

DigiMetrix Robotics Library for KUKA KR C4

Setup manual

Setup overview

The setup procedure for DigiMetrix Robotics Library for KUKA consist of the following steps:

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PRECAUTION

Please carefully read the Safety and Installation manual provided by the manufacturer and other related manuals dedicated to the installation and setup procedures for the robot system before using it with this library.

Following manual assumes that qualified personnel performed all the installation procedures for the robot system.

1 Checking system requirements

Please verify the following system requirements. The library currently supports only one possible configurations:

1. PC-based or RT-based library – UDP over Ethernet.

The library runs on a Windows machine or on a NI Real-time target and uses UDP protocol for transmitting data.

1.1 PC-based or RT-based library – UDP over Ethernet

1.1.1 KUKA system requirements

- KR C4 KUKA robot controller
- **KSS8.3.21** (or higher)
- **WorkVisual 4.0.10** or higher installed on standard laptop/PC for KR C configuration
- KUKA.PLC ProConOS 4.1.1 (or higher)
- **KUKA.PLC mxAutomation 2.1.3** (or higher)

1.1.2 LabVIEW PC system requirements

- NI LabVIEW 2012 SP1 or higher version
- Microsoft Windows XP, Vista, 7, 8, 10 (32 & 64 bit)

1.1.3 LabVIEW Real-Time target system requirements

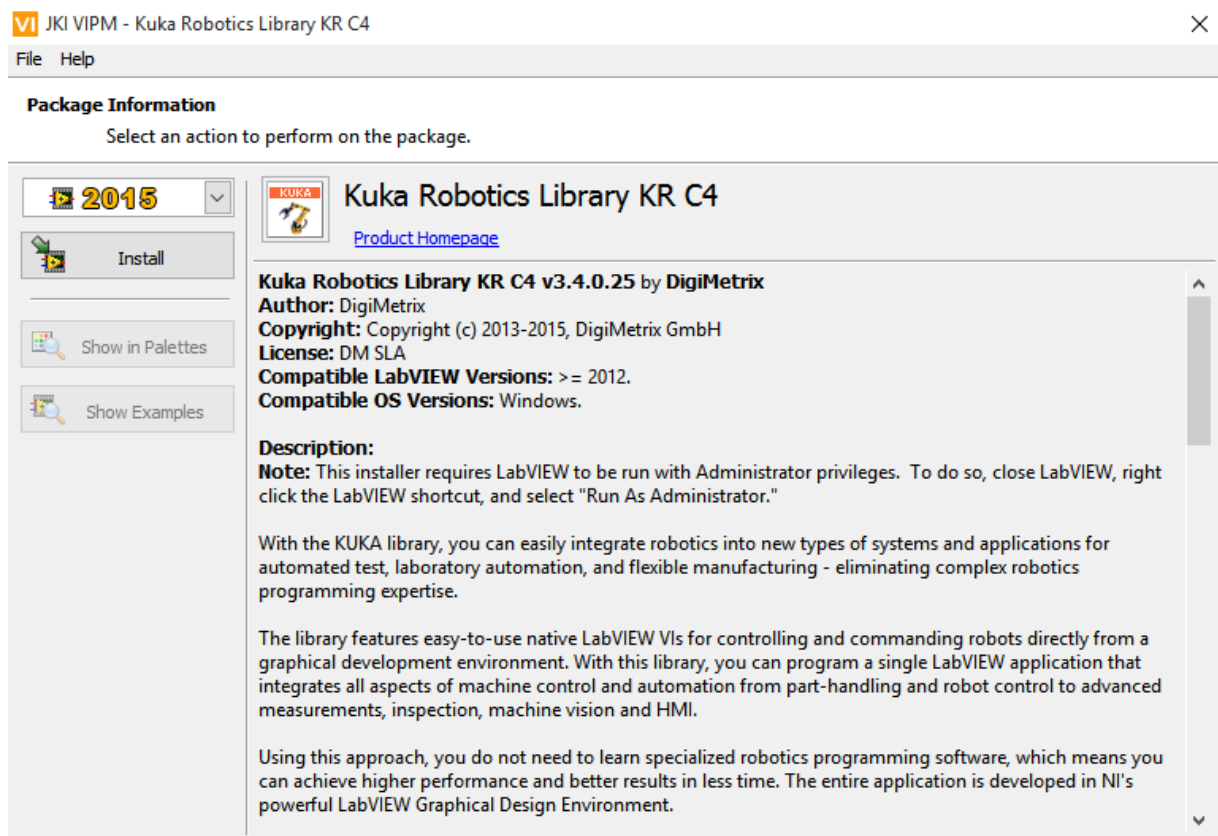
- LabVIEW Real-Time 2012 or higher version
- Linux Real-Time, Phar Lap or VxWorks
- Ethernet Port

