

# TJA1121 – MACsec enabled 1000BASE-T1 Ethernet PHY

TJA1121 adds MACsec to NXP's 1000BASE-T1 Automotive Ethernet PHY portfolio. The device allows to communicate with 1 Gb/s line rate over a single pair of wire, securely authenticated and (optionally) encrypted.

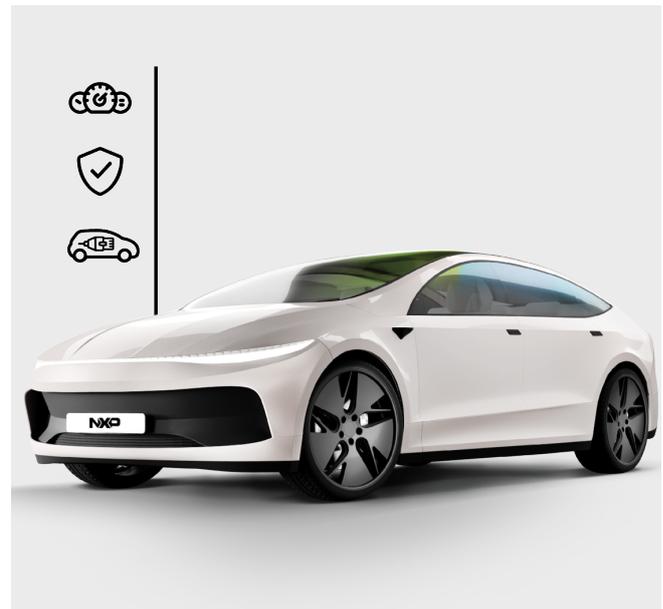
The PHY is pin compatible with TJA1103, TJA1104 and TJA1120 to enable speed grade scaling from 100 Mb to 1 Gb, with and without MACsec. The TJA11xx-evaluation kit provides the reference layout for drop-in replacement.

TJA1121 supports the growing data rate requirements of edge nodes (e.g. Radar), zonal controllers, gateways and communication backbones to central compute units. It adds another instrument to the toolbox of OEMs and Tier-1s, to help fulfill state of the art security requirements as per UNECE regulations.

TJA1121 interoperability and compliance was validated against latest conformance test specifications. Seamless connection to switches and host controllers is ensured by product versions with RGMII and SGMII MAC interface. To support the safety goals at vehicle level, the TJA1121 is designed according to ISO 26262 to meet ASIL B. Its enhanced monitoring and diagnostic features support fast event localization and swift system response. Also the MACsec IP is included in the safety concept.

## Key features

- 802.1AE-2018 MACsec (at 1 Gbps line rate)
- Functional safety ISO 26262 ASIL B compliant
- OPEN Alliance TC-1 advanced PHY features
- IEEE1588v2/802.1AS compliant time stamping
- OPEN Alliance TC-10 compliant sleep/wake up
- HVQFN36 (6 x 6 mm) with wettable flanks
- Optimized for automotive use cases
- 3V3, 1V8, 1V1 direct supply



## Automotive Target Applications

- Radar systems
- Sound system
- Vision systems and cameras, car radio, remote tuner
- E-cockpit and head unit
- TCU
- Gateway and domain controller
- Zonal controller, central compute unit

For additional information and sample availability, contact your local sales office or visit

<https://www.nxp.com/TJA1121>

The TJA1121 evaluation kit enables the functional evaluation of the PHY and consists of the TJA11XX-EVB base board and TJA1121-SDBx adapter cards. The latter gets mounted via SABRE connector and carries the selected TJA1121 variant. To flexibly adapt to different application use cases, all configuration options can be selected via jumpers and all logic interfaces can be accessed via pin headers on the base board.

The TJA1121-SDBx card is available in 2 variants: TJA1121-SDBR (with TJA1121A) offers RGMII, and TJA1121-SDBS (with TJA1121B) offers SGMII. Users, who need to evaluate the RGMII datapath in an application context together with NXP processors, can use the same TJA1121-SDBx SABRE card for software engineering and application prototyping. Various NXP system development boards feature the common SABRE connector; for example, our latest SJA1110 Ethernet switch and S32K3, S32G, SAF85xx and i.MX8 processors.

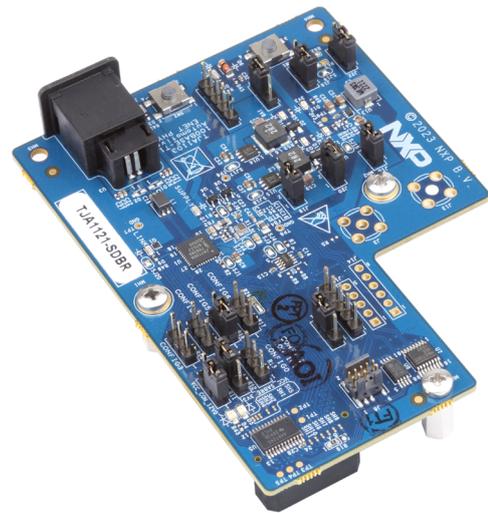
As ASIL B Safety Element out of Context (SEooC), the TJA1121 provides all features and documentation needed for functional safety development. Safety monitors and diagnostic functions enable the host controller to realize fast failure detection and localization for an optimized system response.

AUTOSAR software drivers as well as Low Level Drivers for TJA112x are available from NXP as Realtime Driver (RTD) SW bundle. The drivers support the configuration of the MACsec IP. Key exchange protocols, just like other higher-layer SW as well, are consequently not included in the device driver. To configure the evaluation kits, Python based tools and GUI are available for download.

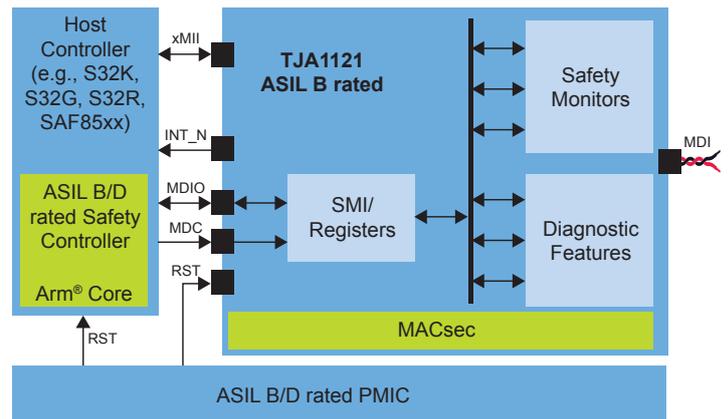
## TJA11xx Evaluation Kit



## TJA1120/21-SDBR/SDBS - SABRE Development Board



## TJA1121 Example Application



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