

STRATUM9

UNLOCK

a new level of industrial wireless.

Who is STRATUM 9?

2022

Founded by
Alfred della Torre Jr. &
Hubert Feurstein

25+

Years of experience
in embedded software &
hardware development

15+

Years of experience
in industrial automation &
PROFINET development

STRATUM 9 GmbH
Kufstein, Tyrol, Austria



DECT NR+

We provide DECT NR+ communication solutions from the initial concept phase through functional validation to fully integrated, production-ready systems. Our end-to-end expertise spans protocol and MAC layer development, firmware, hardware, and complete system integration, optimised for industrial applications.

IoT

We develop customised IoT products from the initial concept phase through the functional prototype to the production-ready solution. Our range of services includes the development of hardware, firmware and cloud backend services – optimised for the customer's application and ready for use in large-scale production.

dect forum member

TÜV SÜD ISO 9001

NORDIC SEMICONDUCTOR SOLUTION PARTNER

NR+ PORTFOLIO

Three ways to work with STRATUM 9:

1

Software Licensing

Integrate our DECT NR+ **software stack** into your device or application stack or run your own demo with our **Starter Kit.**

2

Ready-to-use Hardware

Directly deploy or white-label our DECT NR+ **Gateway** for your own or your customer's industrial wireless application.

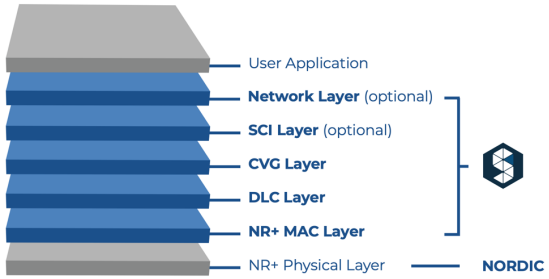
3

End-to-End Solutions

Our expert developers create your own custo-mised **turnkey solution**, tailored precisely to your industrial application.

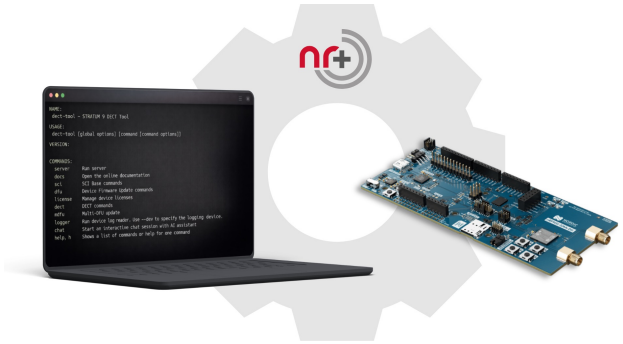
STRATUM 9 DECT NR+ Portfolio

DECT NR+ STACK



Deterministic, scheduled access MAC for industrial applications

DECT NR+ STARTER KIT



Configure, test and optimise your own demo application in minutes

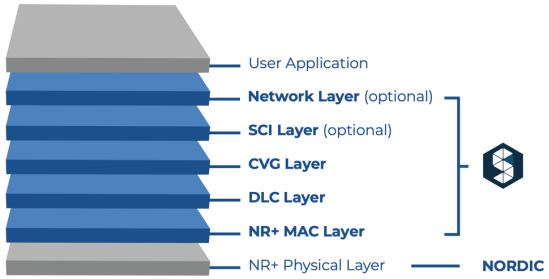
DECT NR+ GATEWAY



Ready-to-use hardware for real-time industrial wireless

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DECT NR+ STACK



Deterministic, scheduled access MAC for industrial applications

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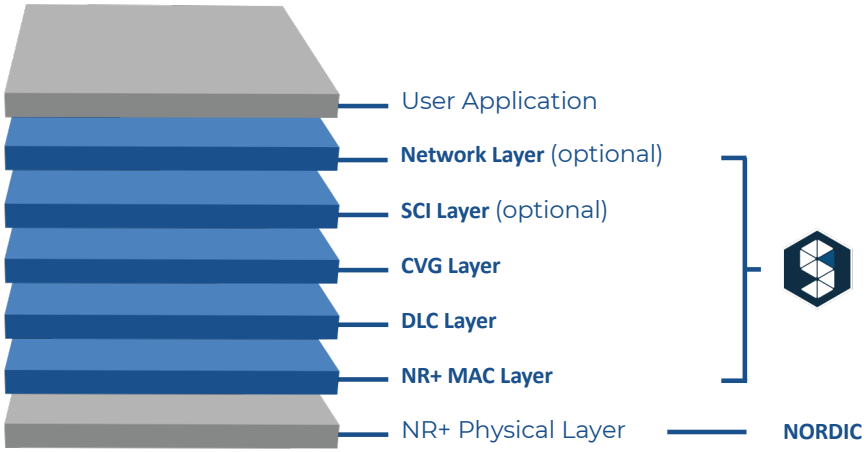
Configure, test and optimise your own demo application in minutes

