

RoboWare Designer Manual

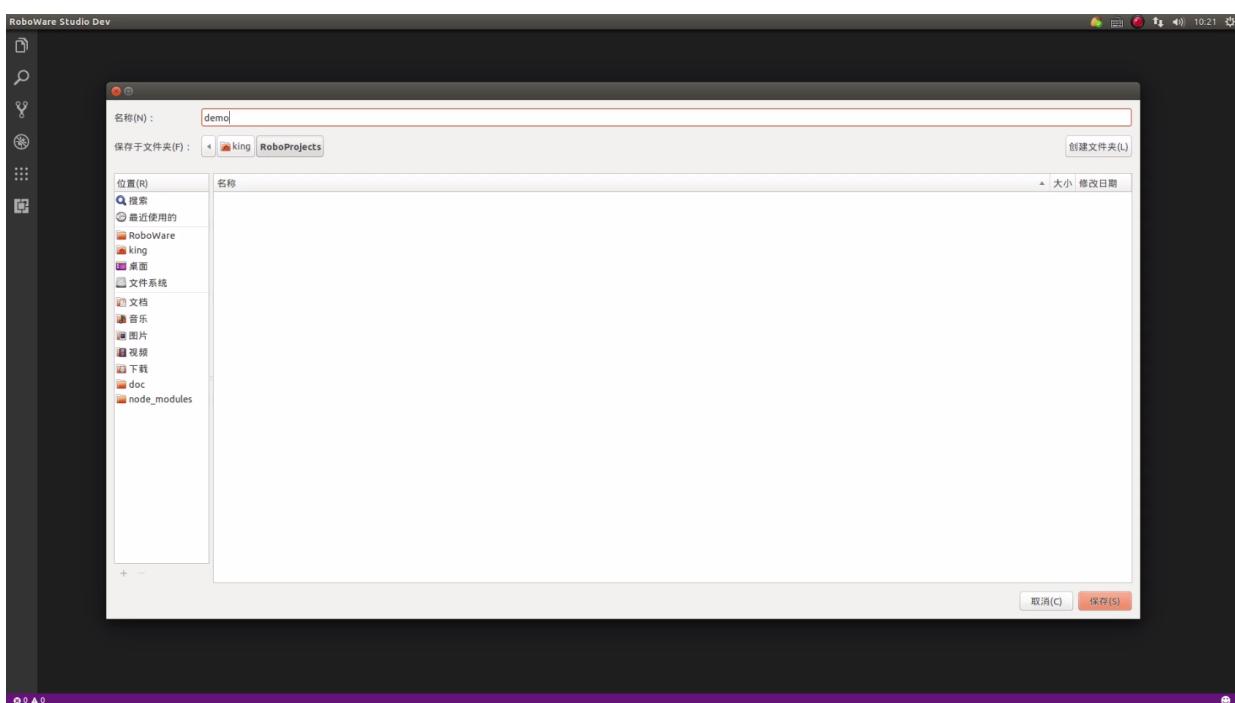
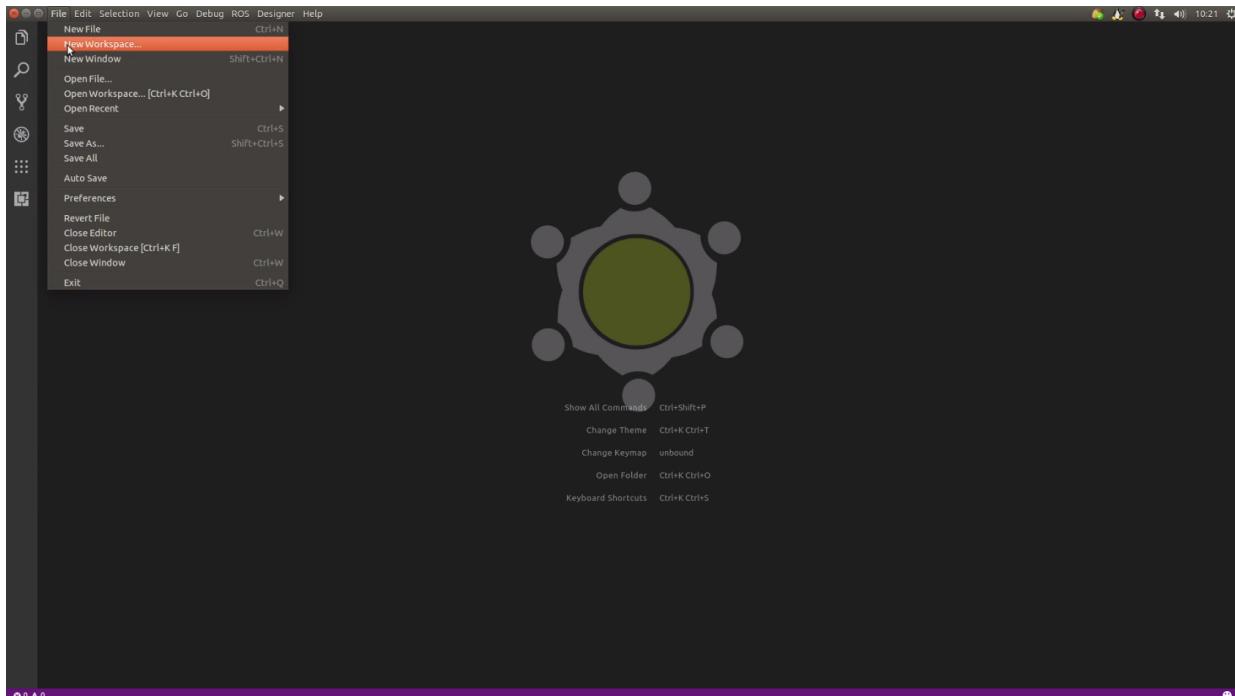
RoboWare Designer is a graphical development tool for ROS shipped with RoboWare Studio. All ROS-based hardware and software are represented as graphical elements in RoboWare Designer. Developers can drag, configre, edit and connect these elements and export them as a ROS workspace.

During the initial planning stage of development, RoboWare Designer can provide a graphical view of the whole ROS project, and prepare all the hardware and software resources for you. When you are done thinking, RoboWare Designer provides you with customized ROS resources.

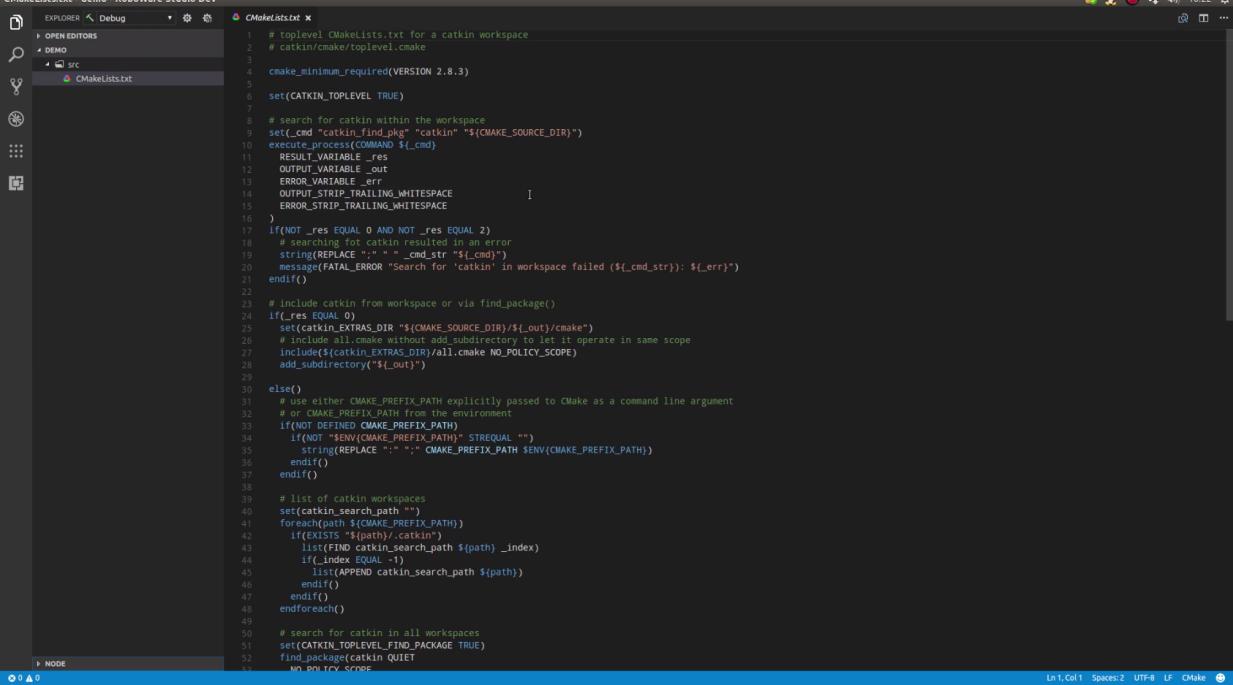
This section introduces the components of RoboWare Designer and its user guide.

1. Create a new workspace

Launch RoboWare Studio, select **File** → **New Workspace...** in the menu, enter your workspace's name to create a new workspace. In this case, we create a workspace named **demo**.



