rc_visard

Quickstart Guide

English

roboception

Table of Contents

Warnings

This guide shows how to initially connect and configure the rc_visard. It is not meant to provide instructions for permanent installation, on a robot, or in an industrial environment.

Before operating the rc_visard, please read the full manual.

This guide assumes you have purchased the optional connectivity kit. Otherwise, please refer to the full manual for connection requirements.

The rc_visard is NOT intended for safety-critical applications.

The rc_visard needs to be properly mounted before use.

All cables need to be secured to the robot mount.

Cables must be at most 30 m long.

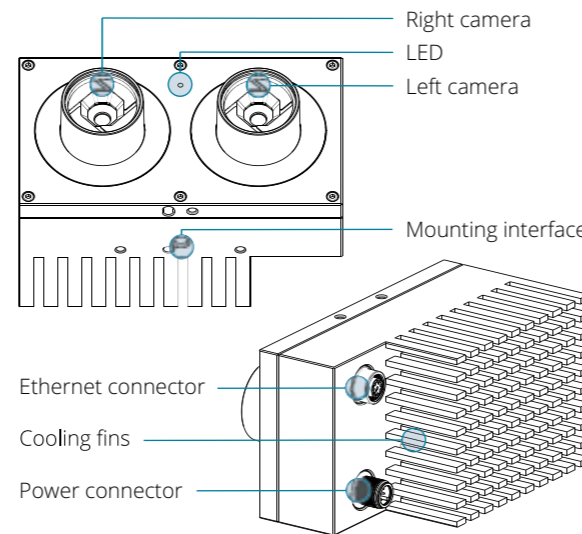Power to the rc_visard must be supplied through an appropriate, separate DC power source.

The housing of the rc_visard must be grounded.

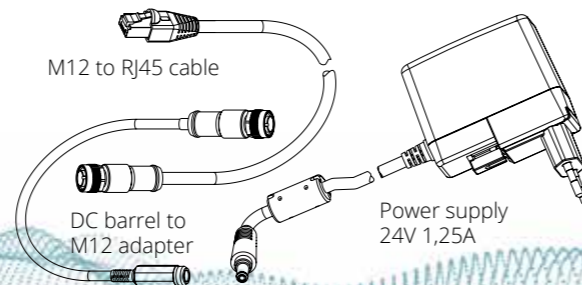The rc_visard's and any related equipment safety guidelines must always be satisfied.

The rc_visard's case temperature may exceed 60°C during operation. Please ensure that no heat-sensitive materials are near the rc_visard. Please use caution when touching or holding the rc_visard during operation.

Package Content

The rc_visard is a self-registering 3D camera based on passive stereo vision. It provides rectified camera images, disparity images, confidence images, and error images, which enable the viewed scene's depth values along with their uncertainties to be computed. Furthermore, the motion of visual features in the scene is combined with acceleration and turn-rate measurements at a high rate, which enables the sensor to provide estimates of its current pose, velocity, and acceleration.

Right camera
LED
Left camera

Mounting interface

Ethernet connector
Cooling fins
Power connector

Optional Connectivity Kit

M12 to RJ45 cable

DC barrel to M12 adapter

Power supply 24V 1,25A

Requirements

PC with Windows 7 or Windows 10, Microsoft Edge* or Mozilla Firefox® 54.0 or higher, and 100 Mbit or 1 Gbit LAN connection

Or

PC with Ubuntu® 14.04 or higher, Mozilla Firefox®, and 100 Mbit or 1 Gbit LAN connection

Or

Apple Mac** with macOS 10.10.5 or higher, Safari, and 100 Mbit or 1 Gbit LAN connection

And

(included in connectivity kit)
• 24V power supply, minimum of 24W
• Adapter cable between power supply and rc_visard's M12 power connector
• M12 to RJ45 network cable

Downloads

Visit http://www.roboception.com

Get the latest instruction manual online as html or downloadable as pdf at http://www.roboception.com/documentation

Download the Discovery Client for your OS from http://www.roboception.com/download

* Windows 7, Windows 10, Microsoft Edge, and Internet Explorer are trademarks of Microsoft Inc., registered in the U.S. and other countries.
** Mac, macOS, and Safari are trademarks of Apple Inc., registered in the U.S. and other countries.