DECT NR+ GATEWAY

Ready-to-use hardware for real-time industrial wireless

The S9 DECT NR+ Stack

- Designed for the Nordic **nRF91** series, built on Nordic's PHY layer
- Enables **deterministic**, reliable, and low-latency wireless communication
- Manages medium access, timing, and collision-free communication
- Every layer is developed and optimised for demanding industrial applications

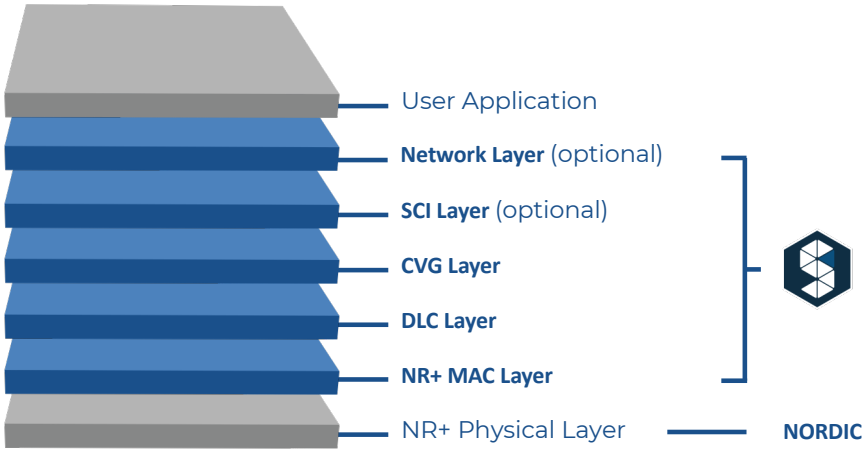


Key Features:

1. **Real-time scheduling with constant data rate and latency**
2. **True QoS management through determinism**
3. **Seamless Handover of moving participants**
4. **Transparent industrial Ethernet tunnelling**

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Typical Use Cases:


AGV


Mobile Robotics



Wireless Safety Applications


Motion Control - Real Time

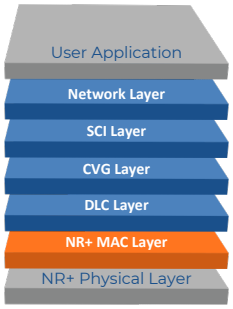

Machine-to-Machine Communication


Sorter Applications

... and many more

The S9 MAC Layer

The MAC layer brings structure and control. It regulates access to the medium, assigns transmission opportunities, and prevents collisions. Especially in industrial environments, this layer is essential for predictable timing, coordinated communication, and deterministic system performance.



Core Features:

Scheduling & Resource Handling

- Up to 32 Devices per FT (bidirectional)
- S9 Vendor Specific Resource Allocation IE
- Pre-Defined Scheduling Plans
- Symmetric Up- and Downlink

Modes & Flow Management

- PT Mode
- FT Mode
- SCAN Mode
- 4 User Plane Flows

Timing & Synchronisation

- Time-sync FT => PT (System Time)
- Sub-millisecond precision
- S9 Vendor Specific TimeCode IE in Beacon Message
- Time-sync FT => FT for Frame Phase alignment

Protocol Compliance & Messaging

- Cluster Beacon Message
- Network Beacon Message
- Unicast Message
- S9 Vendor Specific ARQ Mode (S9 ACK IE)
- Data Encryption

Mobility & Handover

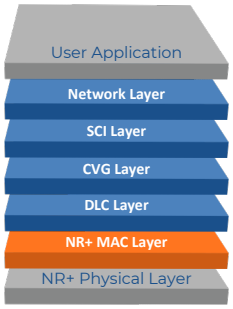
- Standard Handover
- Seamless Handover (no dataflow interruption)
- Pre-Provisioned Devices (for quick and simple device replacement)