There is only a **src** folder with a **CMakeLists.txt** file in it in the new workspace, we call this type of workspace the **pure** type, which can be a target workspace to be exported to by RoboWare Designer. Next, we will use Designer to create packages for this workspace to set up the ROS infrastructure.



```

CMakeLists.txt - demo - RoboWare Studio Dev
EXPLORER Debug
OPEN EDITORS
DEMO
src
CMakeLists.txt

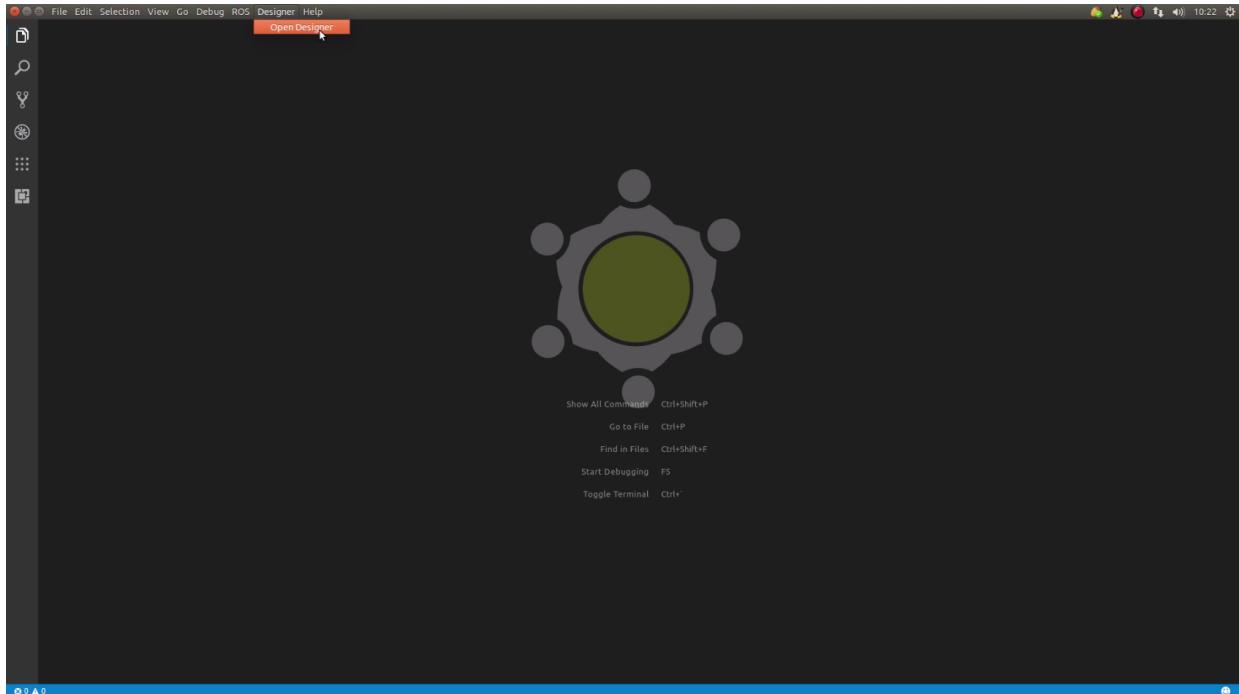
1 # toplevel CMakeLists.txt for a catkin workspace
2 # catkin/cmake/toplevel.cmake
3
4 cmake_minimum_required(VERSION 2.8.3)
5
6 set(CATKIN_TOPLEVEL TRUE)
7
8 # search for catkin within the workspace
9 set(_cmd "catkin_find_pkg" "catkin" "${CMAKE_SOURCE_DIR}")
10 execute_process(COMMAND ${_cmd}
11     RESULT_VARIABLE _res
12     OUTPUT_VARIABLE _out
13     ERROR_VARIABLE _err
14     OUTPUT_STRIP_TRAILING_WHITESPACE
15     ERROR_STRIP_TRAILING_WHITESPACE
16 )
17 if(NOT _res EQUAL 0 AND NOT _res EQUAL 2)
18     # searching for catkin resulted in an error
19     string(REPLACE "=" ";" _cmd_str "${_cmd}")
20     message(FATAL_ERROR "Search for 'catkin' in workspace failed ($_cmd_str): ${_err}")
21 endif()
22
23 # include catkin from workspace or via find_package()
24 if(_res EQUAL 0)
25     set(catkin_EXTRAS_DIR "${CMAKE_SOURCE_DIR}/$(_out)/cmake")
26     # include all_cmake without add_subdirectory to let it operate in same scope
27     include(${catkin_EXTRAS_DIR}/all_cmake NO_POLICY_SCOPE)
28     add_subdirectory("${_out}")
29
30 else()
31     # use either CMAKE_PREFIX_PATH explicitly passed to CMake as a command line argument
32     # or CMAKE_PREFIX_PATH from the environment
33     if(NOT DEFINED CMAKE_PREFIX_PATH)
34         if(NOT "$ENV{CMAKE_PREFIX_PATH}" STREQUAL "")
35             string(REPLACE "=" ";" CMAKE_PREFIX_PATH $ENV{CMAKE_PREFIX_PATH})
36         endif()
37     endif()
38
39 # list of catkin workspaces
40 set(catkin_search_path "")
41 foreach(path IN LISTS CMAKE_PREFIX_PATH)
42     if(path MATCHES "/catkin")
43         list(FIND catkin_search_path ${path} _index)
44         if(_index EQUAL -1)
45             list(APPEND catkin_search_path ${path})
46         endif()
47     endif()
48 endforeach()
49
50 # search for catkin in all workspaces
51 set(CATKIN_TOPLEVEL_FIND_PACKAGE TRUE)
52 find_package(catkin QUIET
53     NO_POLICY_SCOPE

```

Ln:1 Col:1 Spaces:2 UTF-8 LF CMake

2. Launch RoboWare Designer

Select **Designer** → **Open Designer** in the menu to launch RoboWare Designer:



Designer is composed of 4 components:

- **Toolbox**

Toolbox is in the left, there are different kinds of components here.

- **Canvas**

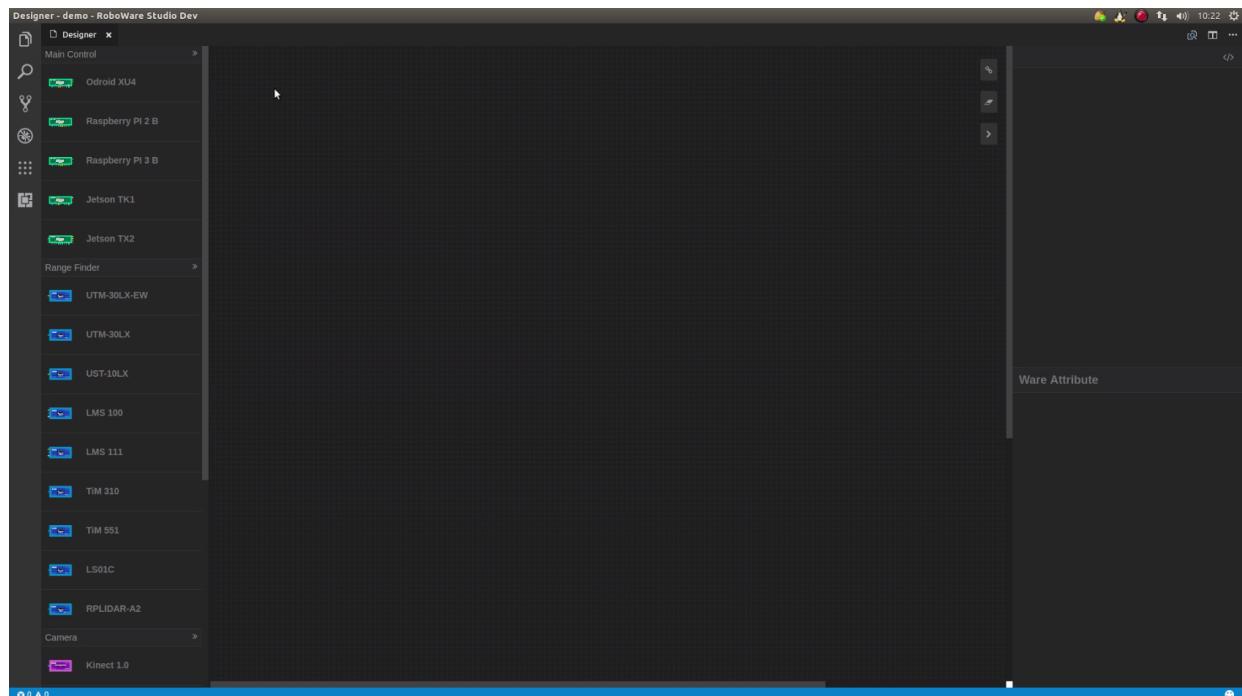
Canvas is in the middle, you can put components here, and connect the ports between two components, delete lines, delete components and view component information.

- **Register**

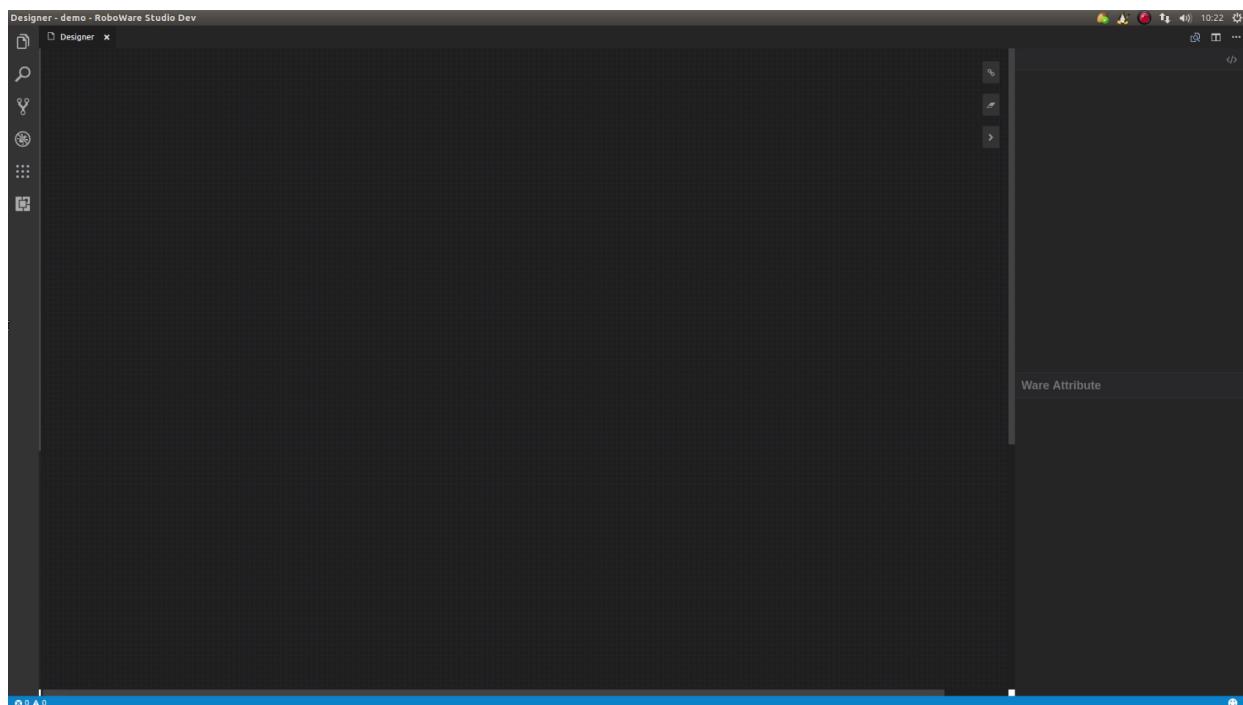
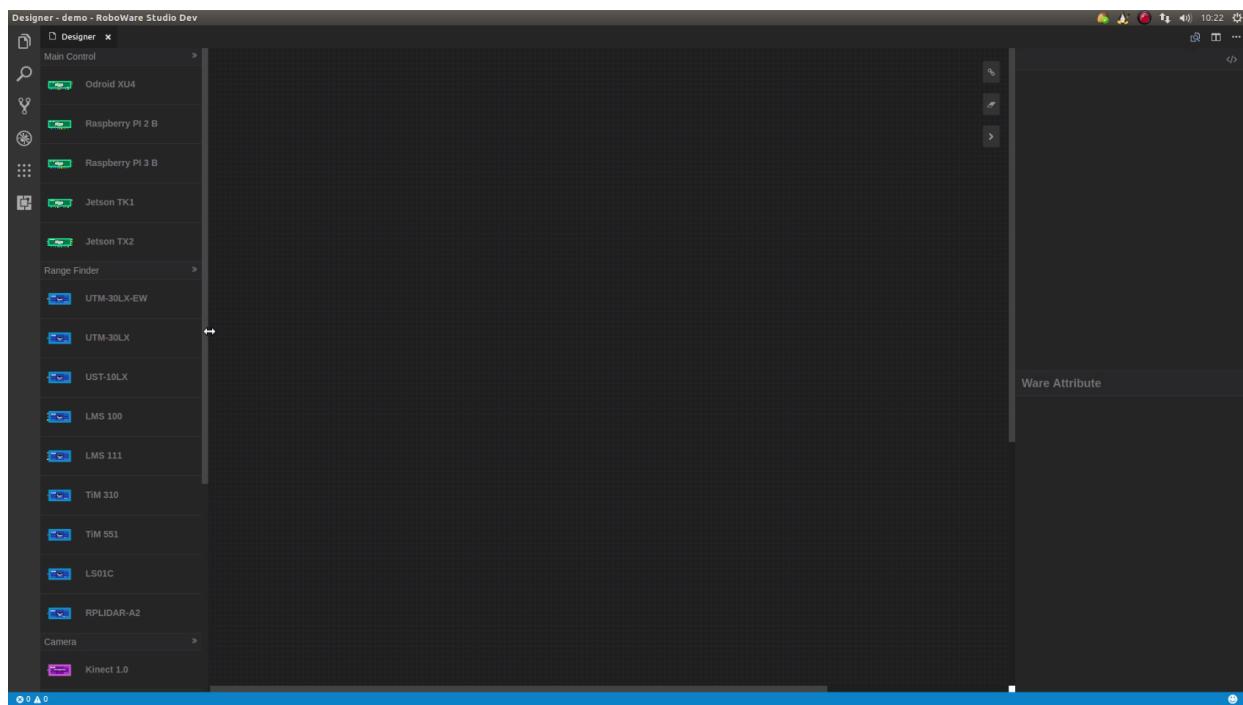
Register is in the top right corner, it indexes all the components in **Canvas** for ease of viewing.