2 Installing DigiMetrix Robotics Library for KUKA using VIPM

Note: This installer requires VI Package Manager **2016.0.0 build 1986** or later to be installed on the computer.

Note: This installer requires LabVIEW to be run with **Administrator privileges**. To do so, close LabVIEW, right click the LabVIEW shortcut, and select "Run As Administrator."

1. Open JKI VI Package Manager from your Desktop – right-click the icon and select **Run As Administrator** option
2. Select **KUKA Robotics Library by DigiMetrix** product in the list or open .vip file using top menu command File -> Open Package File(s).
3. Read the library **description**, select your LabVIEW **version** and click **Install** button



4. After finishing the library installation, VIPM will show up this document
5. Close VI Package Manager and restart LabVIEW

3 Installing and commissioning KUKA.PLC mxAutomation software

3.1 Setup overview

The following setup and commissioning procedure was taken from KUKA Support Machine Automation Robotics document "Commissioning mxA2.1.2" Version 1.0.

3.2 Requirements

- KR C4 KUKA robot controller
- KSS8.3.21 (or higher)
- WorkVisual 4.0.10 or higher installed on standard laptop/PC for KR C configuration

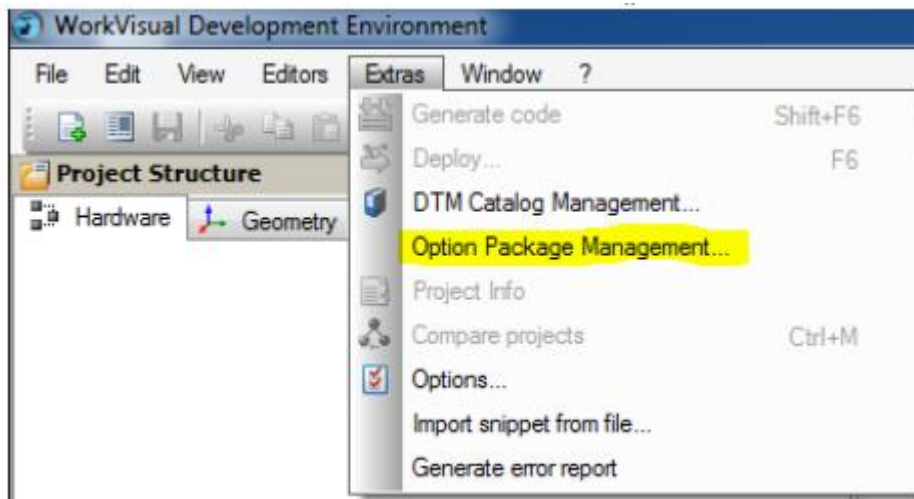
- KUKA.PLC ProConOS 4.1.1 (or higher)
- KUKA.PLC mxAutomation 2.1.3 (or higher) software package

