RipEX – Radio modem & Router

- Native IP device
- 1× ETH, 2× COM, 1× USB
- Sleep & Save modes
- 0.1–10 watts, – 40 to +70 °C
- WiFi management
- SW feature keys
- Backup routes
- Fast remote access
- Advanced security

General

RipEX is a best-in-class radio modem renowned for overall data throughput. This Software Defined Radio with Linux OS is a native IP device which has been designed with attention to detail, performance and quality. All relevant state-of-the-art concepts have been carefully implemented.

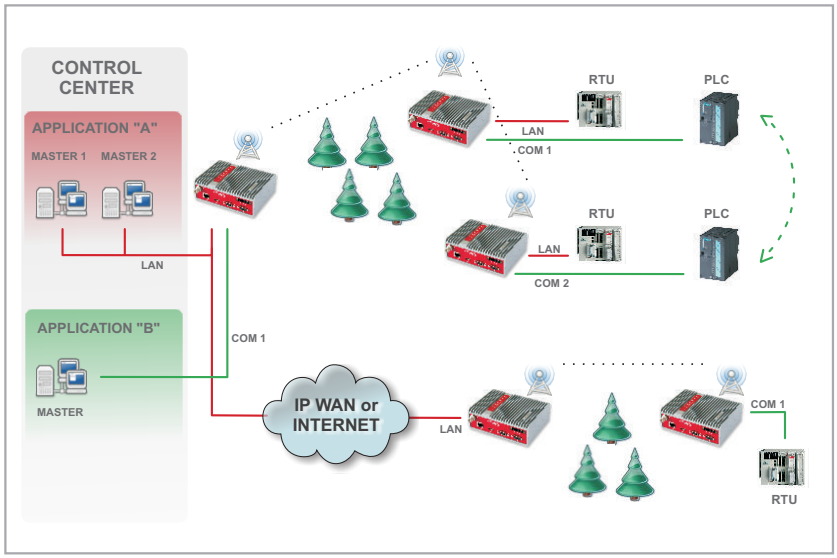
RipEX provides 24/7 reliable service for **mission-critical applications** like SCADA & Telemetry for Utilities, SmartGrid power networks or any packet network while meeting all current security requirements.

Different **protocols** on **Radio channel** are optimized for different applications: Fully **Transparent, Flexible** for meshing networks providing unlimited footprint coverage without base stations, or even the sophisticated **Base driven** protocol optimized for TCP/IP applications like IEC104 making them reliable and stable even with a high number of RTU's.

Thanks to the web interface anybody with basic IP knowledge is capable of starting up RipEX within a few minutes and can maintain the network quite easily.

Applications

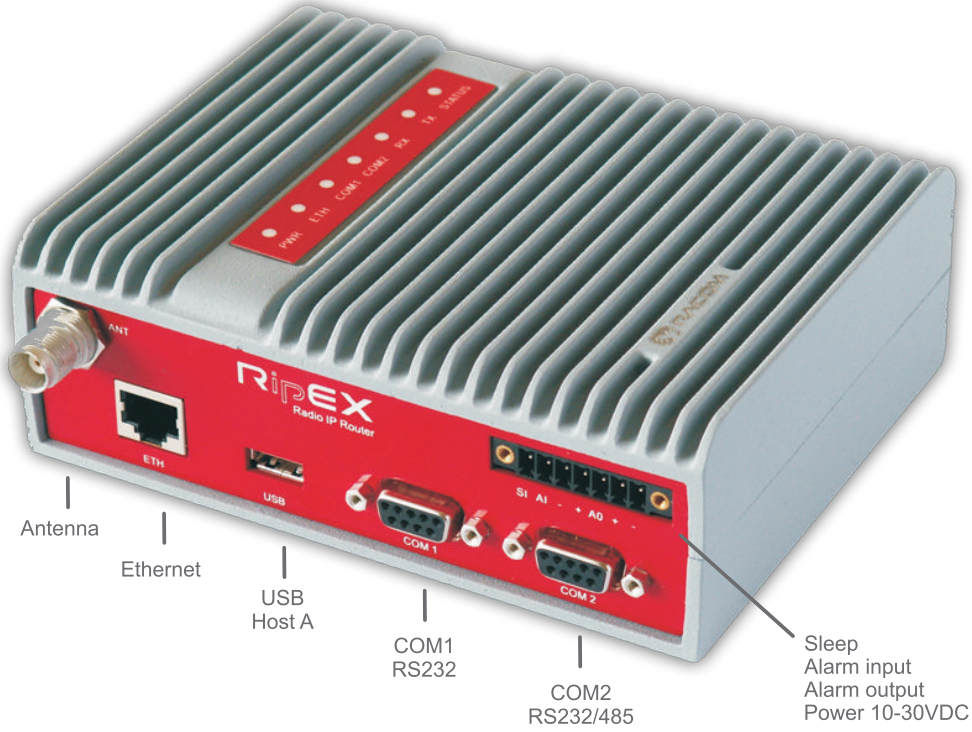
- Polling, Report-by-exception, Mesh
- SCADA & Telemetry
- Water, Oil & Gas
- Electricity
- Smart grid
- POS & ATM
- Lottery
- Weather