Integration & Interfaces

- Optimised for instant associations
- Simple device replacement
- IP networking

The S9 MAC Layer

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Scheduled Access & Resource Handling

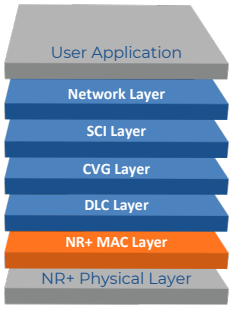
- Stack organises airtime according to the application requirement
- Predefined scheduling plans (e.g. 10/50/100 ms) define how the FT structures communication with PTs
- Plans allow the system to balance latency, capacity and traffic direction

Plan-Type	Optimized for	Typical use case
Ultra-Low Latency	Minimal latency	Robotics, process control, drones
Standard	Balanced performance	Sensor networks, asset tracking
High-Capacity	Maximum device density	Sensors, building automation
Interleaved	High data throughput	Data streaming, condition monitoring

- ✓ Up to 32 devices per FT (bidirectional)
- ✓ S9 Vendor Specific Resource Allocation IE
- ✓ Symmetric Up- and Downlink

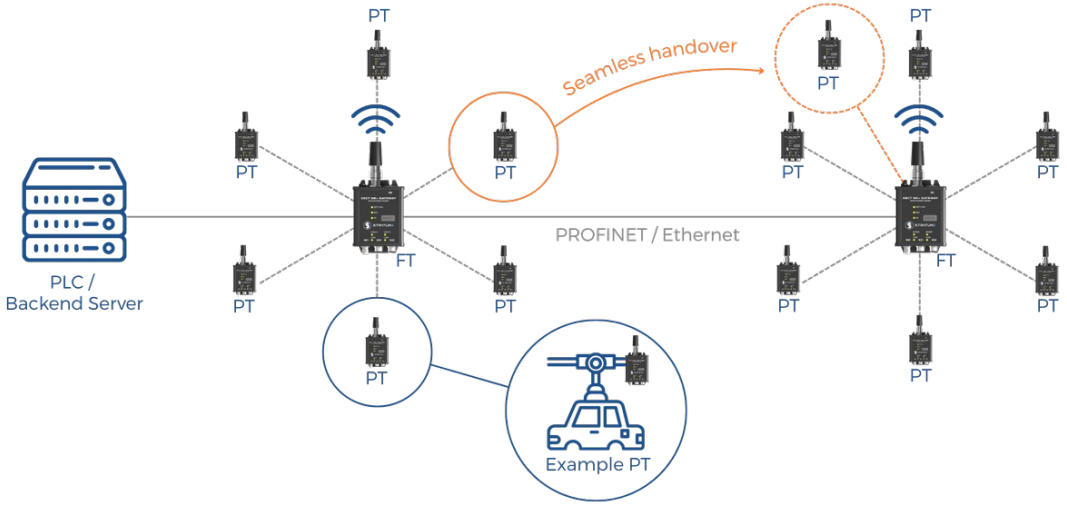
The S9 MAC Layer

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Seamless Handover for Mobile Systems

- Allows mobile PTs to move between FTs while ensuring a constant connection
- No communication dropouts or unnecessary downtime
- Even in high-speed or constantly moving applications

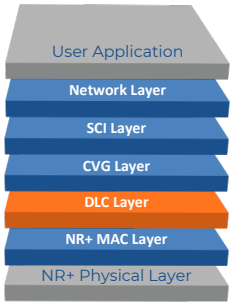


Upper Layers:

The S9 DLC Layer

Offers multiple service types for optimised data transmission depending on latency, reliability, and data size requirements.

0 | DLC-T *Transparent Mode*
1 | DLC-S *Segmentation Mode*
2 | DLC-A *ARQ Mode*
3 | DLC-SA *Segmentation & ARQ Mode*

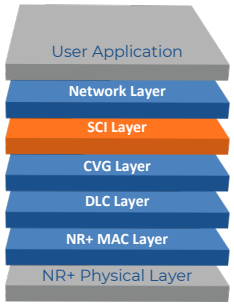


The SCI Layer

STRATUM 9 Controller Interface Layer

Enables the connection of controllers, applications and tools, coordinates commands and distributes relevant information within the system.

