



- 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.

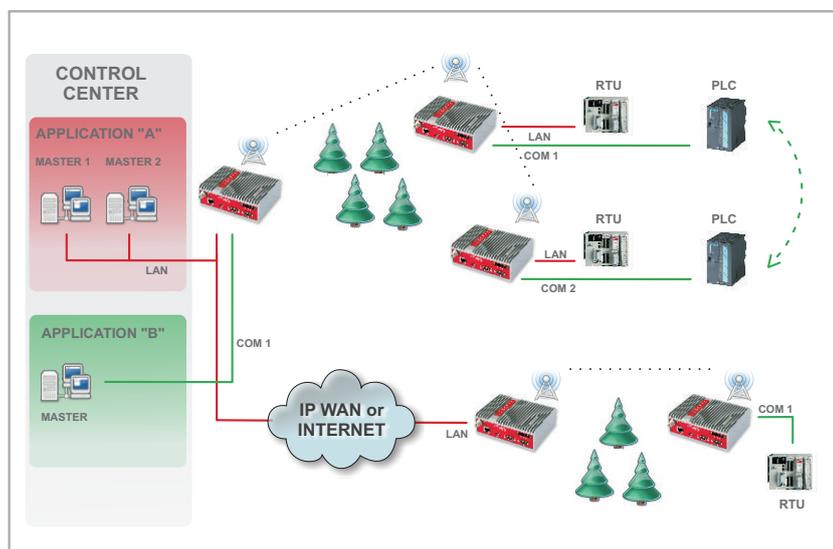
RipEX provides 24/7 reliable service for **mission-critical applications** like SCADA & Telemetry for Utilities, SmartGrid power networks or any packet network while meeting all current security requirements.

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.

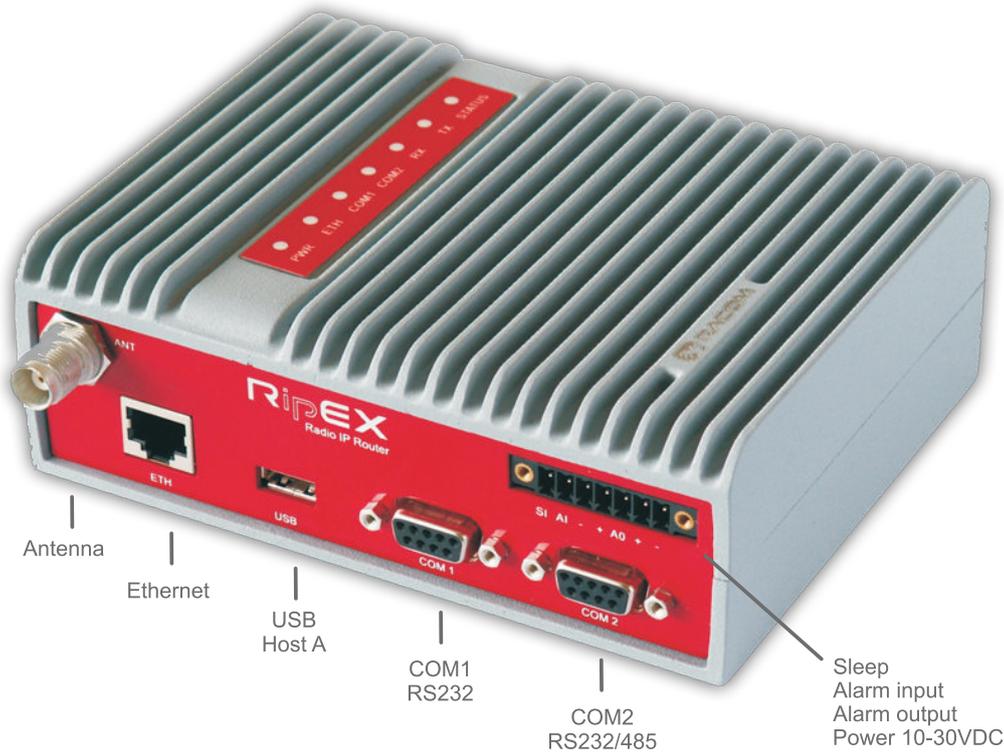
Applications

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



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** - encapsulates serial protocol to TCP(UDP) and vice versa and eliminates a transfer of TCP overhead over Radio channel, 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)



Easy to configure and maintain

- **Basic IP knowledge** is sufficient
- **Web interface** or CLI via SSH
- Service access via ETH or USB/ETH or Wifi 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

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 concurrently
- **Base driven / Router**
 - Star topology, repeaters supported
 - Optimized for TCP/IP (IEC104)

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
- **Wifi/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...



Values from: Ripex-A
Fast remote access ?

Status

Wizards

Settings

Routing

VPN

IPsec

GRE

Diagnostic

Neighbours

Statistic

Graphs

Ping

Monitoring

Maintenance

Device ?

| | | | | | | | |
|----------------|---------|----------|-----------|------------------|-----------|-----------------------|---------|
| Unit name | Ripex-A | Time | Manual | Alarm management | Default | Neighbours&Statistics | Default |
| Operating mode | Router | SNMP | v1/v2c/v3 | Power management | Always On | Graphs | Manual |
| Hot Standby | Off | Firewall | Off | WiFi | On | Management | Default |

Radio ?

- Radio protocol: Base driven
- Station type: Base
- IP: 10.10.10.169
- Mask: 255.255.255.0
- TX frequency: 448.250.000
- RX frequency: 448.250.000
- Channel spacing [kHz]: 25.0
- Modulation rate [kbps]: 20.83 | 4CPFSK
- RF power [W]: 0.1
- Optimization: Off
- Encryption: Off
- MTU [bytes]: 1500

ETH ?

- IP: 192.168.169.169
- Mask: 255.255.255.0
- DHCP: Off
- Shaping: Off
- Speed: Auto
- Modbus TCP: Off
- Terminal servers: Off
- TCP proxy: Off
- ARP proxy & VLAN: Off

COM ?

| | COM 1 | COM 2 |
|-----------------|-------|-------|
| Type | RS232 | RS232 |
| Baud rate [bps] | 19200 | 19200 |
| Data bits | 8 | 8 |
| Parity | None | None |
| Stop bits | 1 | 1 |
| Idle [bytes] | 5 | 5 |
| MRU [bytes] | 1600 | 1600 |
| Flow control | None | None |
| Protocol | None | None |

Apply Cancel

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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 | Linear (QAM): 16DEQAM, D8PSK, π/4DQPSK, DPSK Exponential (FM): 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 |
| | Exponential (FM) | 0.1 W | 13.8 W | 13.2 W |
| | | 1 W | 15.2 W | 14.4 W |
| | Linear (QAM) | 5 W | 33.1 W | 31.2 W |
| | | 10 W | 41.4 W | 38.4 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 | 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, Homogeneity) |
| 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 (Repeats, Lost, ACK etc.) on Radio channel |
| Graphs | For Watched values and Statistics |
| SNMP | v1, v2c, v3 |

Approvals

CE (RED), FCC, ATEX, RoHS