RipEX

Native IP device

- **Bridge mode** – Packets received on any interface are **Transparently** broadcast to the respective interfaces on all units. Packets received on COM are broadcast to both COM1 and COM2 at remote sites, allowing you to connect 2 RTU's to each remote unit.
- **Router mode** – RipEX works as a standard IP Router with 2 interfaces (Radio and Ethernet) and 2 COM port devices without any compromise. There is an option of two protocols on Radio channel: **Flexible** – unlimited anti-collision meshing without base stations or **Base driven** optimized for TCP/IP where all packet transmissions are managed by the local base station.
  - **Terminal server** - Serial-Ethernet converters, 5 independent sessions
  - **TCP proxy** - converts TCP to UDP, eliminates transfer of TCP overhead
  - **Subnets** - unlimited number of virtual Ethernet interfaces (IP aliases)
  - **VLAN** - unlimited number of VLANs assigned to Subnets
  - **ARP proxy** - any IP address simulating (for RTU's without routing capabilities within the same subnet)
  - **NAPT** - many IP addresses behind RipEX can be mapped to one RipEX IP
  - **QoS** - prioritization of packets from different interfaces and/or applications on Radio channel



Easy to configure and maintain

- **Basic** IP knowledge is sufficient
- **Web interface** or CLI via SSH
- **Service** access via **ETH** or External **Wifi** or **ETH/USB** adapter
- **Wizards** - fast and simple setup
- **All** configuration **parameters within one page**
- **Fast remote access** - only the effective data are transferred over the air, html page downloaded from the local unit
- **External flash disc -** automatic configuration, SW keys and FW upgrade

Data speed & throughput

- **> 200 kbps@50 kHz; > 100 kbps@25 kHz; > 50 kbps@12.5 kHz; > 25 kbps@6,25 kHz**
- **Optimization** - embedded optimization triples throughput on the Radio channel
- **Stream mode** - transmitting starts immediately on the Radio channel, without waiting for the end of the received frame on COM => zero latency
- **Auto-speed** - receiver is automatically adjusted to the data rate of the incoming frame

SW feature keys

- Advance features only when and where needed
- Router, Speed, COM2, 10W, Backup routes, Master
- **Free Master-key trial** - for 30 days in every RipEX

Energy savings

- **Sleep mode** - 0.1 W, triggered by Digital input
- **Save mode** - 2 W, wake up by a received packet from Radio channel or by Digital input

Radio modem & Router

Long range

- One radio hop over **50 km**, **Line of sight is not required**
- Carrier output power **0.1 - 10W**
- Exceptional data **sensitivity**
  -99 dBm / 16DEQAM / 25 kHz / BER 10e-6
  -115 dBm / 2CPFSK / 25 kHz / BER 10e-6
- **Any unit** can work **simultaneously as a repeater**
- Unlimited number of repeaters on the way
- Any IP network can interconnect RipEX units
- **Backup routes**
  - Tested alternative paths between two RipEX units
  - Automatic switch-over to backup gateway
  - Unlimited number of Alternative paths
  - Alternative paths priorities

SCADA protocols

- **Modbus, IEC101, DNP3, PR2000, Comli, DF1, Profibus, Async Link, C24, Cactus, RP570, Slip, Siemens 3964(R), IEC104, DNP3/TCP, Modbus TCP and others**
- SCADA serial protocol addresses are mapped to RipEX addresses
- TCP(UDP) protocols can be handled transparently or using Terminal server or TCP proxy
- Each packet is transferred as an acknowledged unicast
- Sophisticated **anti-collision protocol** on Radio channel => simultaneous report by exception and multi-master polling
- Embedded **Modbus RTU / Modbus TCP converter**

Diagnostics & Network Management

- **Statistic** logs for interfaces and communication links
- Historical and on-line values displayed in **graphs**
- 20 periods (e.g. days) of **history**
- **Watched values** (RSS, Ucc, Temp, PWR, etc.) also from neighbouring units
- **SNMP v3** including **Traps** and **Informs**
- HW **Alarm input,** HW **Alarm output**
- **Monitoring** – on-line analysis of communication over any of the interfaces

