

Reference Design Creates Remote-Control Racing Toys



Based on 2.4GHz wireless tech, the nRFready R/C Racing reference design from Nordic Semiconductor allows developers to create advanced remote-control race toy cars. Features of the design include the ability to race with multiple friends, setting up free-form racing tracks using waypoints, feeling crashes through controller vibration, and the ability to collect, see and share racing data.

The nRFready R/C Racing reference design includes a pair of cars and controllers, four waypoints, a USB dongle, the nRFready Racing Studio PC application, as well as all required source code and hardware design files. The cars, controllers and waypoints are all based on Nordic's single chip nRF24LE1 2.4GHz RF System-on-Chip (SoC) solution. This provides both a flexible development platform with flash, and a smooth migration to Nordic's lower-cost OTP (one time programmable) variants for mass production (see www.tinyurl.com/y8vejn5 [1]).

The cars in the nRFready R/C Racing reference design feature continuous steering and throttle control, crash sensors, plus blinker lights and headlights that can be switched on and off from the controller. In addition, the controllers include LEDs for car battery status and force (vibration) feedback to indicate crashes. Cars can also detect when they are in close proximity to a waypoint and wirelessly send race statistics such as lap times, speed and number of crashes to the nRFready Racing Studio PC application through the supplied USB dongle.

"We see an increasing interest in our 2.4GHz technology from the toy industry," says Thomas Embla Bonnerud, Product Manager with Nordic Semiconductor. "This reference design enables innovative toy manufacturers to very easily take advantage of our 2.4GHz technology to take their remote controlled toys to the next level by adding features not possible with the 27/49MHz technologies typically

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employed today, and at a price point consumers around the world will find appealing.”

Availability and pricing

The nRFready R/C Racing (product order code: nRF6909) is available to innovative toy manufacturers from today. Contact Nordic sales for pricing (see www.tinyurl.com/37mnaed [2]).

Key game-play features of nRFready R/C Racing

- Race against all of your friends, not just one friend
Each car and controller can easily be paired to one another, and with Nordic’s Gazell 2.4GHz protocol more than two cars can race against each other without interference. All this, without the typical hassle of changing physical crystals in cars and controllers.
- Free-form racing track using waypoints
Multiple waypoints can be used to set-up a free-form racing track indoors or outdoors. Waypoint functionality can easily be expanded to include additional game features such as pit-stops, fuel stations or repair shops.
- Feel the crash
Two-way communications between each car and remote control enables racers to feel a car crash through force (vibration) feed-back in the controller.
- Collect and share racing data
Racing statistics such as lap time, number of crashes, and speed, are all wirelessly collected by the nRFready Racing Studio application enabling users to log and visualize racing data, and even share it over the Internet.

About the nRF24LE1

The nRF24LE1 is a ULP system-on-chip 2.4GHz transceiver that enables single-chip implementation of wireless applications. The nRF24LE1’s radio is a fully featured nRF24L01+ 2.4GHz transceiver core including Nordic’s proven Enhanced ShockBurst hardware link layer. It delivers true ULP operation with peak currents low enough to run on coin cell batteries.

The nRF24LE1 integrates an enhanced 8051 mixed signal MCU core featuring fewer clock cycles per instruction than legacy 8051 devices. Most instructions need just one or two clock cycles leading to an average performance improvement of 8X using the MIPS (Million Instructions Per Second) benchmark. This high performance combined with 16kbytes of on-chip flash and 1kbytes of SRAM ensures the processing platform is powerful enough to run both the RF protocol stack and application layer with ease.

A wide range of peripherals and power saving modes support the RF protocol stack. A ULP 32kHz crystal oscillator provides high accuracy timing for low report rate synchronous protocols and a 16MHz RC oscillator provides fast start-up times from idle. The 32kHz oscillator can provide timing accurate enough for higher report rate protocols without requiring an external crystal. A security co-processor enables AES encrypted wireless communication. The nRF24LE1 provides a range of nanoamp and microamp idle modes specifically designed for ULP RF protocol stacks. Further

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benefits include higher precision protocol timing, lower power consumption and improved co-existence performance.

For the application layer the nRF24LE1 offers a rich set of interfaces and peripherals including an SPI, 2-wire, UART, 12-bit ADC, PWM and an analog comparator. As such, the nRF24LE1 is the ideal single chip solution for applications including mice, keyboards, remote controls, game controllers, sports/healthcare sensors, toys and active RFID tags.

www.nordicsemi.com [3]

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Links:

[1] <http://www.tinyurl.com/y8vejn5>

[2] <http://www.tinyurl.com/37mnaed>

[3] <http://www.nordicsemi.com>