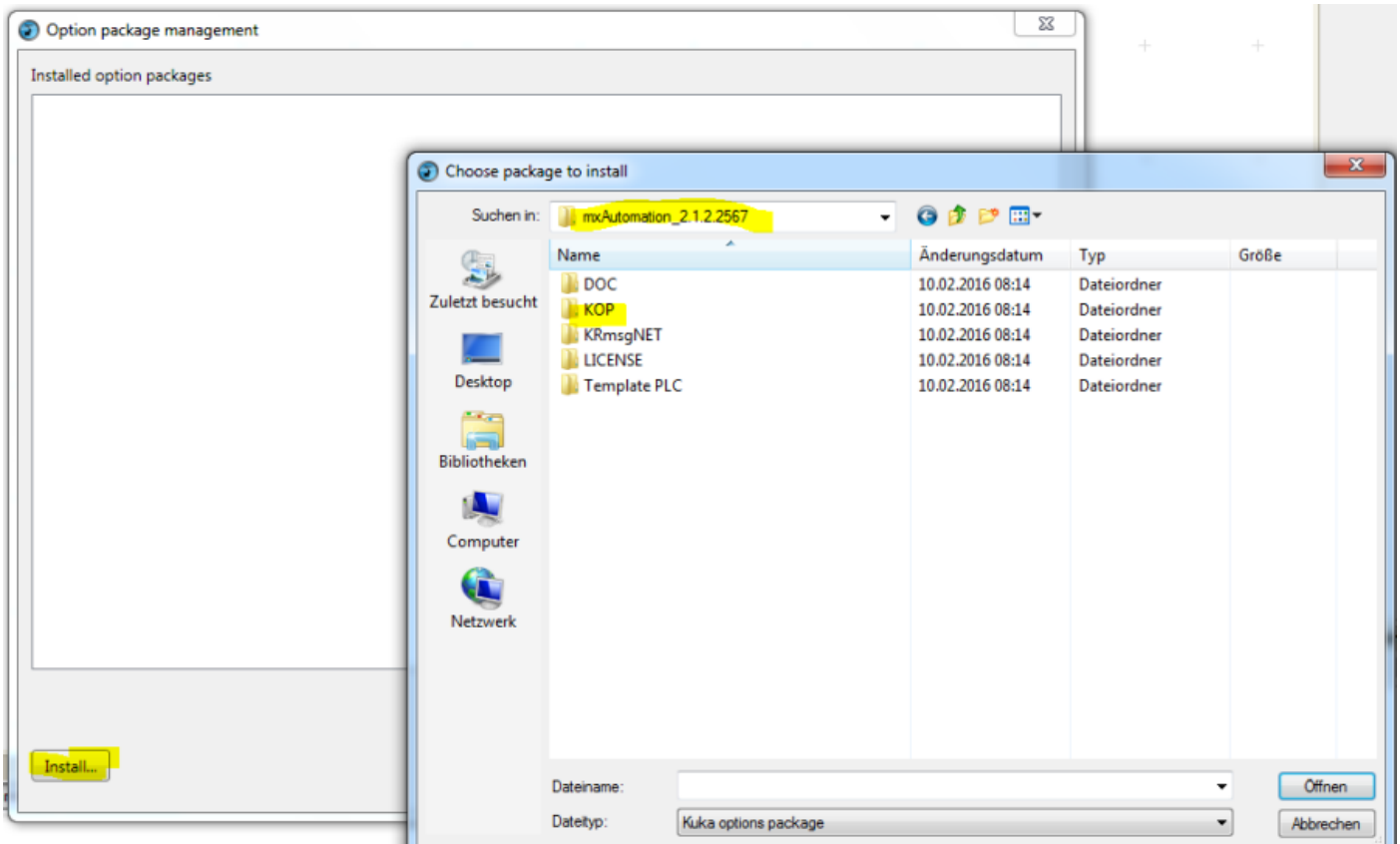
If one or few requirements are missing or require an update, please contact KUKA Support for assistance.

3.3 Installation and configuration

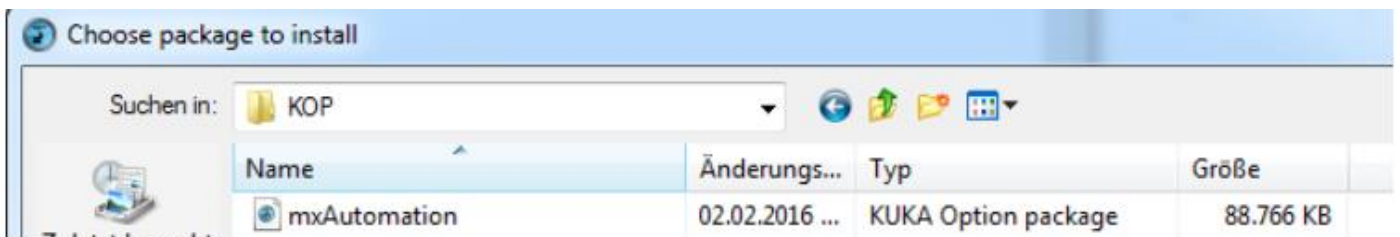
1. Start WorkVisual on your PC
2. Install the KOP-File in WorkVisual.

