

DECT NR+ Embedded C API — Overview

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What it is

FLSEMI's DECT NR+ stack runs on the Nordic Semiconductor nRF91x1. With the **embedded C API**, your application runs on the same chip, beside the stack, and calls it directly. No host processor is needed. The stack ships as a prebuilt library for nRF Connect SDK (Zephyr), with headers and five sample applications.

If your product already has a processor, the same stack can be driven from it instead, through the **host interface**. A separate overview describes it. Both paths reach the same stack.



Figure 1. Two ways to integrate the same stack

The programming model

- **One stack thread owns the radio timeline.** Your threads never block it, and the stack never blocks you.
- **Calls return at once.** Results and state changes arrive as events, through handlers you register before start-up.
- **Exactly one delivery result per accepted send.** A send the stack cannot take now is refused at once, so your code can wait and retry without losing track of anything.
- **Data travels on endpoints.** Your application picks endpoint numbers for its own traffic, and the stack segments larger messages for you.
- **The build checks your configuration.** If your application changes a stack option the library was not built with, the build stops and names the option, instead of failing on the air.

A typical flow



Figure 2. From power-up to data, in six steps

The API by area

Area	What your application can do
Bring-up	Start the radio and every layer with one call, in the right order. Register event handlers first.
Identity and provisioning	Set the network identity, the operating carrier and the network-beacon carrier. Read the node's own identity back.
Roles and topology	Choose mesh or star. Start a mesh sink, relay or leaf, or a star hub or member. Optionally prefer a parent. Stop or change the role.
Data	Send to the sink (routed uplink), to a node (routed downlink) or to a direct neighbour. Receive on your own endpoints. Get flow control and a delivery result for every message.
Events	Radio ready; association up and down; a routing child or route appears or leaves; time synchronised; the site configuration changed.
Security	Mode 1 link security, when enabled. Install the network key (kept in the chip's secure storage), require secured links, cipher beacons, and rotate the key without taking the network down.
Site configuration	At the sink, publish a site configuration once. The stack distributes it to every node across the mesh.

Status	Read each link's quality and protection, the node's role and parent, and counters for every layer.
Persistence	Save a boot profile, so the node returns in its role after a power cycle with no host involved.

Sample applications

Sample	Role	What it shows
mesh_sink	Mesh root	Receives every node's routed reports and lists its links.
mesh_relay	Mesh relay	Joins a parent, opens its own cluster for children and forwards both ways.
mesh_leaf	Mesh leaf	Joins a sink or relay and sends a routed report every few seconds.
star_ft	Star hub	Members associate with it directly; it acknowledges each message.
star_pt	Star member	Talks to its hub directly; no forwarding.

Boards

Board	Status
Nordic Semiconductor nRF9151 DK	verified on hardware All five roles, with link security enabled.
Nordic Semiconductor Thingy:91 X	verified on hardware All five roles, with link security enabled. Needs an SWD debug probe.
Nordic Semiconductor nRF9131 EK	verified on hardware All five roles, with link security enabled. 1.9 GHz only (no 902–928 MHz); in the US, Band 9.
LooUQ MTC.2 N9151	supported (build) Needs an SWD debug probe.

"Supported (build)" means the samples are compiled and linked for that board but have not yet been run on it.

What you receive

Evaluation-kit holders receive the library for their board, the headers, the source of the five samples, ready-to-flash images, and the Developer Guide, which documents every call, event and configuration rule. To receive them, leave your company details at flsemi.us/downloads#sdk.

Notes.

- The HIF and the Embedded SDK are supported only on nRF91 devices and related products shipped by FLSEMI, or shipped under licence from FLSEMI.
- The stack is provided as a prebuilt library. Source code is not provided.
- FLSEMI's DECT NR+ firmware has not yet been through DECT NR+ certification or formal conformance testing. Boards running it are evaluation platforms, not FCC-authorized end products.
- In the United States, operate on Band 9 (1.9 GHz) or Band 4 (902–928 MHz) only; the nRF9131 EK supports 1.9 GHz only. No throughput or range figures are stated.

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