- **Property**

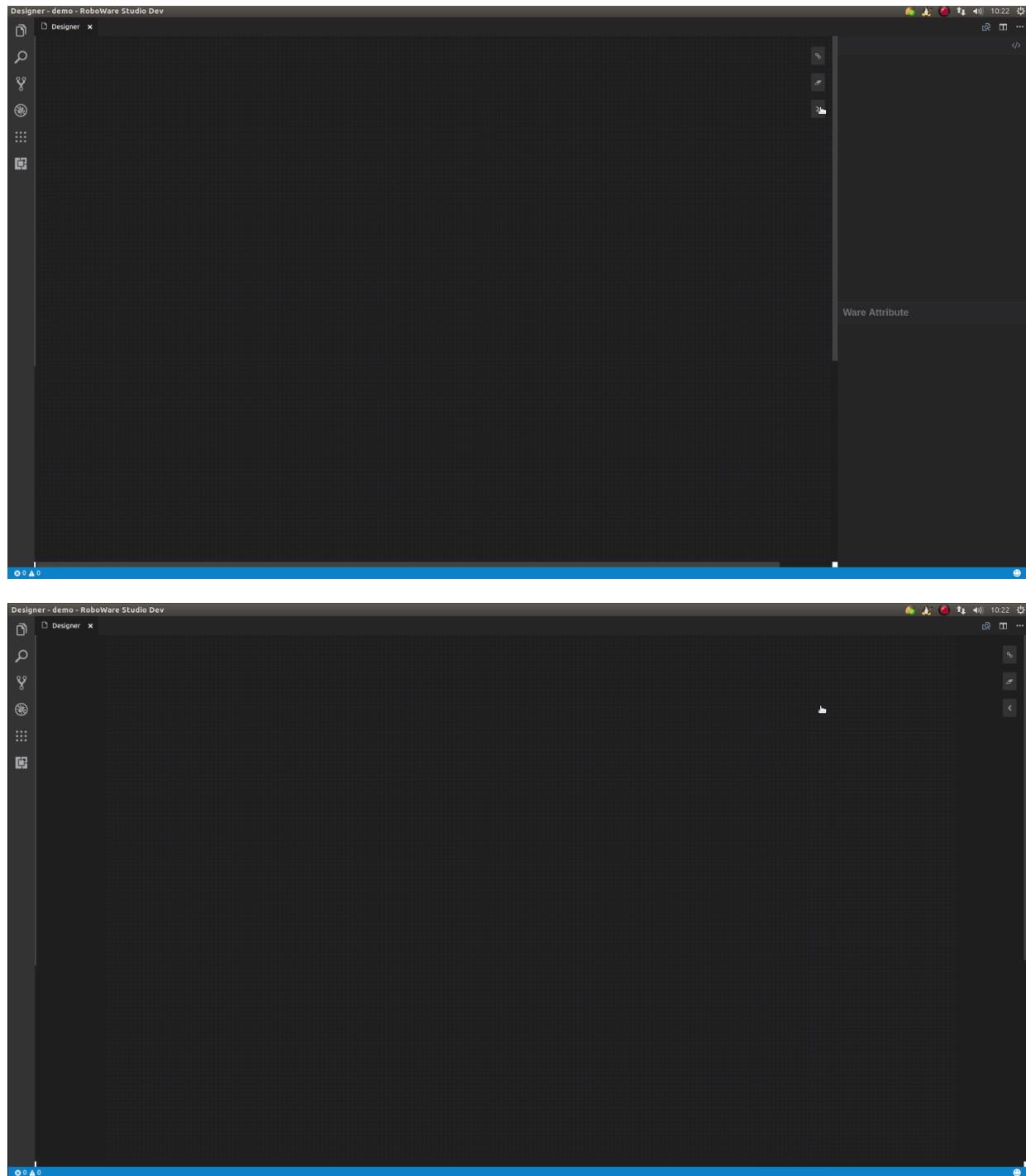
Property is in the bottom right corner, you can view information of all the components in **Canvas**.



Toolbox could shrink to the left to leave larger space for **Canvas**.

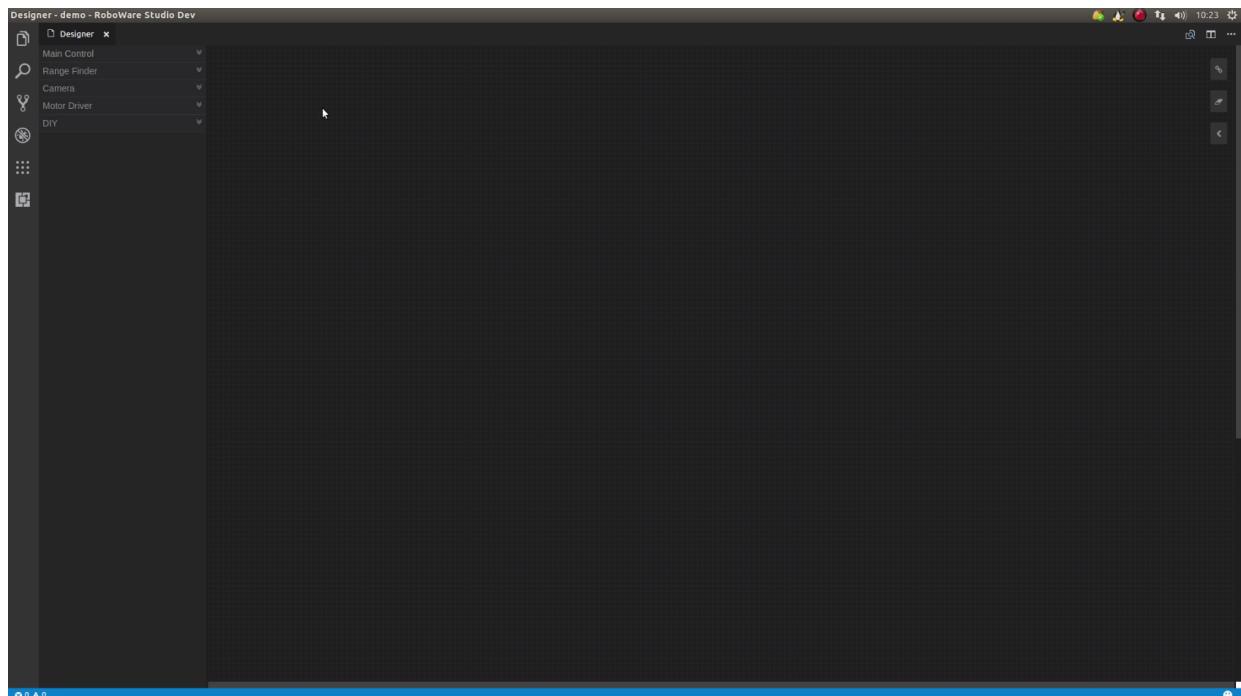
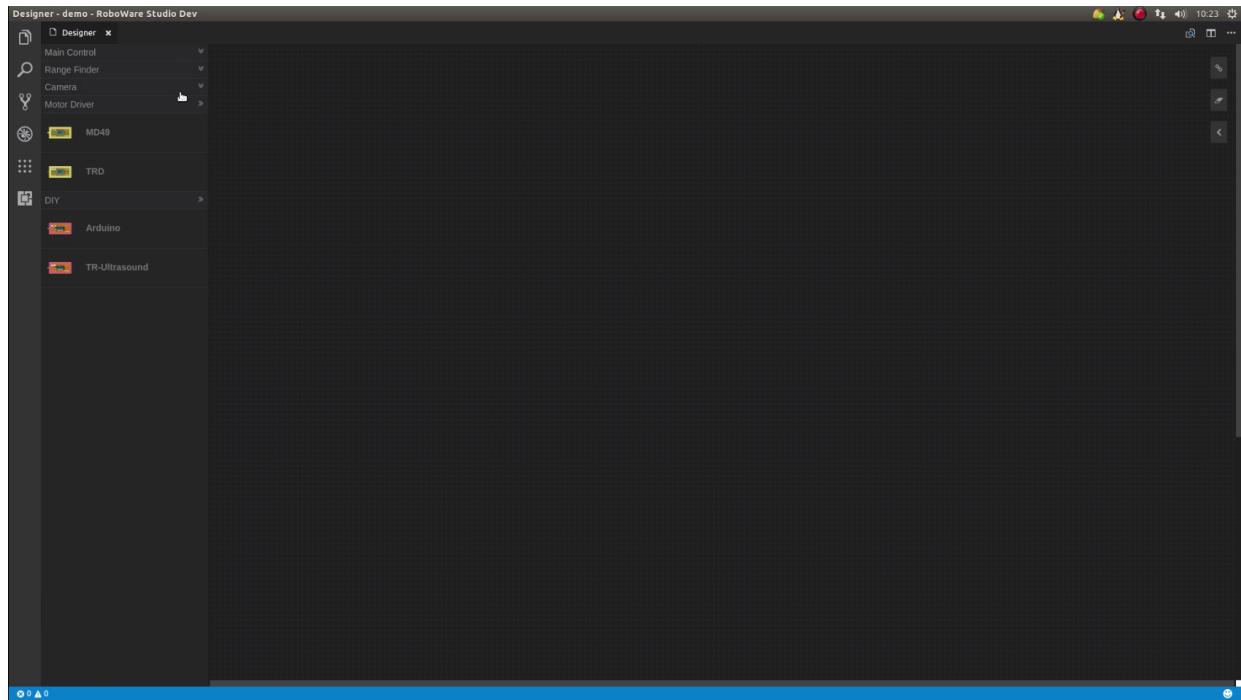


There are 3 buttons in top right corner on **Canvas**, you can shrink **Register** and **Property** to the right by clicking the 3rd button button to leave larger space for **Canvas**.