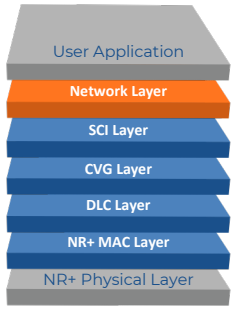
- Command Services (Base, DFU, ...)
- Command Transport Layer (UART, RTT, DECT, CAN, SPI, TCP/IP, ...)
- Command Routing to other Controllers
- etc.



The S9 Network Layer

Transparent industrial Ethernet tunnelling on Layer 2 without protocol conversion - simplifies integration into existing automation architectures.





Stack Implementation Options:

Software Stack

For direct integration of the DECT NR+ Stack into an existing nRF91 firmware project as a Zephyr module.

Powerful SDK for faster and more efficient DECT NR+ application development.

More functions, less effort: add-on modules relieve users of the burden of implementation and create space for core applications.

Firmware Image

Ready-to-use firmware image with all basic functions for immediate use of DECT NR+ on existing hardware.

Tried and tested firmware image that saves users the trouble of developing their own firmware for the nRF91 chip.

Application runs on a controller of the user's choice and communicates with the nRF91 via defined interfaces.

Development Package

Customised hardware solutions, from the idea to a product ready for series production.

Customised firmware tailored to client's hardware and application, ensuring smooth, high-performance processes.

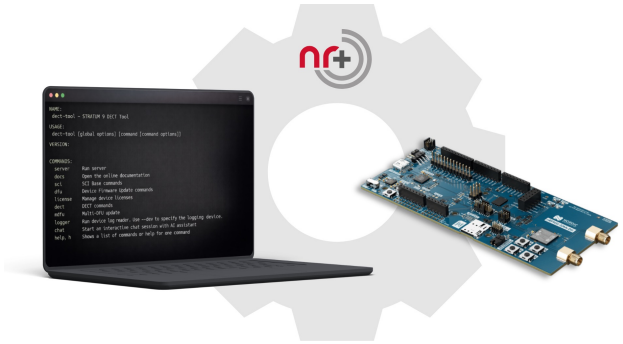
Client retains control of their devices and data at all times with scalable S9 backend solutions.

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DECT NR+ STACK

Deterministic, scheduled access MAC for industrial applications

DECT NR+ STARTER KIT



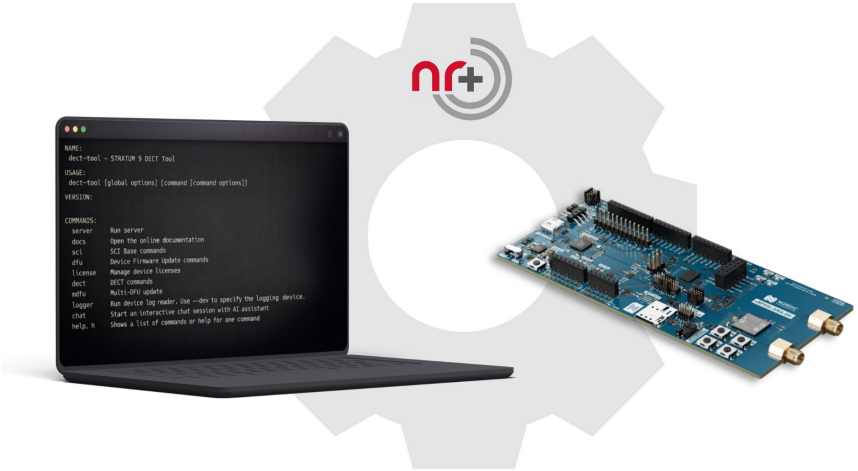
Configure, test and optimise your own demo application in minutes

DECT NR+ GATEWAY

Ready-to-use hardware for real-time industrial wireless

The S9 DECT NR+ Starter Kit

Licence-based development and evaluation platform on the
Nordic nRF9151 DK*



Your own demo application: Get started in minutes

- Send and receive real data over DECT NR+
- Experience the performance in practice
- Validate your application ideas immediately

Your command center: The DECT tool

- Configure, test, and optimise wireless networks
- Monitor live statistics & analyse signal quality
- Manage fleet firmware, updates & licences