Radio protocols

- **Transparent / Bridge**
  - Repeater(s) supported
  - No collision avoidance capability
- **Flexible / Router**
  - Unlimited No of repeaters
  - Multi-polling and report-by-exception concurently
- **Base driven / Router**
  - Star topology, repeaters supported
  - Optimized for TCP/IP (IEC104)
  - Fair distribution of channel capacity among all remotes

Security & Integrity

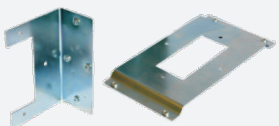
- Licensed radio bands
- **FEC**, interleaving, proprietary data compression
- **CRC32** data integrity control on Radio channel
- **AES256** encryption
- **Firewall** - Layer 2 – MAC, Layer 3 – IP, Layer 4 – TCP/UDP
- **Secured management** - https, ssh, access password
- SSL (own) certificate up to 2048 bits for https
- **IPsec, GRE, SNMP v3**

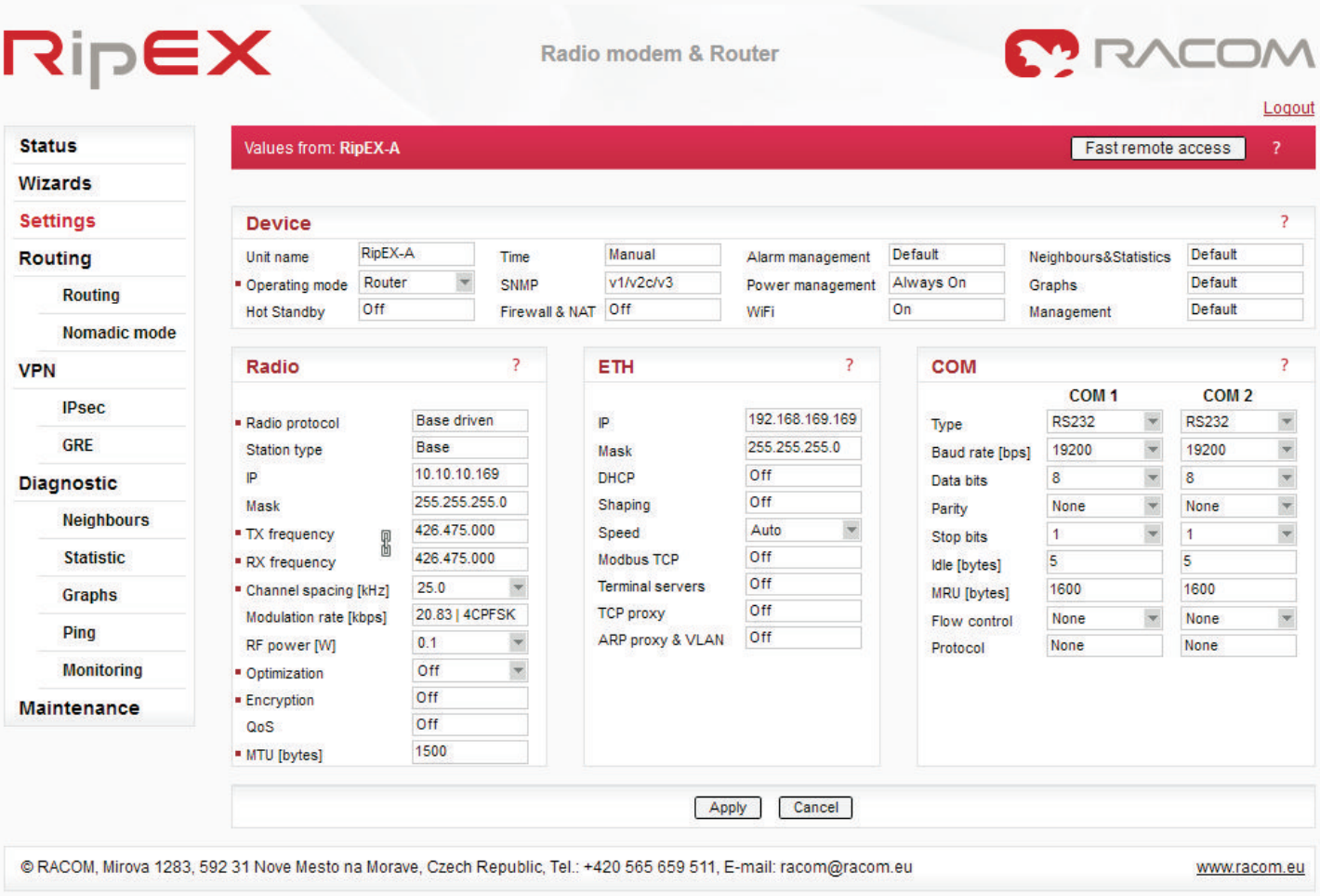
Reliability

- Units **tested in a climatic chamber** as well as in real traffic
- **Heavy-duty or industrial components**
- Industrial rugged die-cast aluminium case
- IP51
- **-40 to +70 °C**
- 3 years warranty