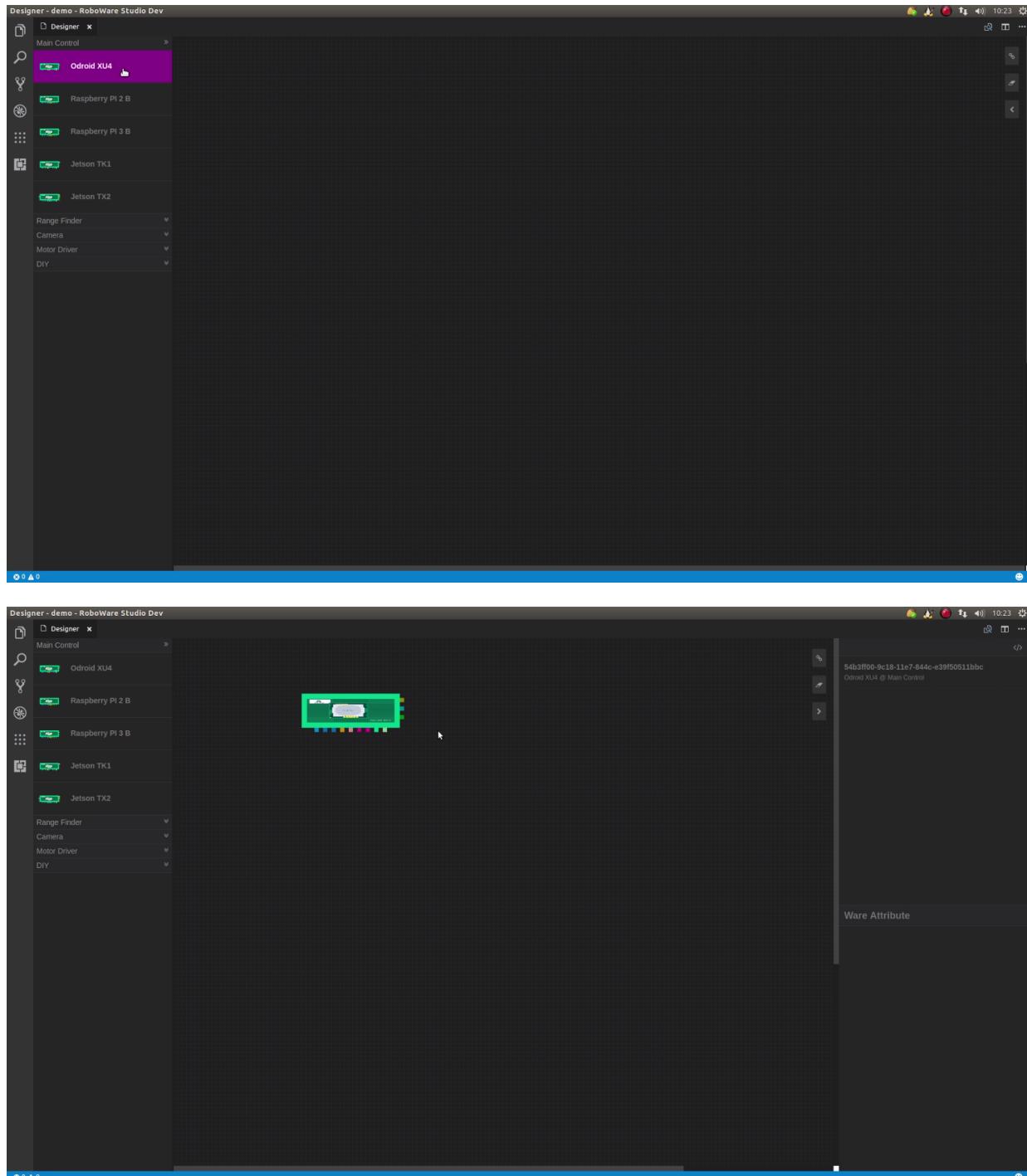
There are 4 kinds of components currently in **Toolbox**: **Main Control**, **Range Finder**, **Camera** and **DIY**.

Each section of these components can be folded for ease of viewing:

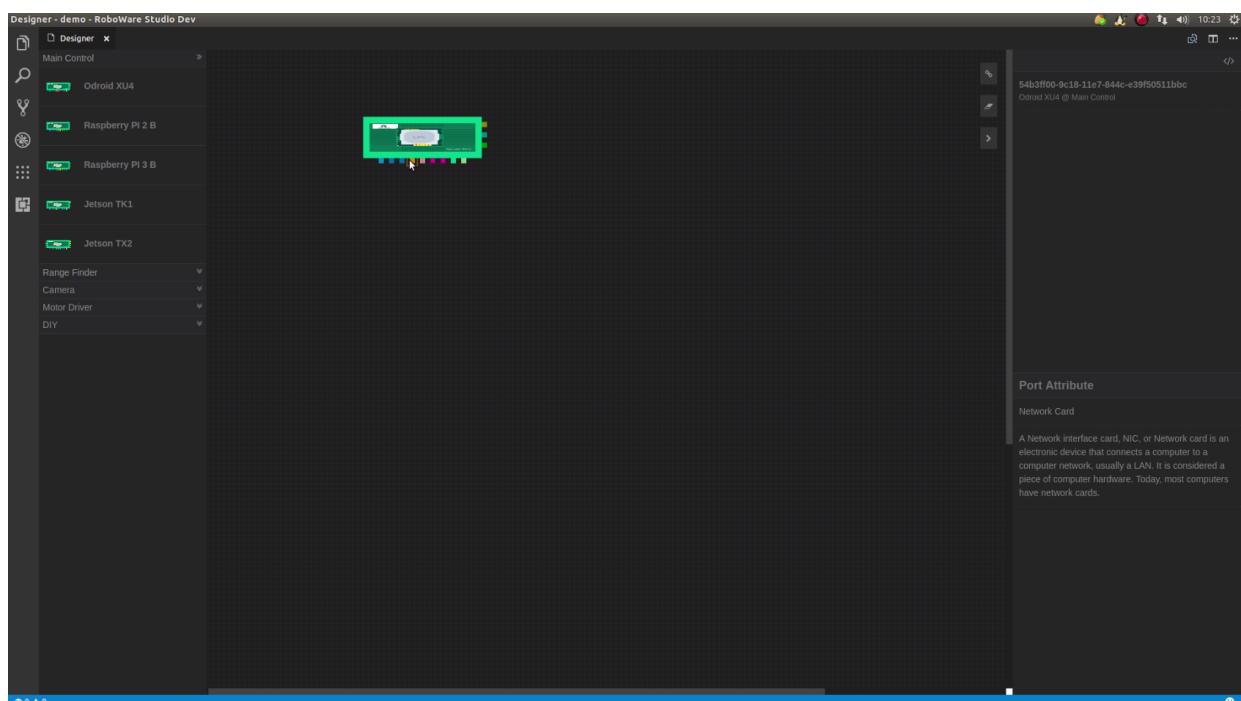
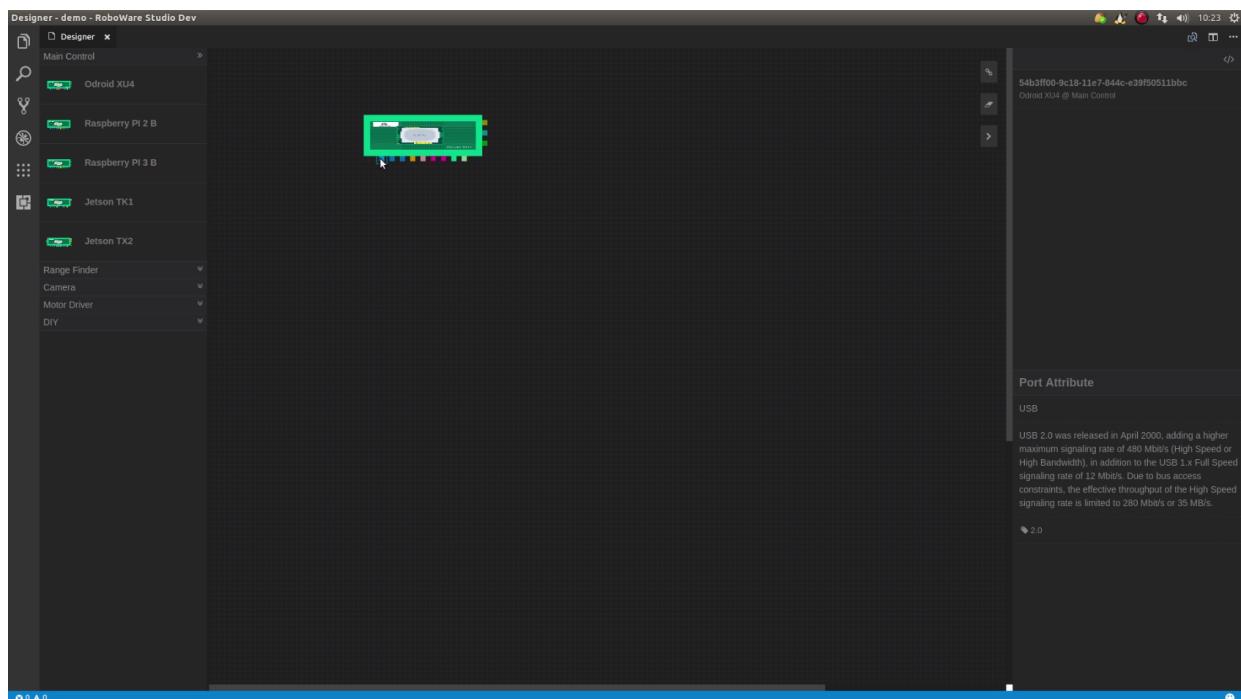


3. Create component and view the property

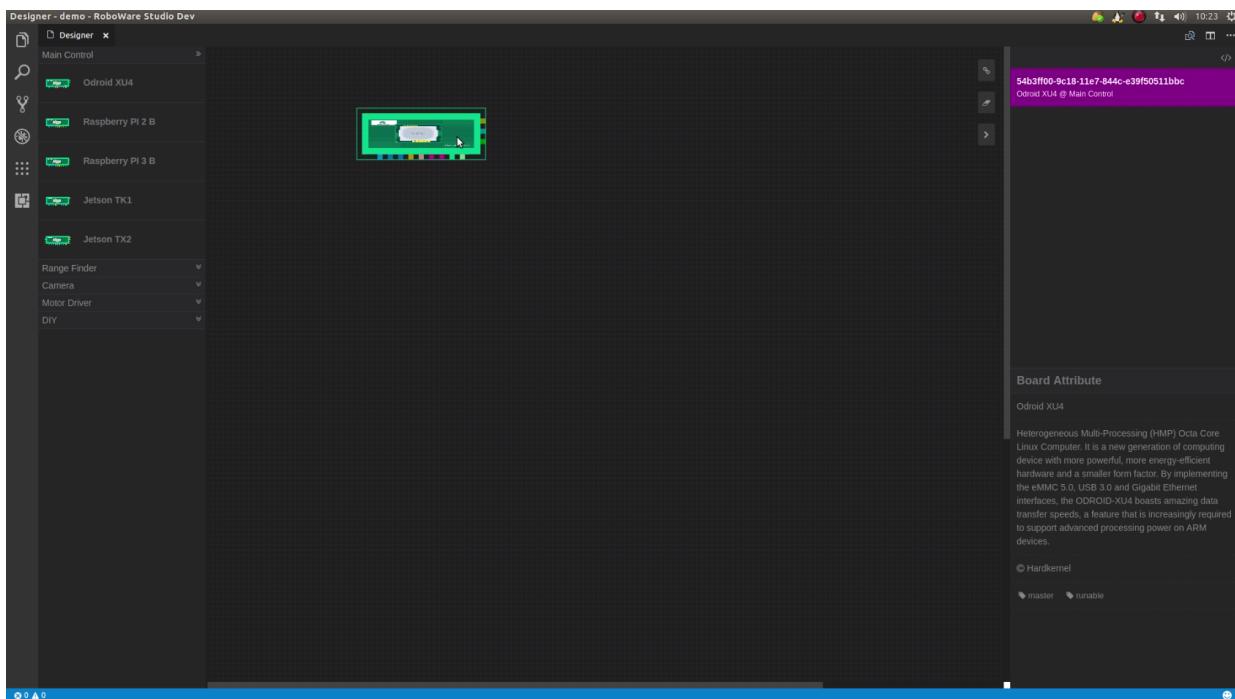
Click the component in **Toolbox**, then click on **Canvas**, this component will be added to **Canvas**, it will also be registered to **Register**.



