NEW RADIO COMMUNICATION FOR NEW ERA

NRC7394 SW PKG Release Note (v1.0)

Ultra-low power & Long-range Wi-Fi

Ver 1.0
Apr. 5, 2023

NEWRACOM, Inc.

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Ultra-low power & Long-range Wi-Fi

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1 Overview

The IEEE 802.11ah is a new Wi-Fi standard created to fulfill the requirements of a variety of IoT applications. Newracom's NRC7394 chip provides two modes of operation: host mode and standalone mode. Host mode necessitates an external host device, like the Raspberry Pi4 included in Newracom's EVK, to supply 11ah Wi-Fi connectivity. On the other hand, standalone mode enables users to develop their own applications using the APIs provided in the standalone package, compile binaries with the SDK, and execute them on the NRC7394. In standalone mode, users can use the NRC7394's various peripheral interfaces to collect sensor data and transmit it to the server over the 11ah network. Furthermore, the NRC7394 offers an AT commands application in standalone mode, allowing users to utilize the 11ah Wi-Fi network.

This document outlines the NRC7394 software package for host mode.

2 Contents of software release package

The software release package encompasses all the necessary components for utilizing the most recent features, including firmware libraries, header files, APIs, sample codes, downloader tool, makefile, and documentation. Figure 2.1 illustrates the directory structure of the package, while Table 2.1 presents a summary of its contents.

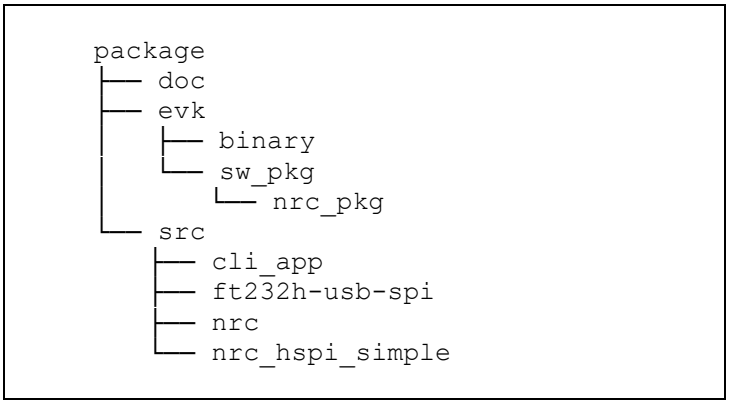

Figure 2.1 NRC7394 software release package directory

Table 2.1 Contents of NRC7394 software release package

Directory	Description
src/cli_app	The cli_app is a C-based application program. The user can use CLI commands on Raspberry PI4 by using this app. The application document and source code are included so user can build and apply it to their host platform.
src/nrc	The nrc is Linux driver for NRC7394 and its source code is included, so user can modify the source code for their own host platform.
src/ft232h-usb-spi	The FT232H USB-SPI bridge driver codes.
src/nrc_hspi_simple	The simple nrc driver codes for SPI interface testing.
evk/sw_pkg	This directory contains user guide documents and software package nrc_pkg is for 11ah. All the scripts, driver and firmware for host-mode EVK are included in the package.
evk/binary	This directory contains firmware, driver and cli_app.
doc	This directory contains document files.

The information of the binaries released in this package is as follows.

- Firmware
  - Name : nrc7394_cspi.bin (MD5: b7520dd618fcb00739dbc4fcfa53f976)
  - Location : evk/binary
  - Version : 1.0
  - Build date : Apr. 5, 2023
- Linux driver
  - Name : nrc.ko (MD5: 4c8f3a6e52a7c5d424478e98c99edee2)
  - Location : evk/binary
  - Version : 5.10.17 (Linux Kernel Version)
  - Build date : Apr. 5, 2023
- CLI application
  - Name : cli_app (MD5: 3b1b645bb82b0b9f4a6810da9b296b54)
  - Location : evk/binary
  - Version : 2.16.0
  - Build date : Apr. 5, 2023

3 SW Release Package

3.1 Features

The NRC7394 software release package contains the following features.

- **HaLow certification features**
  - HaLow R1 mandatory features (v1.0)
  - HaLow R1 optional features (v1.0)

    - AP optional features: BSS color, fragmentation

    - STA optional features: MCS 3-7, NDP probing, A-MPDU TX, power save
- **Security feature**
  - WPA3-SAE (v1.0)
  - OWE (v1.0)
  - Kr00k vulnerability (v1.0)
- **Network stack features**
  - Channel switch announcement (CSA) (v1.0)
  - Dynamic vendor IE (v1.0)
  - WPS-PBC (v1.0)
  - IEEE 802.11s mesh network (v1.0)
  - Tree-based relay network (v1.0)
  - Network bridge (v1.0)
  - Self-configuration (v1.0)
  - RSSI-based roaming (v1.0)
  - Passive scan (v1.0)
- **Regulation features**
  - Duty cycle (v1.0)
- **System features**
  - Power save – deep sleep (v1.0)
  - WDT/Recovery (v1.0)

3.2 Resolved issues

Table 3.1 Resolved issues

Version	Description
v1.0	N/A

3.3 Changed items

Table 3.2 Changed items

Version	Description
v1.0	N/A

3.4 Known issues

Table 3.3 Known issues

Category	Description
Mesh	In multi-hop mesh network, DHCP may experience delays or failures. It is recommended to use static IP addresses for networks with more than three hops.
Performance	Using a short guard interval on 1 or 2 MHz channels can lead to degraded performance.
Recovery	WDT reset recovery is not supported on concurrent mode devices such as MAP or relay.
PMF	The issue of deauthentication frame delivery failure can occur between PMF-enabled NRC7394 and PMF-enabled NRC7292 devices.