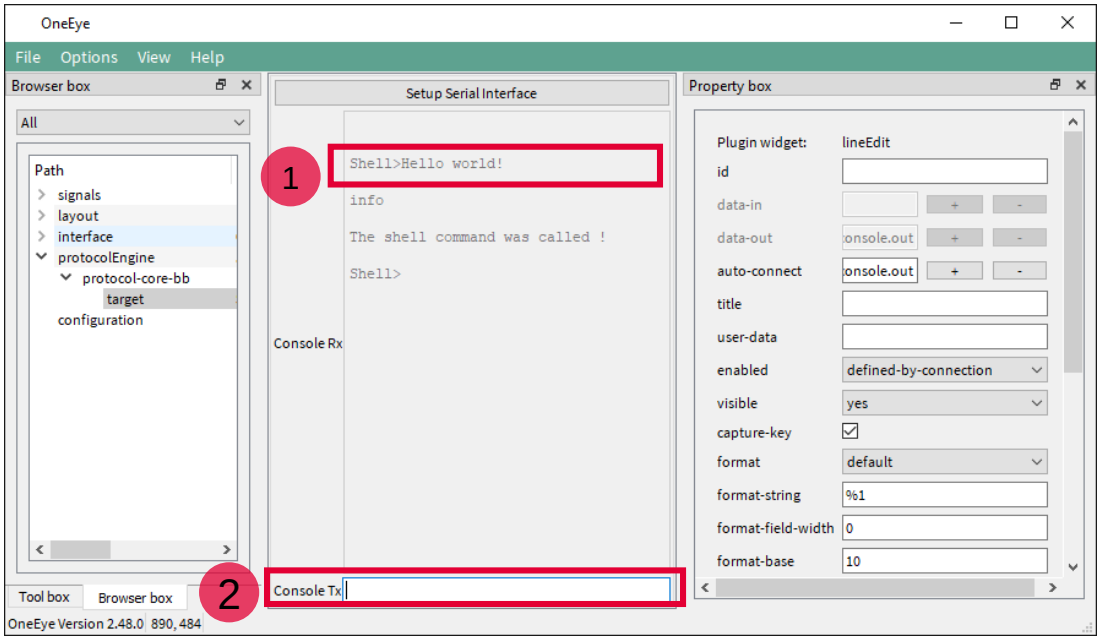


Implementation - OneEye

Test the shell interface

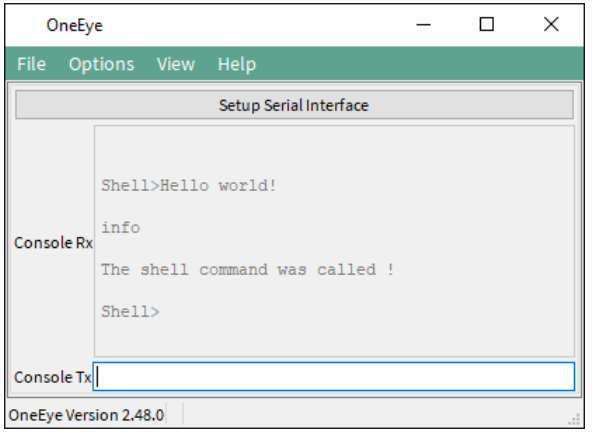
Restart the AURIX software. The shell textbox should display the “Hello World !” text 1.

Enter “info” in the ***Console Tx*** lineEdit field 2 and press ENTER, the microcontroller executes the ***printShellInfo()*** function and should answer as below to acknowledge the command.



Save your configuration with CTRL+S.

Exit the edit mode with the OneEye menu “**Options -> Edit mode**” to only see the GUI 3.



References

- AURIX™ Development Studio is available online:
- https://www.infineon.com/aurixdevelopmentstudio
- Use the *„Import...“* function to get access to more code examples.

- More code examples can be found on the GIT repository:
- https://github.com/Infineon/AURIX_code_examples

- For additional trainings, visit our webpage:
- https://www.infineon.com/aurix-expert-training

- For questions and support, use the AURIX™ Forum:
- https://www.infineonforums.com/forums/13-Aurix-Forum

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