Select Top Menu -> Extras -> Option Package Management... option.
You will find the KOP-File on the „mxAutomation CD/USB-stick“ in the folder “KOP”

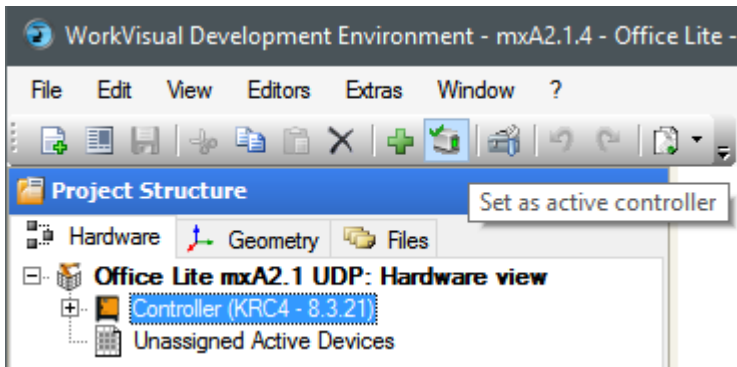




Click **Install** button and select mxAutomation.kop file in KOP folder

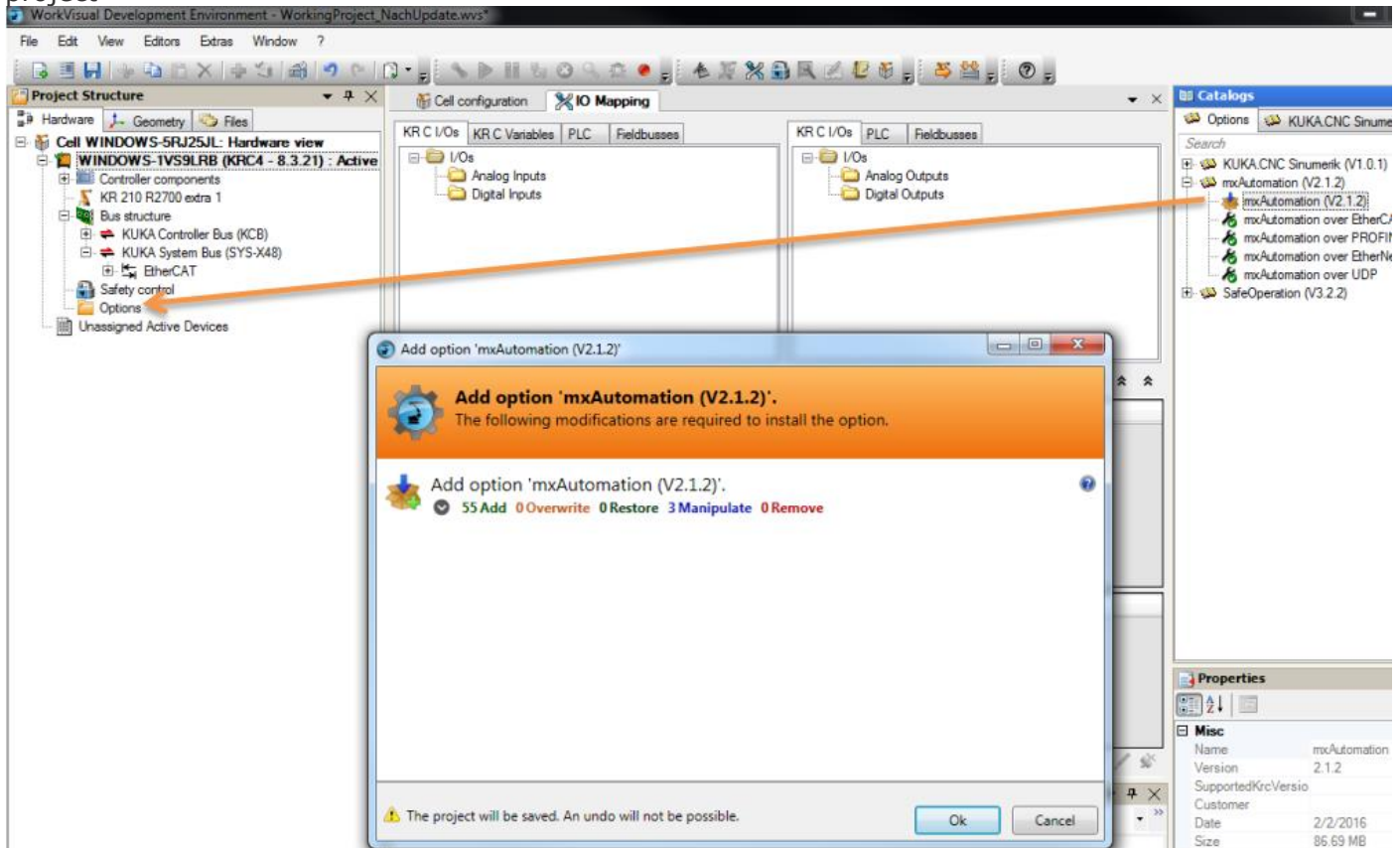


3. Install the Software **ProConOS** on the KRC4 using a usb stick
