



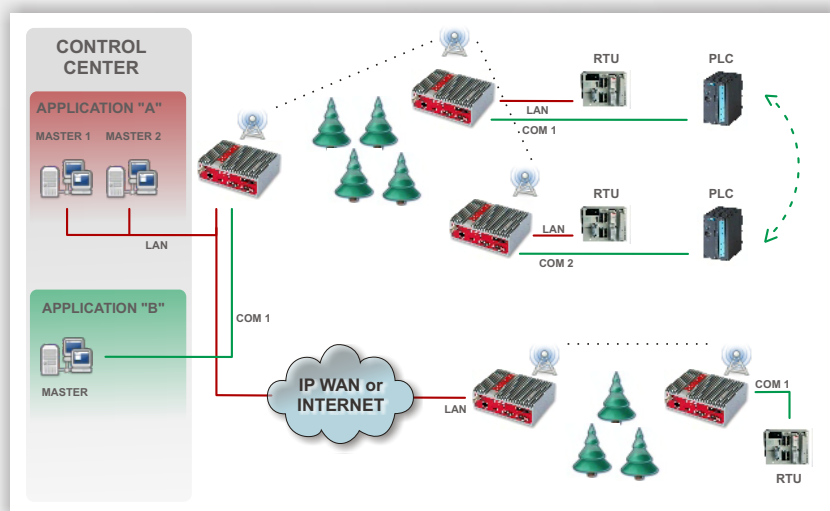
General

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.

Every unit can serve as the central master, a repeater, a remote terminal, or all of these simultaneously. Anti-collision protocol on Radio channel allows whatever traffic: master or even multi master-slave polling and report by exception from remotes concurrently.

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.

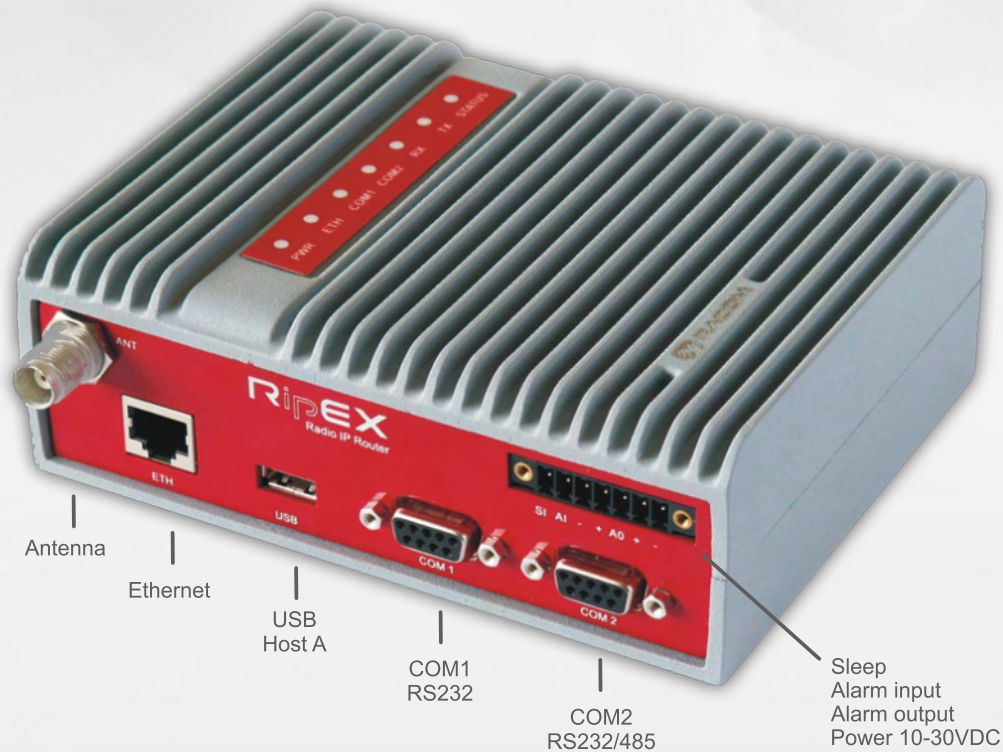


Radio Router

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

Applications

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



Native IP device

- **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 a sophisticated anti-collision protocol on Radio channel, where every single packet is acknowledged. Moreover each unit can simultaneously work as a store-and-forward repeater.
- **Bridge mode** - Packets received on any interface are 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.
- **IP specialities**
 - **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

- **166 kbps / 50 kHz**, 42 kbps / 12,5 kHz, 11 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 mode, 166/83 kbps, COM2, 10W, Backup routes
- **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 / 83 kbps / 25 kHz / BER 10e-6
-115 dBm / 10 kbps / 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, Comli, DF1, Profibus, 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** including TRAP alarms
- **HW Alarm input, HW Alarm output**
- **Monitoring** – on-line analysis of communication over any of the interfaces


Security & Integrity

- Licensed radio bands
- **FEC**, interleaving, proprietary data compression
- **CRC32** data integrity control on Radio channel
- Proprietary protocol on Radio channel with packet acknowledgement
- **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

Reliability

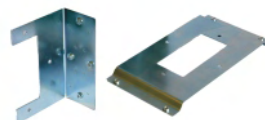
- Units **tested in a climatic chamber** as well as in real traffic
- **Heavy-duty or industrial components**
- Industrial rugged die-cast aluminium case
- **-40 to +70 °C**
- 3 years warranty

Others

- Removable sticker plate for your notes
- DIN rail, flat, vertical or 19" rack mounting
- Separated Rx and Tx antenna connectors *
- Integrated GPS *
- Hazardous locations:  II 3G Ex ic IIC T4 Gc
- Substation environment: IEEE 1613 Class 1
- Vibration and shock: EN 61373:1999 * optionally

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 ?

Device ?

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

Radio ?

ETH ?

COM's ?

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
FEC: Off
Optimization: Off
Encryption: Off
MTU [bytes]: 1500

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 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

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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: 16DEQAM, D8PSK, π/4DQPSK, DPSK Exponential (FM): 4CPFSK, 2CPFSK
Max. Data rate	50.0 kHz Unl. 166 kbps CE& 139 kbps max. 2 W 42 FCC 42 max. 10 W 25.0 kHz CE 83 FCC 69 max. 2 W 21 21 max. 10 W 12.5 kHz CE 42 FCC 35 max. 2 W 10 10 max. 10 W 6.25 kHz CE 21 FCC 17 max. 2 W 5 5 max. 10 W
Carrier output power	0.1 to 10 W programmable
Duty cycle	Continuous
Sensitivity for BER 10e-6	-99 dBm / 83 kbps / 25 kHz -115 dBm / 10 kbps / 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	5 W 33.1 W / 13.8 V; 31.2 W / 24 V 10 W 41.4 W / 13.8 V; 38.4 W / 24 V
Sleep mode	0.1 W
Save mode	2 W

SW

Operating modes	Bridge / Router
User protocols on COM	Modbus, IEC101, DNP3, UNI, Comli, DF1, RP570, Profibus...
User protocols on Ethernet	Modbus TCP, IEC104, DNP3 TCP, Comli 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
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

Approvals

CE, FCC, ATEX, IECEx

ver. 1.8