Accessories

- **RipEX-HS – redundant 19‘ hot standby chassis**
  - Two hot-stand-by standard RipEX units inside
  - Automatic switchover capability on detection of failure
  - For important sites where no single point of failure is required
- **Wifi adapter** – with DHCP for service access
- **ETH/USB adapter** with DHCP for service access
- **Demo case** – the set of 3 units for bench or field tests
- **Brackets** – for flat or vertical mounting
  possible direct DIN rail mounting without brackets
- **19‘ rack shelves** – for single or double units
- **Others** – power supplies, antennas, cables…





Technical parameters

Radio parameters

Frequency bands	135-154; 154-174; 215-240; 300-320; 320-340; 340-360; 368-400; 400-432; 432-470; 470-512; 928-960 MHz
Channel spacing	6.25 / 12.5 / 25 / 50 kHz
Frequency stability	+/- 1.0 ppm
Modulation	QAM (Linear): 16DEQAM, D8PSK, π/4DQPSK, DPSK FSK (Exponential): 4CPFSK, 2CPFSK
Data speed (up to)	> 200 kbps@50 kHz; > 100 kbps@25 kHz; > 50 kbps@12.5 kHz; > 25 kbps@6,25 kHz
RF Output power	0.1 to 10 W programmable
Duty cycle	Continuous
Sensitivity for BER 10e-6	-99 dBm / 16DEQAM / 25 kHz -115 dBm / 2CPFSK / 25 kHz

Electrical

Primary power	10 to 30 VDC, negative GND			
Rx	5 W / 13.8 V; 4.8 W / 24 V; (Radio part < 2 W)			
Tx	Modulation	RF power	13.8 V	24 V
	FSK (Exponential)	0.1 W	13.8 W	13.2 W
		1 W	15.2 W	14.4 W
		5 W	33.1 W	31.2 W
		10 W	41.4 W	38.4 W
	QAM (Linear)	0.5 - 1 - 2.0 W	30.4 W	30.0 W
Sleep mode	0.1 W			
Save mode	2 W			

SW

Operating modes	Bridge / Router
User protocols on COM	Modbus, IEC101, DNP3, PR2000, Comli, DF1, Profibus, Async Link, C24, Cactus, RP570, Slip, Siemens 3964(R) and others…
User protocols on Ethernet	Modbus TCP, IEC104, DNP3 TCP, Terminal server…
Multi master applications	Yes
Report by exception	Yes
Collision Avoidance Capability	Yes
Repeaters	Store-and-forward; Every unit; Unlimited number

Interfaces

Ethernet	10/100 Base-T Auto MDI/MDIX	RJ45
COM 1	RS232 / 300–115 200 bps	DB9F
COM 2	RS232/RS485 SW configurable 300–115 200 bps	DB9F
USB	USB 1.1	Host A
Antenna	50 Ohms	TNC female

Environmental

IP Code	IP40, IP51
Temperature	-40 to +70 °C / -40 to +158 °F
Humidity	5 to 95% non-condensing

Mechanical

Casing	Rugged die-cast aluminium
Dimensions	150 W x 118 D x 50 H mm (5.90 x 4.65 x 1.97 in)
Weight	1.1 kg (2.4 lbs)

Diagnostics and Management

Radio link testing	Yes (ping with RSS, Data Quality, Homogenity)
Watched values	Device – Ucc, Temp, PWR, VSWR, HW Alarm Input. Radio channel – RSScom, DQcom, TXLost[%] User interfaces – ETH[Rx/Tx], COM1[Rx/Tx],COM2[Rx/Tx]
Statistics	For Rx/Tx Packets on User interfaces (ETH, COM1, COM2) and for User data and Radio protocol (Repeates, Lost, ACK etc.) on Radio channel
Graphs	For Watched values and Statistics
SNMP	v1, v2c, v3

Approvals

CE (RED), FCC, ATEX, RoHS