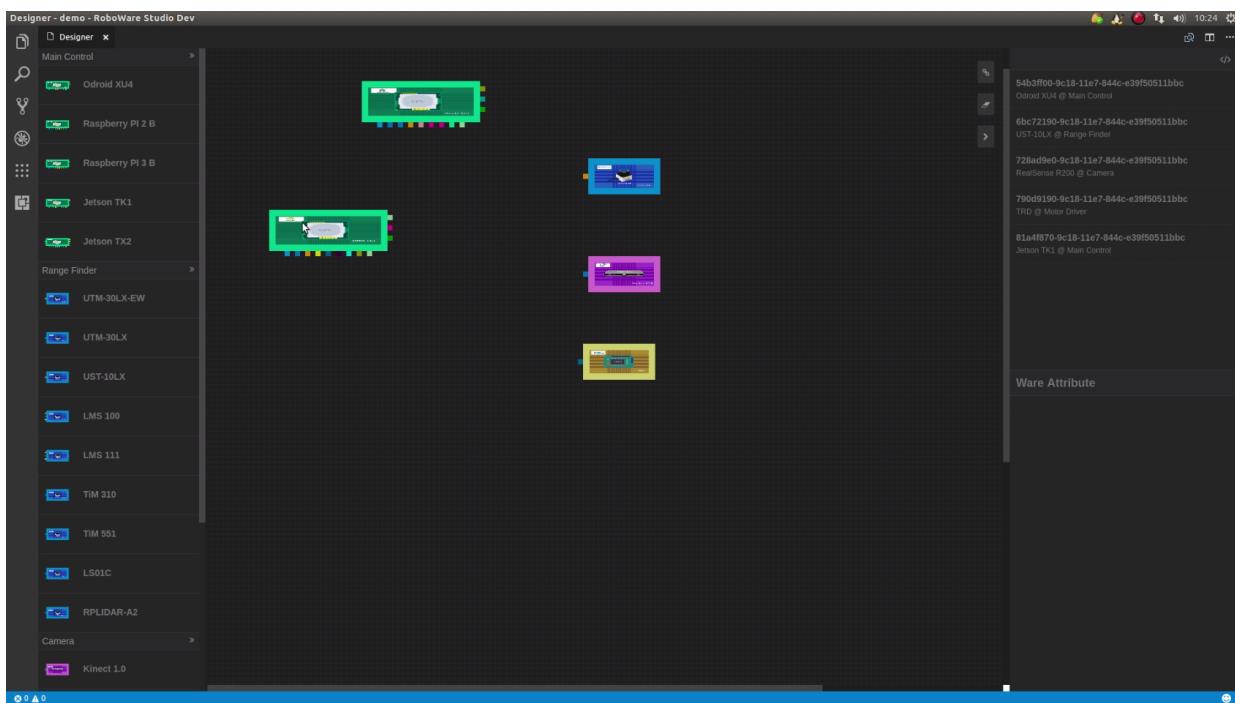
By clicking the component or the ports on it, you can view their properties in **Property**.



There are 5 properties of component: Name, Description, Manufacturer, ROS Package and Tag:

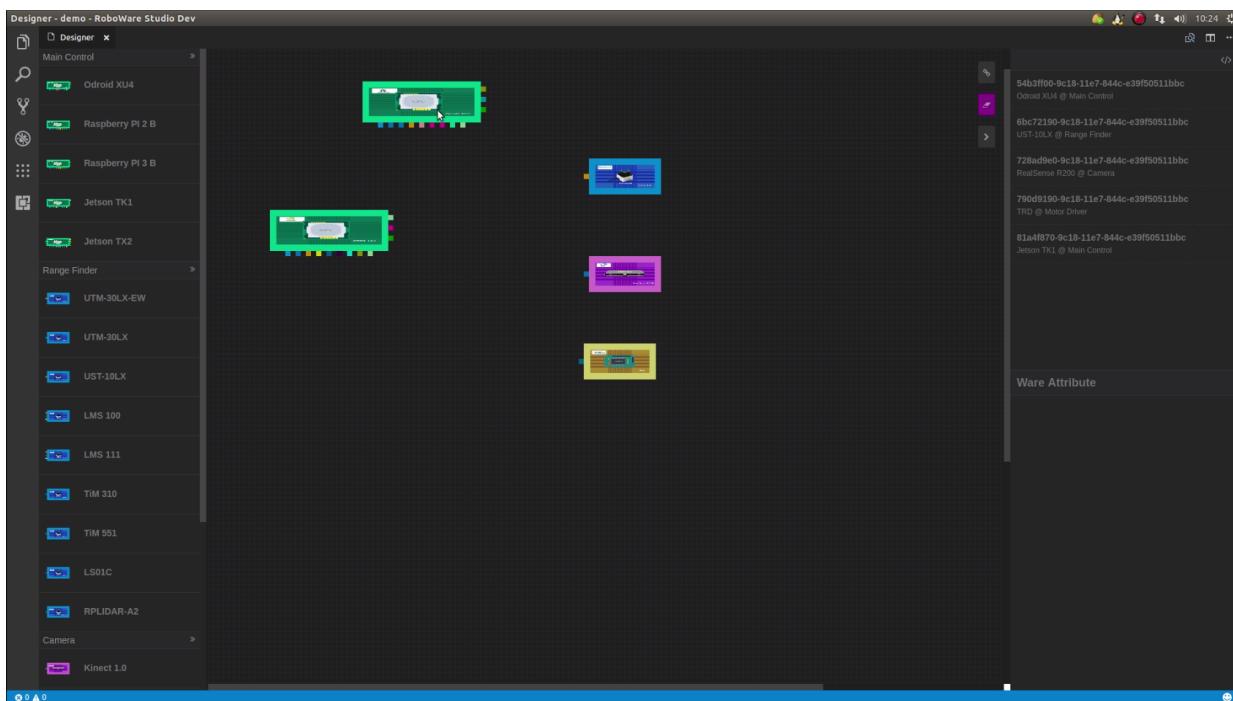
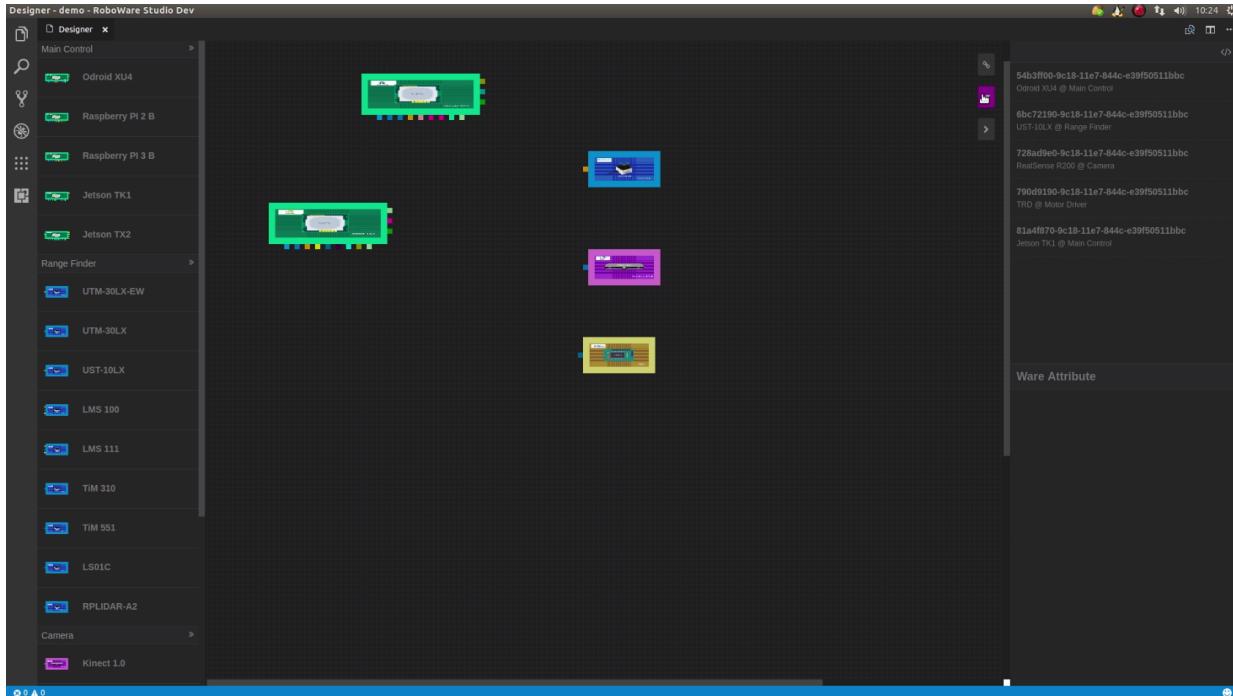


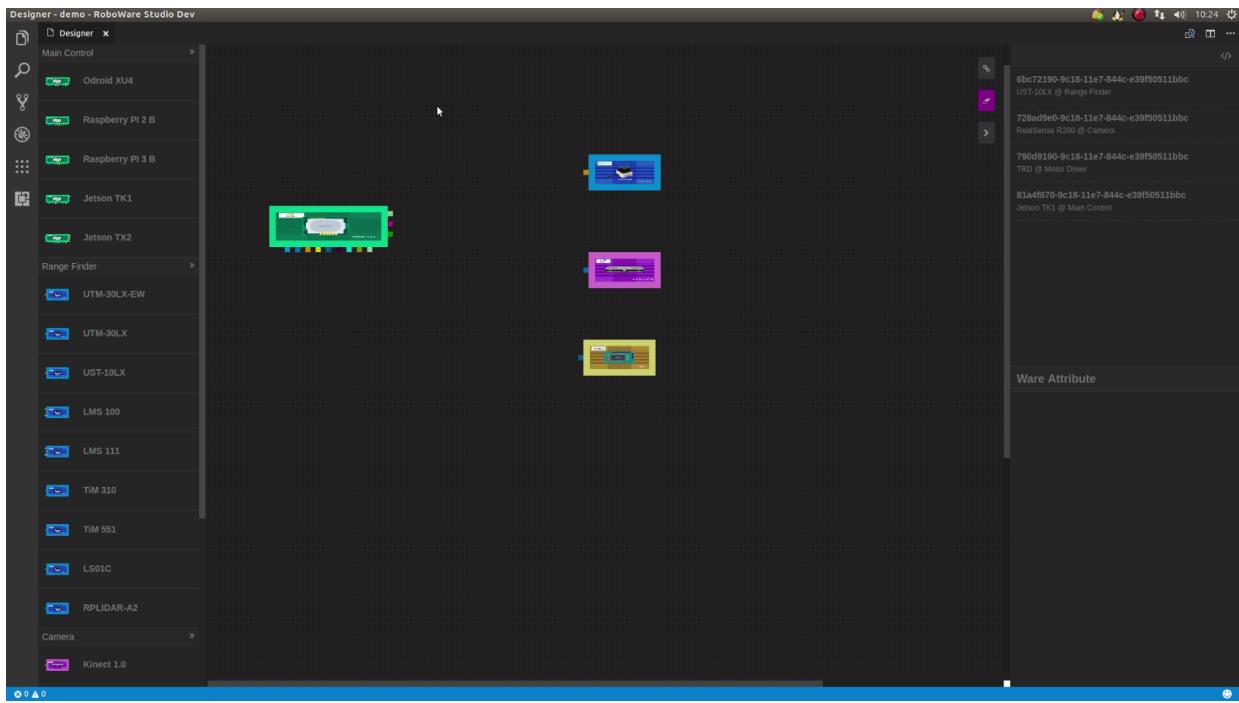
You can drag components from **Toolbox** to **Canvas** one by one, RoboWare Designer will download and configure their ROS packages automatically.



