Module name: Robotino® communication

- *Main functionalities:*

The main functionality of the module is to communicate with the Robotino®[1]. The Robotino® is a mobile robot platform for research and education developed by Robotics Equipment Corporation GmbH[2] and distributed by Festo Didactic.

- *Technical specifications:*

This module is an adaptation of the qDSA protocol of the API1 for Robotino® v2[3], made in native Vis for use with LabVIEW™ software without the need to call external code.

Hardware requirements of the module: Festo Robotino® v2 (Firmware 670, OS Date: 11.02.2011), Wi-Fi access point (AP) (factory standard accessory), UVC standard Webcam (factory standard accessory). (See 1. Figure)
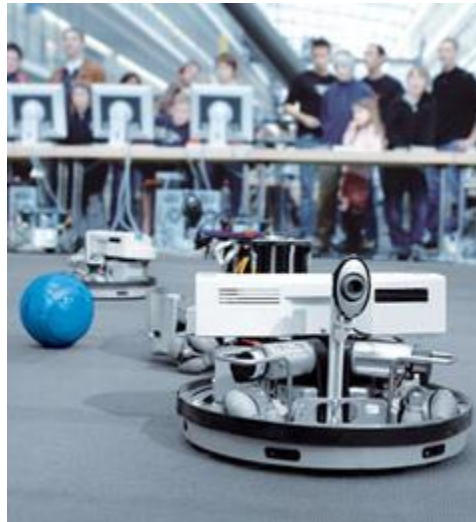
1. Figure Robotino® v2 mobile robot for education and research[4].

The module consists of two continuously running parallel loops (tasks). One task is dedicated to the keep-alive type communication of the Robotino®, where the Robotino® continuously sends data to the host computer and expects data in response. The other task is the receiver of the camera images, continuously sent by the Robotino® if the camera is enabled.

- *Inputs and outputs:*

The inputs and outputs of the Keep-alive communication task can be seen in 1. Table.

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[1] *Product homepage: https://www.festo-didactic.co.uk/gb-en/learning-systems/education-and-research-robots-robotino/?fbid=Z2IuZW4uNTUwLjE3LjIwLjg1OA&page=1&offset=0&showitems=32*

[2] *Company homepage: http://www.servicerobotik.eu/*

[3] *Description available at https://wiki.openrobotino.org/index.php?title=Downloads#API.2C_Plugins_.26_Packages*

[4] *Source: https://www.festo-didactic.co.uk/gb-en/learning-systems/education-and-research-robots-robotino/the-highlights.htm?fbid=Z2IuZW4uNTUwLjE3LjE4Ljg1OC40NzUy*

1. Table Inputs and outputs of the Keep-alive communication Host side.

Keep-alive communication Host side		
	Inputs	**Outputs**
qDSA protocol	State of 8 digital outputs	State of 8 digital inputs
	State of 2 relay outputs	State of the collision detection switch
	Motor speed set-points in RPM for each motor	State of the power button
	Reset Position for each motor	Sequence number of the communication
	Break for each motor	Readings of 8 analog voltage inputs
	On-board PID controller parameters for each motor	Current readings of each motor
	Odometry (Position of the robot)	Actual position of each motor
	Set Odometry switch	Actual speed of each motor
	Camera enable switch	Actual Odometry (Position of the robot)
	Shutdown switch	Readings of 9 IR distance sensors
		Reading of the battery voltage
	IP address of the Robotino®	Is the Robotino® connected switch
	Constructional parameters of the Robotino®	Kinematics and inverse kinematics matrices of the Robotino®

The inputs and outputs of the Camera control task can be seen in 2. Table.

2. Table Inputs and outputs of the Camera control task Host side.

Camera control Host side	
Inputs	**Outputs**
IP address of the Robotino®	Is the Robotino® connected switch
UDP Port Parameters	Image
Image parameters	Framerate of the image

- **Interface specification:**

In case the software is used i.e. the use case demonstration is operated by the end user then the end user cannot perform any action with this module, since this module is a part of the software.

In case this module is incorporated in another software then a software developer can communicate with the Robotino® using this module.

- **Formats and standards used**:

The qDSA protocol of the API1 for Robotino v2 is used in this module.

- **Availability:**

The module is already available in source code and as a part of a standalone desktop application by contacting the authors of this description.

- **Application scenarios:**

Communication with a Robotino®.

- ***Offered for internal / external use***

The module as a source code is available both for internal and external use.

- ***Legal disclaimer:***

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