Your personal expert: The integrated AI assistant

- Get answers to configuration questions
- Get command suggestions
- Resolve issues faster

*Nordic development kits are not included in the Starter Kit

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Ready-to-use hardware for real-time industrial wireless

The S9 DECT NR+ Gateway

Industrial-grade radio hardware with S9 DECT NR+ Software Stack



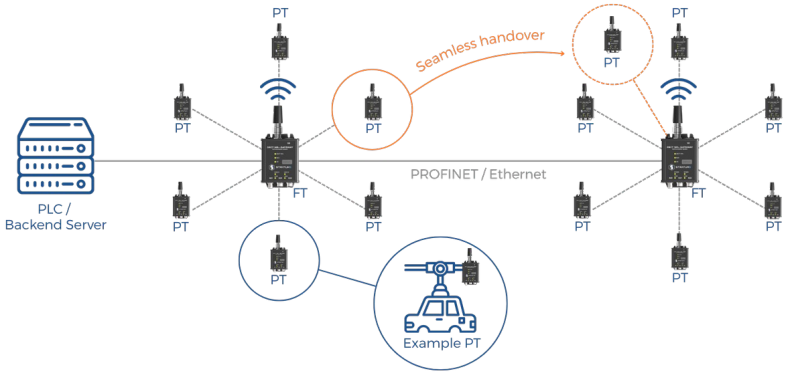
- **Deterministic real-time communication**
- **Wireless PROFINET & PROFIsafe**
- **Seamless Handover**
- **Same hardware configurable as FT or PT**
- **Retro-fit without downtime**
- **“Device stacking” function for more bandwidth**

Technical Data

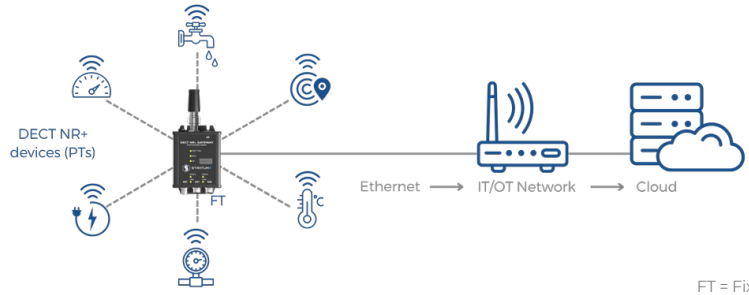
Data Interface:	2x LAN, 1x CAN/Pwr
Connectors:	Vibration-proof M12 ports
Supply Voltage:	24 V DC
Range:	Up to 1 km (line-of-sight)
Start-up Time:	< 5 s
Dimensions (H x B x D):	192 x 87 x 32 mm
Housing:	Aluminum, IP54

Communication Architecture

For industrial real-time communication:



For industrial data transmission:



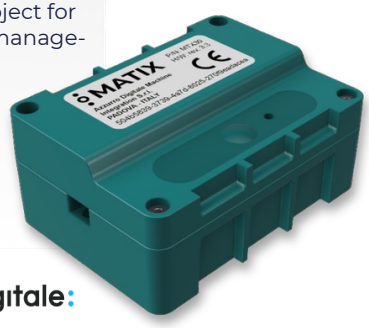
FT = Fixed Termination Point
PT = Portable Termination Point

NR+ Deployment Examples:

1

Software Licensing

DECT NR+ stack integrated as Zephyr module into existing firmware project for digital asset management



azzurrodigitale:

2

Ready-to-use Hardware

DECT NR+ Gateway white-labeled as “Smart Antenna” for rail-guided systems in automotive & intralogistics

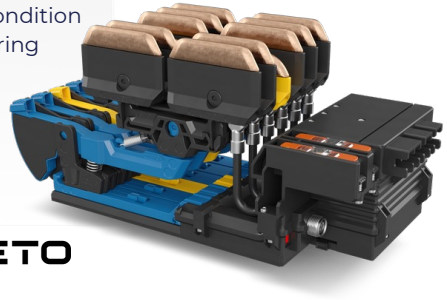


SPIE
technology powered by DETO

3

End-to-End Solutions

Customised solution with electronics, firmware, embedded software & UI for real-time condition monitoring



DETO

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