4. Delete component or line

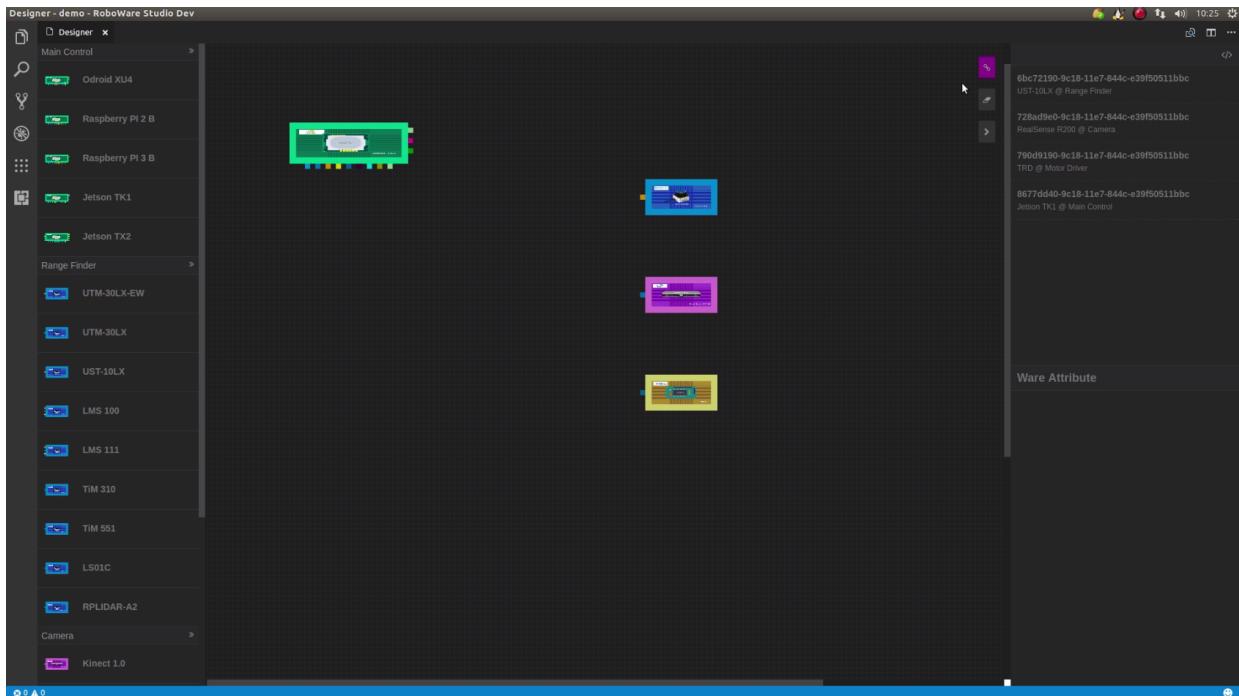
You can enable **Delete** function by press the 2nd button on top right of **Canvas**. Then, you can click a component to delete it or click a port to delete a line on it.

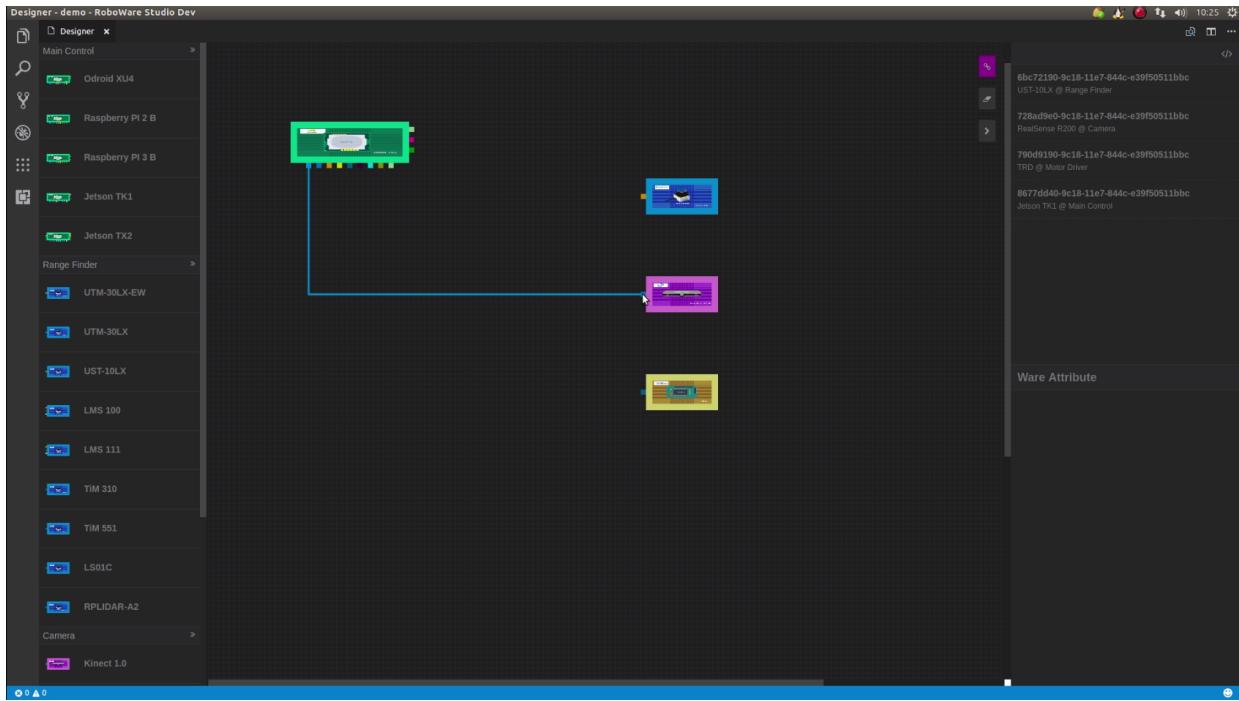
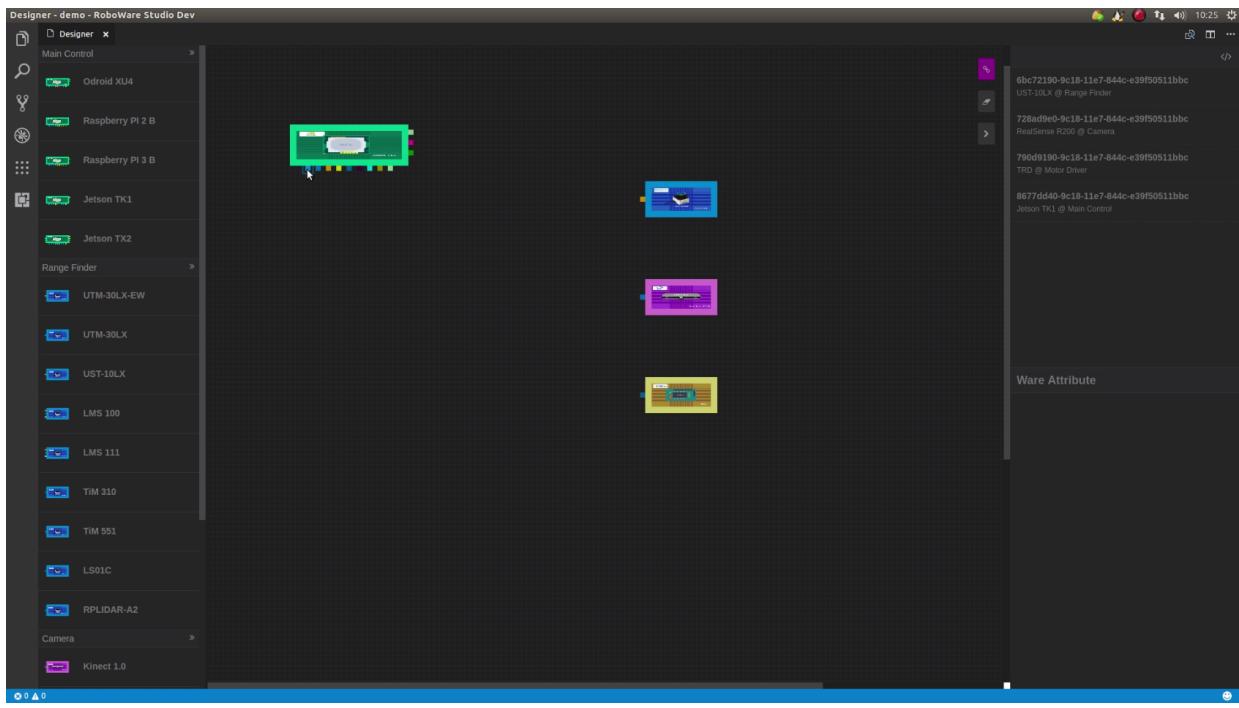


