

# Rockchip ROS Introduction

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ID: RK-SM-YF-377

Release Version: V1.0.2

Release Date: 2020-08-06

Security Level: ☐Top-Secret ☐Secret ☐Internal ☒Public

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## Overview

This document mainly introduces how to use ROS of Rockchip Linux SDK.

## Product Version

Chipset	Kernel Version
RK3XXX	4.4

## Intended Audience

This document (this guide) is mainly intended for:

Technical support engineers

Software development engineers

#### **Revision History**

<b>Version</b>	<b>Author</b>	<b>Date</b>	<b>Change Description</b>
V1.0.0	WZZ	2018-12	ROS has been porting into buildroot, removing the original building method and switching to the new one.
V1.0.1	WZZ	2019-12	Fix beginner_tutorials building issue
V1.0.2	Ruby Zhang	2020-08-06	Update the company name and document format

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# 1. Overview

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Rockchip Linux SDK integrated ROS which provides a range of libraries and tools to help software developers create robotic applications.

ROS version which Rockchip integrated are Indigo and kinetic.

## 2. Build

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There are two default configurations of `ros_indigo.config` and `ros_kinetic.config` under `buildroot/configs/rockchip` directory. Before building rootfs, add `ros_XXX.config` to the config corresponding to rootfs.

Take RK3308 Linux SDK as an example. Others are similar, modify `buildroot/configs/rockchip_rk3308_release_defconfig`:

```
diff --git a/configs/rockchip_rk3308_release_defconfig
b/configs/rockchip_rk3308_release_defconfig
index f905f16..a2afac1 100644
--- a/configs/rockchip_rk3308_release_defconfig
+++ b/configs/rockchip_rk3308_release_defconfig
@@ -135,3 +135,4 @@ BR2_TARGET_ROOTFS_SQUASHFS=y
 # BR2_TARGET_ROOTFS_TAR is not set
 BR2_PACKAGE_HOST_MKE2IMG=y
 BR2_PACKAGE_HOST_VBOOT_UTILS=y
+#include "ros_indigo.config"
```

And then run `./build.sh`.

Or first select the `rockchip_rk3308_release` corresponding to `source envsetup.sh`, then run `make`.

The compilation for the first time will take a few hours. After the compilation is complete, `buildroot/output/rockchip_rk3308_release/images/rootfs.squashfs` which is the rootfs firmware will be generated.

## 3. Add the New ROS Code

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There is a `ros_sample` provided: [https://github.com/DZain/ROS\\_Sample.git](https://github.com/DZain/ROS_Sample.git)

Put the project to external, and rename to `beginner_tutorials`.

Then add the following files and modifications in buildroot:

1. `vi buildroot/package/rockchip/ros/beginner_tutorials/Config.in`, add the following contents:

```

config BR2_PACKAGE_BEGINNER_TUTORIALS
bool "beginner tutorials"
select BR2_PACKAGE_ROSCPP
select BR2_PACKAGE_ROSPY
select BR2_PACKAGE_STD_MSGS
select BR2_PACKAGE_GENMSG
help
beginner tutorials

```

The select option in the Config depends on the dependencies in the project.

2. `vi buildroot/package/rockchip/ros/beginner_tutorials/beginner_tutorials.mk`

```

BEGINNER_TUTORIALS_VERSION = 1.0.0
BEGINNER_TUTORIALS_SITE_METHOD = local
BEGINNER_TUTORIALS_SITE = $(TOPDIR)/../external/beginner_tutorials

BEGINNER_TUTORIALS_DEPENDENCIES = roscpp rospy std-msgs genmsg

${eval ${catkin-package}}

```

3. Add beginner\_tutorials to buildroot:

```

@@ -46,6 +46,7 @@ source diff --git a/package/rockchip/ros/Config.in
b/package/rockchip/ros/Config.in
index e26003aa9f..cb6f6c18e6 100644
--- a/package/rockchip/ros/Config.in
+++ b/package/rockchip/ros/Config.in
@@ -46,6 +46,7 @@ source "package/rockchip/ros/cmake_modules/Config.in"
source "package/rockchip/ros/rospack/Config.in"
source "package/rockchip/ros/orocos_kinematics_dynamics/Config.in"
source "package/rockchip/ros/image-common/Config.in"
+source "package/rockchip/ros/beginner_tutorials/Config.in"
source "package/rockchip/ros/bond-core/Config.in"
source "package/rockchip/ros/nodelet-core/Config.in"

```

4. Build

Run the source `envsetup.sh` in the SDK root directory, select `rockchip_rk3308_release` (If you have already ran it, don't have to run again).

Configure `make menuconfig`, use '/' opening search menu, search `BEGINNER_TUTORIALS` (in step 1, defined in `Config.in`), and select.

Save the configuration.

Build with `make`.

(Or use `make beginner_tutorials` directly. Rebuild using `make beginner_tutorials-dirclean && make beginner_tutorials`)

## 4. Flashing

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Please refer to the release documentations of Rockchip Linux SDK for instructions on how to flash firmware. It won't go into details here. Just download the Rootfs.img generated by ROS building to the corresponding rootfs partition.

## 5. Run

---

The steps to run ROS are as follows:

1. Configure environment variables

```
source /opt/ros/indigo/setup.sh
```

2. Run roscore

```
roscore &
```

3. Run the code

Take the beginner\_tutorials as an example:

```
roslaunch beginner_tutorials talker
```

Running result:

```
[ INFO] [1501923947.458788791]: hello world 0
[ INFO] [1501923947.558904332]: hello world 1
[ INFO] [1501923947.658774958]: hello world 2
[ INFO] [1501923947.758644458]: hello world 3
[ INFO] [1501923947.858779666]: hello world 4
[ INFO] [1501923947.958779291]: hello world 5
```

(The beginner\_tutorials code is a pair of programs, "talker" is used to send and "listener" is used to listen, open talker alone, number will accumulate continuously, and there is no phenomenon when opening listener alone, but when talker is opened at the same time, two programs number print simultaneously)