Installation instructions can be found in ProConOs distribution package -> Doc -> KST_PLC_ProConOS_41_en.pdf document
4. Reboot the controller
5. Commission the robot as usual
6. Pull the WorkVisual project from the controller and set the controller as Active in the Project Structure

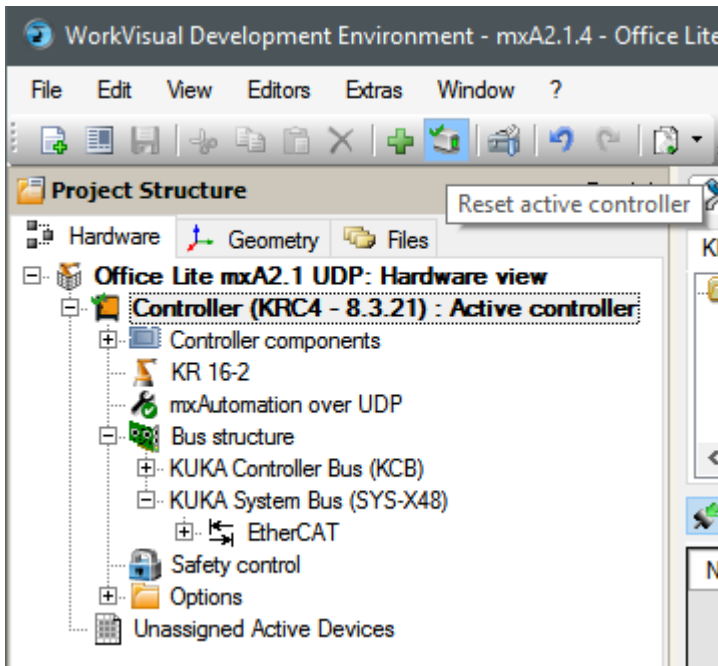


Important: Before you pull the project, you have to install the ProConOS software on the KRC4. See the step 3.

