

NetModule Extension Modules

Compile your use case specific product variant by enhancing the standard routers with extension modules



Available Options

- GSM-R
- LTE450
- CDMA450
- IBIS
- CAN
- RS-232
- RS-485
- Audio
- GNSS with Dead Reckoning
- Mass storage

The NetModule Router architecture is based on a modular concept that allows a high degree of product customization. Providing a product family specific number of PCI Express Mini Card slots on the router main board, the router may be extended with up to six additional extension modules. All product variants are assembled and verified by NetModule to ensure type approvals and the standard conformity.

To enhance the NetModule standard cellular modules with LTE, UMTS and GSM, the options GSM-R, LTE450 and CDMA450 are available. These make it possible to connect the NetModule routers with the communication infrastructure of the railway operators and to enlarge the transmission distance.

By use of the CAN and IBIS modules the routers can interact with the digital operational control system in vehicles and trains.

The RS232 and RS485 modules enhance the functions of the NetModule routers with serial connection possibilities. Emergency calls, radio communication and VoIP can be realized with the audio module.

Precise localization of vehicles can be realized with the GNSS option. This includes also Dead Reckoning, which enables to keep high accuracy positioning by using information from various sensors (motion, direction and height) to calculate the current position, even when GNSS only positioning is difficult or impossible.

The mass storage options enable the possibility to - regardless of the internet connectivity - save documents, images, audio and video data, etc. and provide them as offline media.

Specifications

GSM-R	Frequency bands: GSM-R/ EGSM900/ GSM1800 Data service: GPRS class 10 up to 85.6 kbps (DL) and 42.8 kbps (UL) Data only
LTE450	Frequency bands: LTE Band 3 (1800 MHz), LTE Band 7 (2600 MHz), LTE Band 20 (800 MHz), LTE Band 31 (450 MHz), UMTS Band 1 (2100 MHz), UMTS Band 8 (900 MHz) Data rates: LTE 100 Mbps Downlink/50 Mbps Uplink, UMTS 42Mbps Downlink/5.76Mbps Uplink
CDMA450	CDMA 1xEV-DO Rev-B Module 450MHz, Cellular 0.25W Power class 3 Frequency bands: Band Class 5 Block Designators A + B Transmit frequencies: 452.000 - 457.475 MHz Receive frequencies: 462.000 - 467.475MHz Data rates: max. 14,7 Mbps downlink / 5.4 Mbps uplink
IBIS	IBIS Peripheral Device according to VDV 300 (Slave) Signals: WBED, WBME, WBSD, WBMS Bit: 1200 bit/s Galvanic isolation: 1500 VDC Connection: Extension connector
CAN	Protocol: CAN V2.0B Signals: CANH, CANL, GND Signal level: High > 2.75V / Low < 2V Bit rate: Up to 1Mbps Galvanic isolation 1500 VDC; no internal bus termination Connection: Extension connector
RS-232	Signals: TX, RX, CTS, RTS Signal level: High > 5V / Low < -5V Bit rates: 600, 1200, 2400, 4800, 9600, 14400 (not supported by the Linux stty), 19200, 38400, 57600, 115200, 230400, 460800, 921600 bits/s Parity: None/Even/Odd Connection: Extension connector
RS-485	Signals: RS485A, RS485B Signal level: Differential Output Voltage, Loaded 1.5V – 3.6V Bit rate: 600, 1200, 2400, 4800, 9600, 14400 (not supported by the Linux stty), 19200, 38400, 57600, 115200, 230400, 460800 bit/s Parity: None/Even/Odd Connection: Extension connector
Audio	In: level (0dB corresponds to 721mVRMS @ 1kHz) / impedance 36kΩ @ 1kHz Out: max. level -1.5dBu (0.65 VRMS, unloaded) / output level software controllable / impedance 375 Ω @ 1kHz Connection: Extension connector
GNSS with Dead Reckoning	GPS (1575.42MHz) / GLONASS (1602MHz) / BeiDou (1561.098MHz) / Galileo Ready Channels: 27 Accuracy: 2 meters Sensors: 3D accelerometer & 3D gyroscope
Mass storage	Flash: 32 GB / 64 GB SSD: 128 GB / 256 GB / 512 GB / 1 TB