Installation

For configuration and troubleshooting, the rc_visard may be mounted using the standardized tripod thread (UNC 1/4"-20). For dynamic applications, please refer to the full manual.
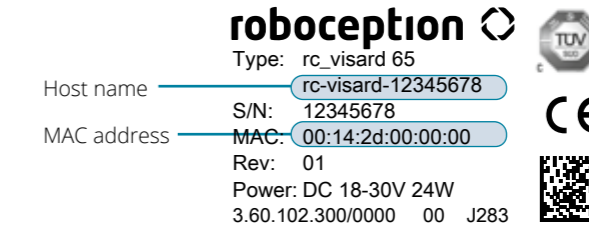
The rc_visard offers a Gigabit Ethernet interface for connecting to a computer network. All communication to and from the device is performed via this interface. Setup is performed following the four steps below.

Step 1
Power Connection

Always fully connect and tighten the M12 power connector on the rc_visard before turning on the power supply. After connecting the rc_visard to power, the LED on the front of the device should immediately illuminate. During the boot process of the device, the LED will change color and will eventually turn green. This signals that all processes are up and running. If the network is not plugged in, or the network is not properly configured, the LED will briefly flash red every 5 seconds. In this case, the network configuration of the device should be verified.

Installation

Step 2
Network Configuration

roboception
Type: rc_visard 65
Host name — rc-visard-12345678
S/N: 12345678
MAC address — MAC: 00:14:2d:00:00:00
Rev: 01
Power: DC 18-30V 24W
3.60.102.300/0000 00 J283

The rc_visard requires an Internet Protocol (IP) address for communication with other network devices. The IP address must be unique in the local network, and can be set automatically or manually.

Automatic Configuration via DHCP

The DHCP (Dynamic Host Configuration Protocol) is the preferred way for setting an IP address, which is the factory default on the rc_visard. It tries to contact a DHCP server at startup and every time the network cable is plugged in. If a DHCP server is available on the network, then the IP address is automatically configured. In some networks the DHCP server is configured to only accept known devices. In this case, the MAC (Media Access Control) address, which is printed on the sensor, needs to be configured in the DHCP server. The rc_visard's host name, which is also printed on the device, can be set in the Domain Name Server (DNS). Both MAC address and host name should be sent to the network administrator for configuration.

Installation

Step 2 continued

Automatic Configuration via Link-Local

If the rc_visard cannot contact a DHCP server for about 15 seconds after startup, or after plugging in the network cable, it will try to assign itself a unique IP address. This is called Link-Local. This option is especially useful for connecting the rc_visard directly to a computer. The computer must be configured to Link-Local as well. Link-Local might already be configured as a standard fallback option. If you are using Windows or macOS you can skip the following configuration and continue directly with 'Step 3: rcdiscover-gui Tool'. Other operating systems, such as Linux, require Link-Local to be explicitly configured in their network manager (the configuration procedure in Ubuntu 16.04 is shown below).

1. Open Network Manager
2. 'Edit Connections'
3. 'Add' connection
4. Connection Type: 'Ethernet'
5. 'Create'
6. Give the new connection a name such as 'Link-Local'
7. Select the Tab 'IPv4 Settings'
8. Select 'Link-Local Only' under 'Method' dropdown
9. 'Save'
10. Select the new connection in the Network Manager

Installation

Step 3
rcdiscover-gui Tool

All rc_visards that are powered up and connected to the local network or directly to a computer can be found using the standard GigE Vision® discovery mechanism. Roboception offers the tool rcdiscover-gui, which can be downloaded free of charge from http://www.roboception.com/download for Windows as single executable* and for Ubuntu as Debian package**.

At startup, all available rc_visard devices are listed with their names, serial numbers, current IP addresses, and unique MAC addresses.
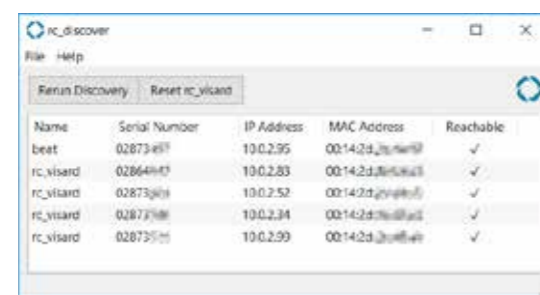
* In Windows 10, Smart Screen Defender will be triggered when starting the tool for the first time. Please allow execution by clicking on 'More Info', confirm that the issuer is Roboception GmbH, and then click 'Run Anyway'.
** In Ubuntu you will be prompted whether to disable Reverse Path Filtering. With filtering turned on, you will not be able to discover rc_visards in subnets other than the current one.