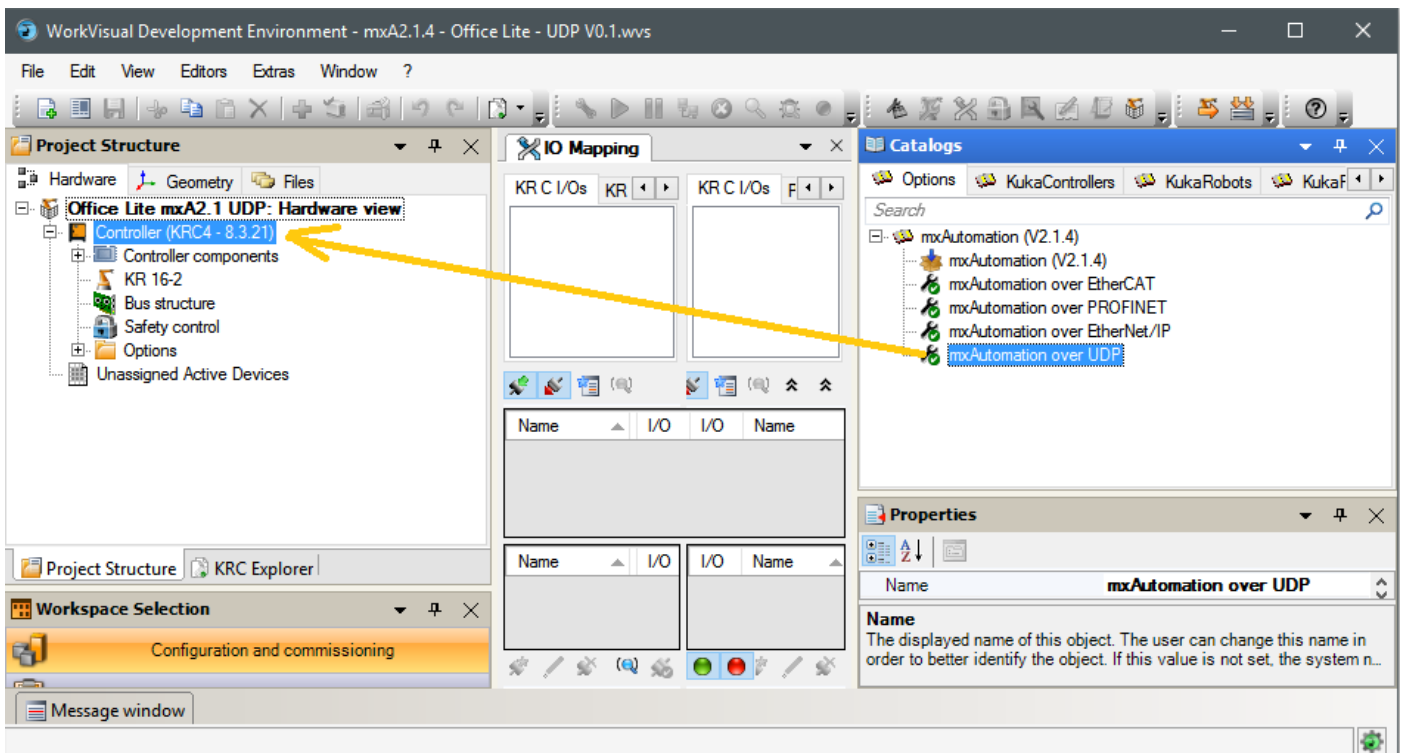
7. "Drag and Drop" the option "mxAutomation (V2.1.3)" from the catalogue "Options" into the project-> Options.
Press OK for the notify message. To confirm the installation of the mxAutomation files into your project

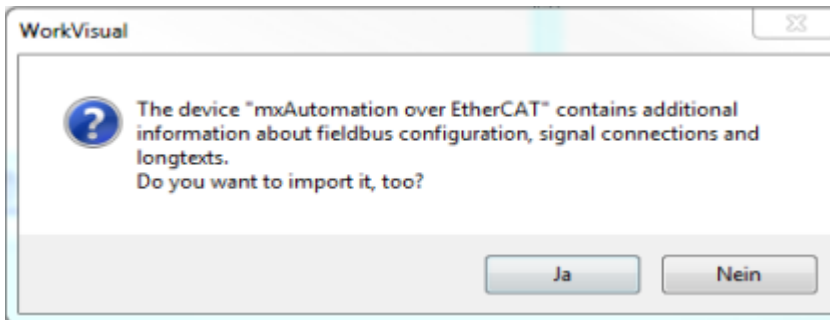


8. Deactivate the controller of the project.

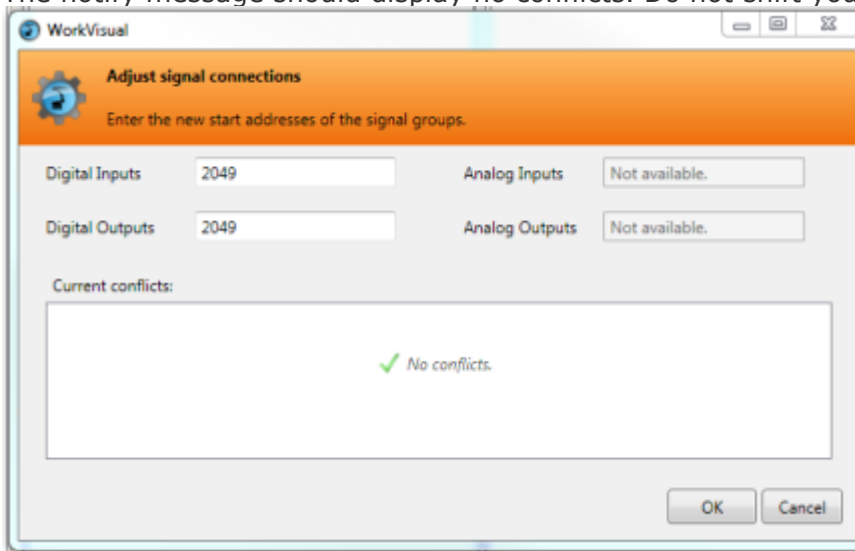


9. Insert your fieldbus system – UDP for your mxAutomation Interface to the Project.
Important: If the fieldbus system was previously already in your project you have to delete it first!
 e.g.: You want to use the EtherCAT for mxA, so there should be no X44 in your project before.