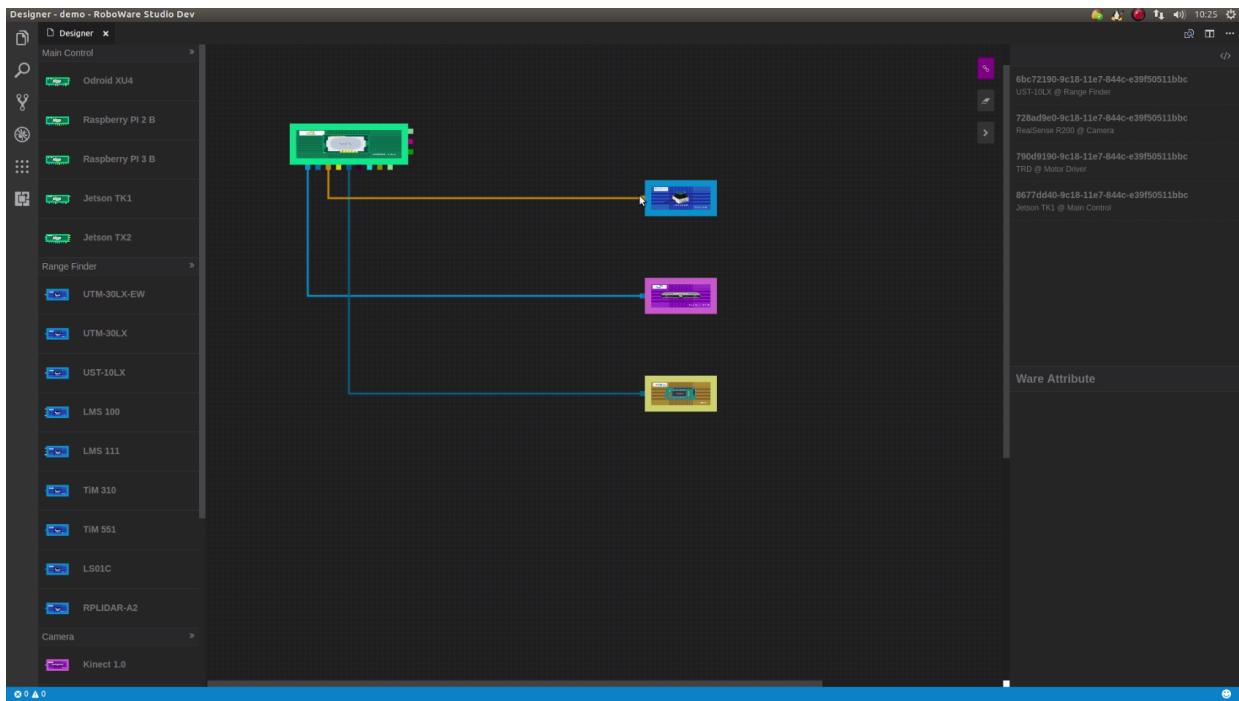


5. Connect two ports

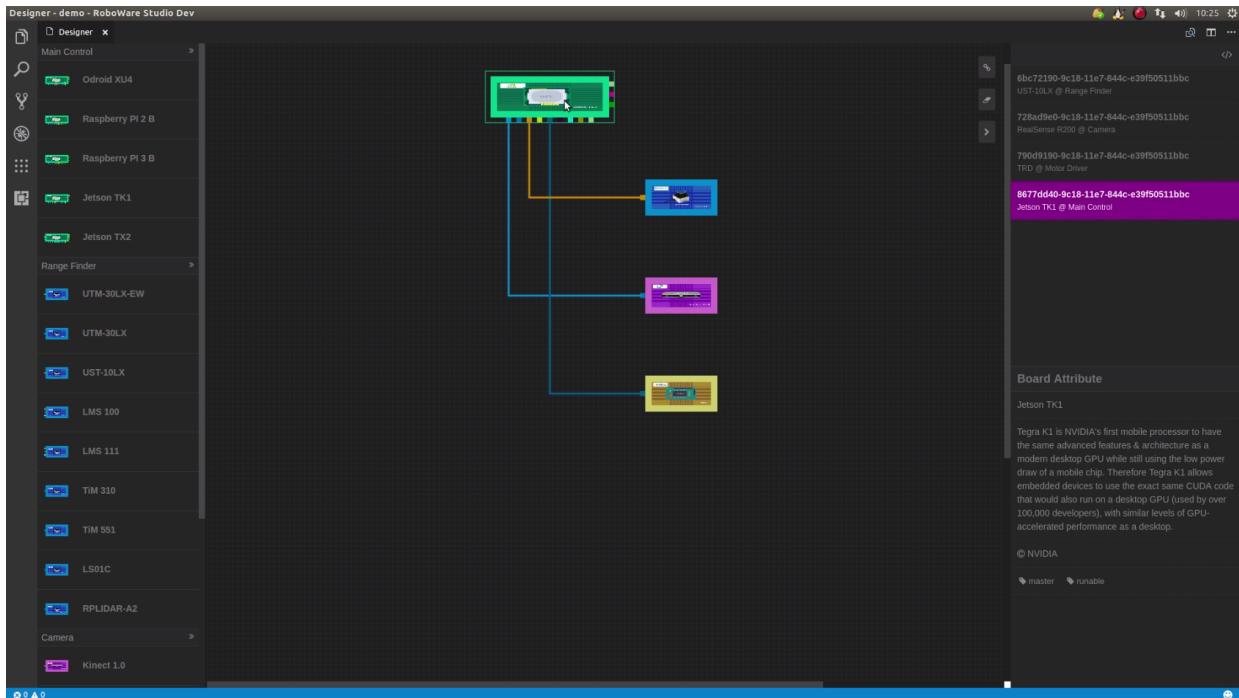
You can enable **Connect** function by press the 1st button on top right of **Canvas**. Then, you can click a port on one component first, then click a port with the same type(color) on another component, the two ports will be connected

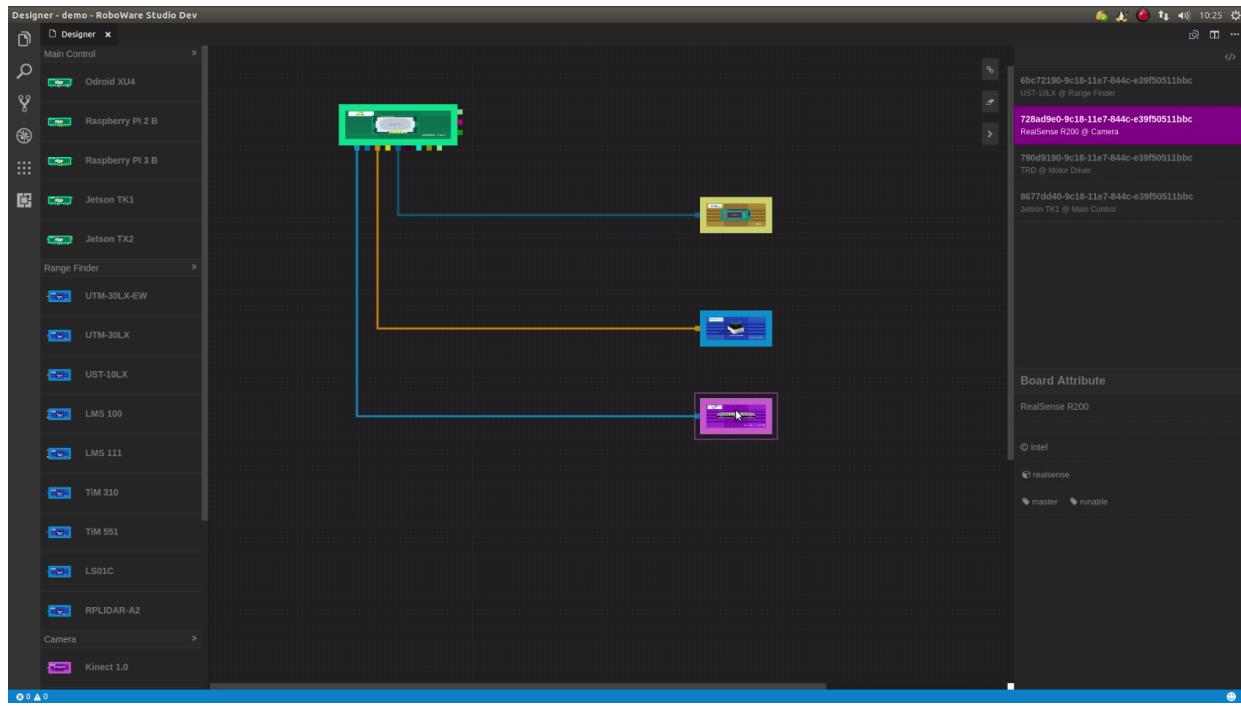






The lines between two ports can autofit when you move the components.



