UNIVERSAL ROBOTS Support

OVERVIEW OF CLIENT INTERFACES

Overall explanation of client interfaces

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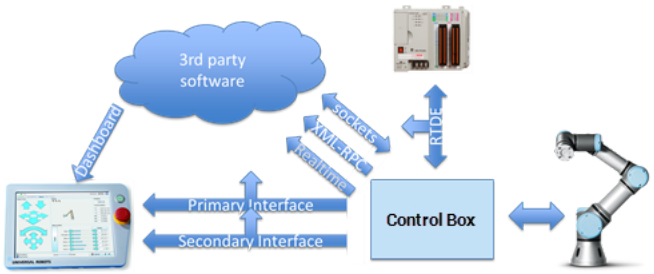
UR robot can interact with external devices by different types of communication interfaces.



- Primary/Secondary Interfaces

UR controller provide servers to send robot state data and receive URScript commands. The primary interface transmits robot state data and additional messages. The secondary interface transmits robot state data only. The data is mainly used for communication between GUI and controller. Both accept URScript commands with 10 Hz update rate. It makes possible to control robot remotely without robot program. Information in regards to ports and update, please check this article: Remote Control Via TCP/IP

- Real-time Interfaces

The functionality of real-time interface is similar with primary/secondary interfaces. The controller transmits the robot state data and receives URScript commands. The main difference is update rate. Information in regards to ports and update, please check this article: Remote Control Via TCP/IP

- Dashboard Server

A Universal Robot can be controlled from remote by sending simple commands to the GUI over a TCP/IP socket. This interface is called the "Dashboard Server". Main functions of the server are to load, play, pause, and stop a robot program, set user access level, and receive feedback about robot state.

- Socket Communication

UR robot can communicate with outside equipment through TCP/IP protocol. Data can be transferred via socket communication between robot and other device. In the socket communication, robot acts as client and other device play a role as server. URScript provides commands which open and close sockets, and send and receive different data formats.

- XML-RPC

XML-RPC is a Remote Procedure Call method that uses XML to transfer data between programs over sockets. With it, the UR controller can call methods/functions (with parameters) on a remote program/server and get back structured data. By using it, a complex calculation which is not available in URScript can be performed. In addition, other software packages can be combined with URScript.

- RTDE (Real-Time Data Exchange)

RTDE is designed as robust replacement for the real-time interface. This allows UR controller to transmit custom state data and accept custom set-points and register data. Information in regards to ports and update, please check this article: Remote Control Via TCP/IP - 16496

RELEVANT ARTICLES

There are how-to articles for communication interfaces.

Interface Type	Link
Primary/Secondary Interfaces	Remote Control Via TCP/IP
Real-time Interface	Remote Control Via TCP/IP
Dashboard Server	Dashboard Server e-Series, port 29999 Dashboard Server CB-Series, port 29999
Socket Communication	Ethernet socket communication via URScript
XML-RPC	XML-RPC communication
Real-Time Data Exchange (RTDE)	Real-Time Data Exchange (RTDE) Guide

GOOD PRACTICE

If you try connecting to a port which is already being used, it would cause a conflict and communication failure. It is recommended to use other ports than occupied ports and frequently used ports to avoid conflicts.

Ports used in UR robots include the followings.

Port Number	Interface
80	Reserved by UR
502	Modbus TCP
2222	Ethernet/IP
7827	Internally used
7828	Internally used
8080	Not recommended since many old URCaps default to this port
29919	Internally used
29998	Internally used
29999	Dashboard server
30001	Primary
30002	Secondary
30003	Real-time
30004	RTDE
30011	Primary read only
30012	Secondary read only
30013	Real-time read only
34964	Profinet
40000	Ethernet/IP
40002	Profinet
44818	Ethernet/IP
49152	Profinet

50003	Internally used (e-Series only)
50004	Internally used (e-Series only)
50005	Internally used (e-Series only)
50006	Internally used (e-Series only)