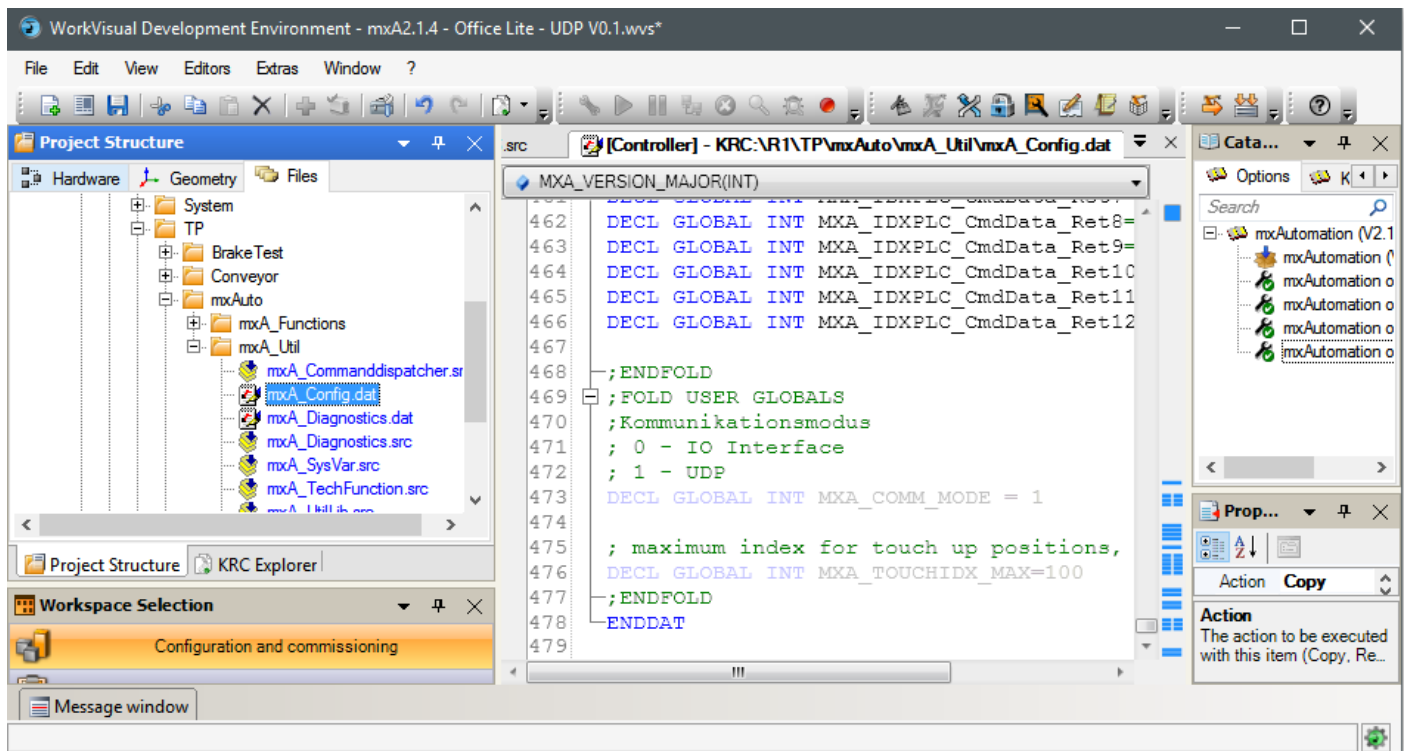


10. The notify message should display no conflicts. Do not shift your In/Outputs here!



11. Set the controller as active in WorkVisual,

12. Go to Files Tab in your Project Structure and open mxA_Config.dat file
Controller-> KRC -> R1 -> TP -> mxAuto -> mxA_Util -> mxA_Config.dat