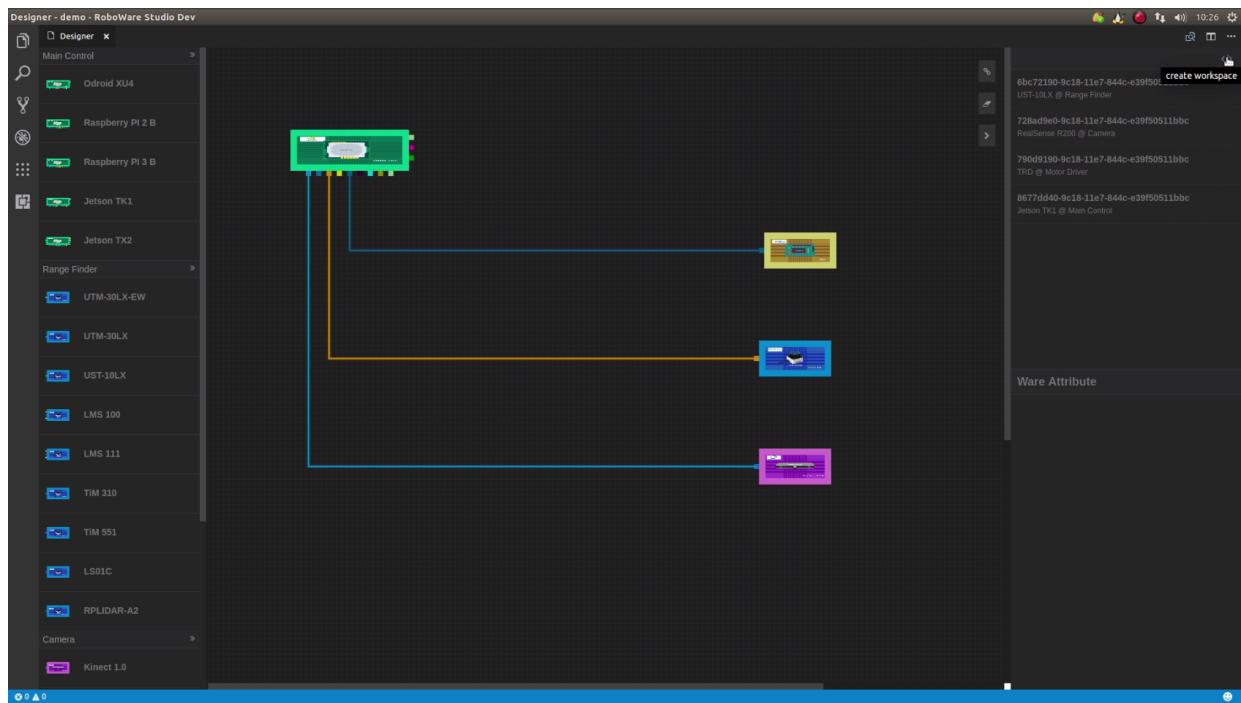


6. Export ROS packages to a workspace

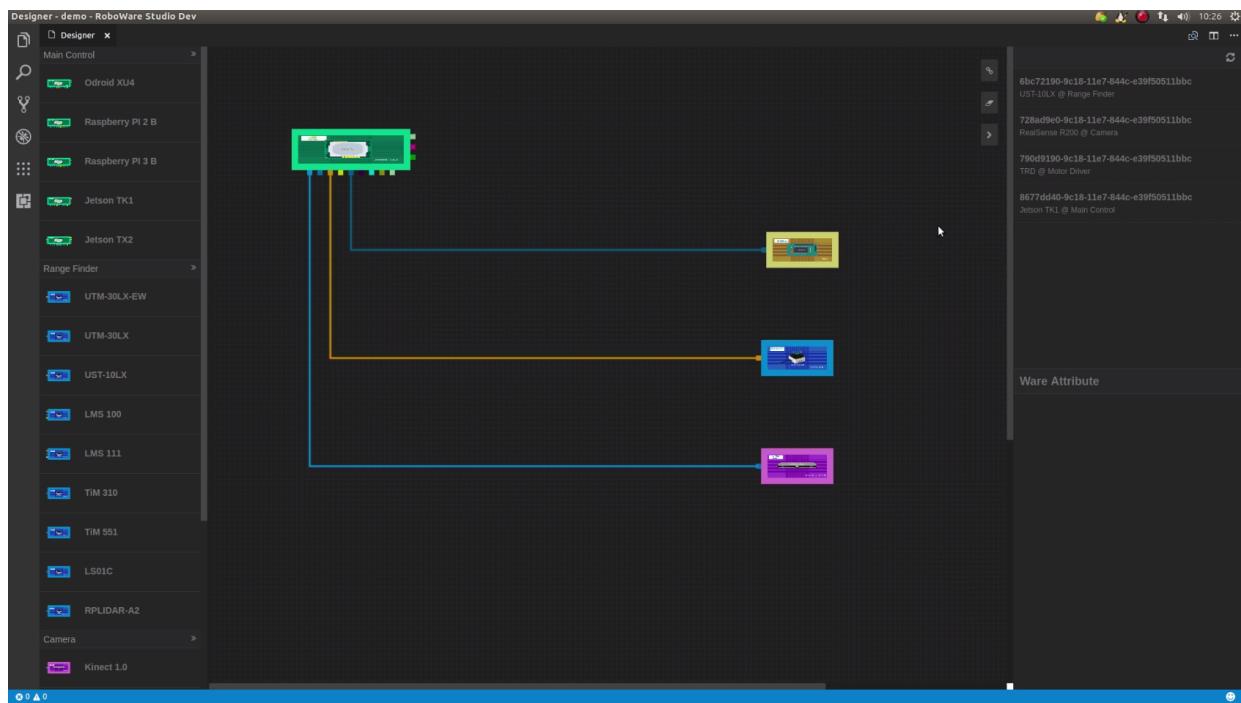
You can export ROS packages to a workspace after you put your components on **Canvas**. In this case, we have 4 components:

Type	Name	Manufacturer	ROS Package
Main Board	Jetson TK1	NVIDIA	
Camera	RealSense R200	Intel	realsense
Range Finder	UST-10LX	Hokuyo	urg_node
Motor Driver	TRD	Tony Robotics	

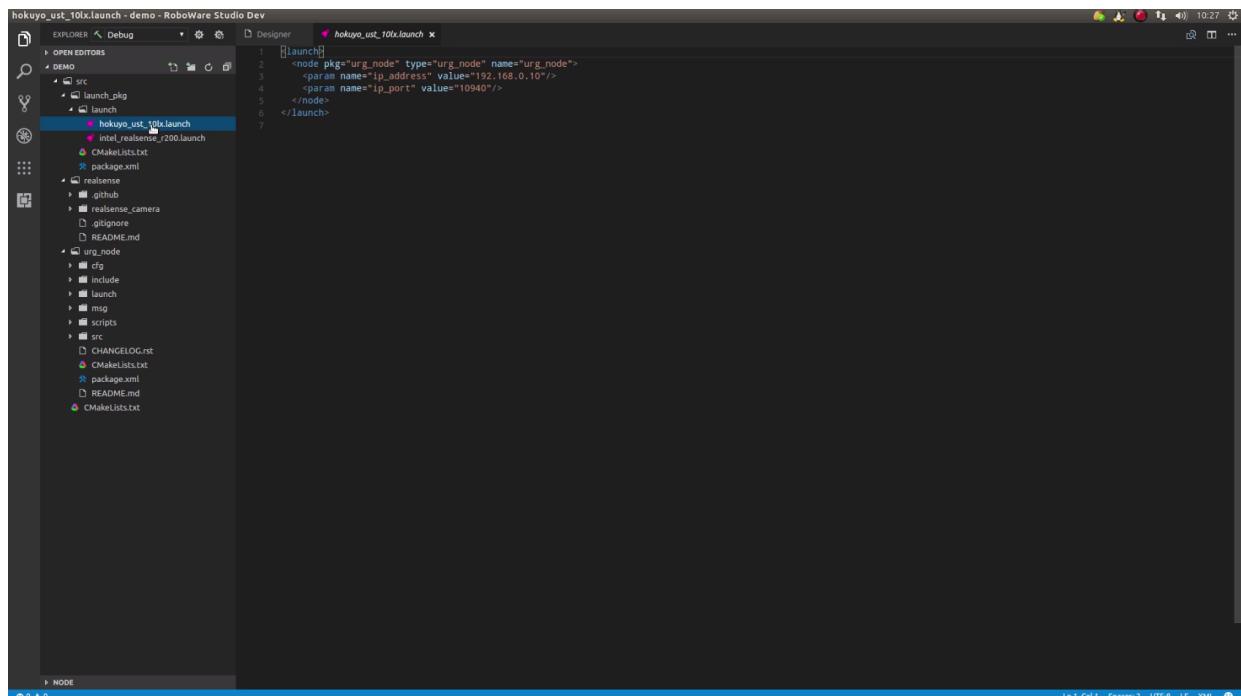
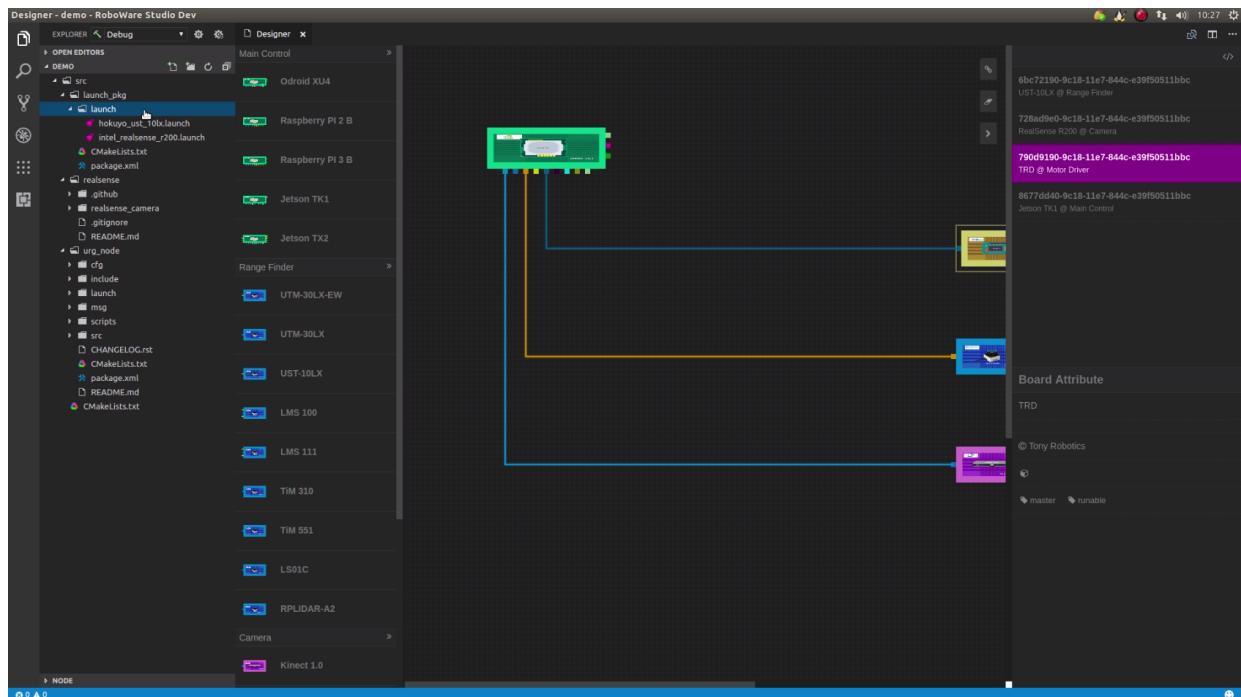
Click **create workspace** button on **Registry**.



RoboWare Designer will collect all the package information of the components on **Canvas**, and download the packages, export them to a workspace, generate ROS launch file automatically.



When export task is done, you can view all the packages and a launch file in ROS workspace.



```

intel_realsense_r200.launch - demo - RoboWare Studio Dev
EXPLORER Debug DESIGNER intel_realsense_r200.launch
1 [launch]
2   <include file="$(find realsense_camera)/launch/r200_nodelet_default.launch"
3   </include>
4 </launch>

```



```

package.xml - demo - RoboWare Studio Dev
EXPLORER Debug DESIGNER package.xml
1 <?xml version="1.0"?>
2 <package>
3   <name>launch_pkgs</name>
4   <version>0.0.0</version>
5   <description>The launch_pkgs package</description>
6   <!-- One maintainer tag required, multiple allowed, one person per tag -->
7   <!-- Example: -->
8   <!-- <maintainer email="jane.doe@example.com">Jane Doe</maintainer> -->
9   <!-- <maintainer email="King<todo.todo>King">King</maintainer> -->
10  <!-- One license tag required, multiple allowed, one license per tag -->
11  <!-- Common usage license strings: -->
12  <!-- BSD, MIT, Boost Software License, GPLv2, GPLv3, LGPLv2.1, LGPLv3 -->
13  <!-- license>TODO</license>
14  <!-- Url tags are optional, but multiple are allowed, one per tag -->
15  <!-- Authors do not have to be maintainers, but could be -->
16  <!-- Example: -->
17  <!-- <url type="website">http://wiki.ros.org/launch_pkgs</url> -->
18  <!-- Author tags are optional, multiple are allowed, one per tag -->
19  <!-- Authors do not have to be maintainers, but could be -->
20  <!-- Example: -->
21  <!-- <author email="jane.doe@example.com">Jane Doe</author> -->
22  <!-- The *_depend tags are used to specify dependencies -->
23  <!-- Examples: -->
24  <!-- Use build_depend for packages you need at compile time: -->
25  <!-- <build_depend>catkin</build_depend> -->
26  <!-- Use buildtool_depend for build tool packages: -->
27  <!-- <buildtool_depend>catkin</buildtool_depend> -->
28  <!-- Use run_depend for packages you need at runtime: -->
29  <!-- <run_depend>message_runtime</run_depend> -->
30  <!-- Use test_depend for packages you need only for testing: -->
31  <!-- <test_depend>gtest</test_depend> -->
32  <!-- <buildtool_depend>catkin</buildtool_depend> -->
33  <!-- The export tag contains other, unspecified, tags -->
34  <!-- <export> -->
35  <!-- Other tools can request additional information placed here -->
36  </export>
37 </package>

```

7. Develop in ROS workspace

At this point, RoboWare Designer has completed the layout and configuration tasks. Then, you can do your job in the exported ROS workspace.