Installation

Step 3 continued

After successful discovery, a double click on the device row opens the Web GUI of the rc_visard in the default web browser of the operating system. Please check the browser requirements.

Alternatively, some network environments automatically configure the unique host name of the rc_visard in their DNS (Domain Name Server). In this case, the Web GUI can also be accessed directly using the URL:

http://rc-visard-<serial-number>

by replacing <serial-number> with the serial number printed on the device.
For Linux and macOS, this even works without DNS via the multicast Domain Name System (mDNS), which is automatically used if .local is appended to the host name. Thus, the URL simply becomes:

http://rc-visard-<serial-number>.local

The overview page of the Web GUI gives the most important information of the on-board processing.

Congratulations
You have successfully connected to your rc_visard.
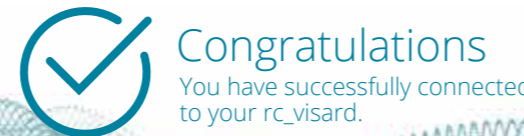
Installation

Step 4
Web GUI

The Web GUI of the rc_visard is a web-based user interface for testing, calibration and configuration. Tabs in the top row of the page give access to individual modules. Further information on all parameters in the Web GUI can be obtained by pressing the Info button next to each parameter.

* *Camera* shows a live stream of the rc_visard's left and right rectified images. The frame rate can be reduced to save bandwidth when streaming to a GigE Vision® client. Furthermore, exposure can be set manually or automatically.

* *Depth Image* shows a live stream of the left rectified image, the depth image, and the confidence image. The page contains various settings for depth-image computation and filtering.
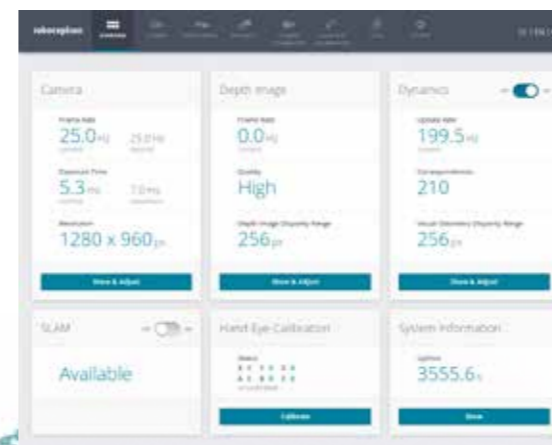
Installation

Step 4 continued

* *Dynamics* shows the location and movement of image features that are used to compute the egomotion of the rc_visard. Settings include the number of corners and features that should be used.

* *Camera Calibration* permits the camera to be checked for proper calibration. In rare cases when the camera is no longer sufficiently calibrated, calibration can also be performed using this module.

* *Hand-Eye-Calibration* allows the computation of the static transformation between the rc_visard and a coordinate system known in the robot system. This can be the flange coordinate system of a robotic arm if the rc_visard is attached to the flange. Alternatively, the rc_visard may be mounted statically in the robot environment and calibrated to any other static frame known in the robot system.

* *Logs* permits access to the log files on the rc_visard.

* *System* permits the firmware or the license file to be updated, and provides some general information about the device.

* Full *Documentation* can be accessed through the button ⍰ in the top right corner of the Web GUI, or via download from the Roboception web page http://www.roboception.com/documentation.

Troubleshooting

LED Colors

During the boot process, the LED will change color several times to indicate stages in the startup process:

LED color	Boot stage
White	Power supply OK
Yellow → Purple → Blue	Normal boot process in progress
Green	Boot complete, the rc_visard is ready

The LED will also signal some warning or error states to support the user during troubleshooting. For detailed information, please consult the full manual.

LED color	Warning or error state
Off	No power to the sensor
Green with brief red flash every 5 seconds	No network connectivity
Green with longer red flash	A process terminated and fails to restart
Red while sensor appears to function normally	Temperature warning (case exceeds 60 °C)

Support

Please refer to Web GUI and documentation. For further support issues, please refer to http://www.roboception.com/support or email support@roboception.de or phone +49-89-8895079-0. *

* phone support during CET business hours only

Conformity

The rc_visard has been designed and tested to be in compliance with the following standards:

AS/NZS CISPR32 : 2015, CISPR 32 : 2015, GB 9254 : 2008, CISPR 24 : 2015+A1 : 2015, EN 50581 : 2012, EN 55032 : 2015, EN 55024 : 2010+A1 : 2015, EN 61000-6-2 : 2005, EN 61000-6-3 : 2007+A1 : 2011

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