13. Set **DECL GLOBAL INT MXA_COMM_MODE = 1** to enable UDP communication and save changes
14. Compile the project now – select Generate Code command (takes up to 5 minutes)
15. Send the project to the robot. (Now the I-KOP will be transmitted, and installed)
16. After the activation of the robot, the project requires a reboot of the controller
17. Reboot the controller a second time. (This step is necessary to start the ProConOS)
18. For questions: SupportMachineAutomation.Robotics.De@kuka.com

4 Connection scheme and communication settings

4.1 UDP communication scheme

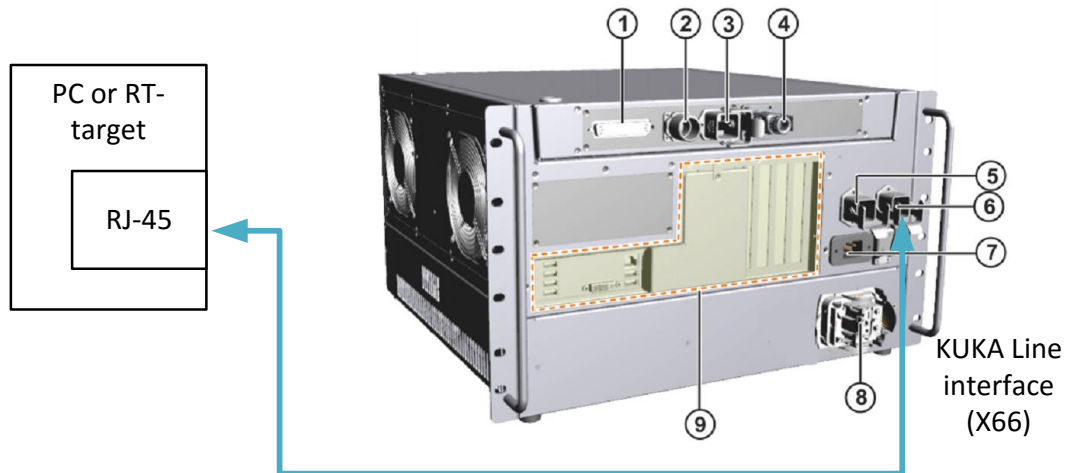


Figure 1. UDP connection scheme

4.2 UDP Communication settings

1. It is recommended to use a direct Ethernet cable without switches if possible
2. Your PC or RT network adapter should have a valid IP address that belongs to the same network range as your controller IP address (KLI interface).

For example:

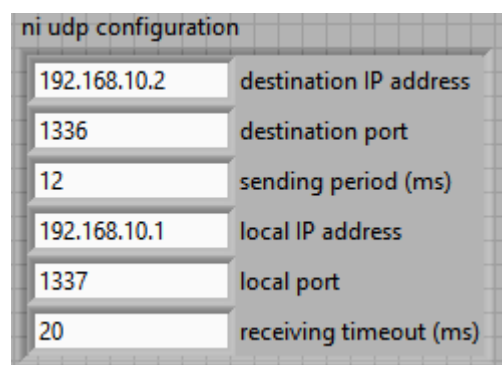
PC/RT configuration

1. IP Address: 192.168.10.1
2. Mask: 255.255.255.0

KRC configuration

3. IP Address: 192.168.10.2
4. Mask: 255.255.255.0

3. The library uses these communication settings that are standard to mxAutomation 2.1



1. Destination IP address: 192.168.10.2
This is the address of your controller (KLI interface)

2. Destination port: 1336
This port specifies the destination port for sending packets from LabVIEW to KRC
3. Sending period: 12 (ms)
Communication period for sending UDP packets
4. Local IP address: 192.168.10.1
IP address of your network adapter connected to the robot controller
5. Local port: 1337
Local port for receiving UDP packets from controller
Important! You need to allow incoming packets for this port in your Firewall settings
6. Receiving timeout (ms)
Specifies the time, in milliseconds, that the loop waits for the reply from a controller before repeating the UDP request

5 Configuring Automatic External Mode

LabVIEW will be able to operate the robot only in Automatic External Mode. Please refer to KUKA manuals in order to configure your controller properly.

During debug and teaching phases you may use mode switch on your Teach Pendant in order to change controller mode to Automatic External Mode.

6 Next steps

Now your robot controller is configured. We suggest you start with library examples. Please refer to the Getting Started help topic.