



MUM China

January 2018

More than 160 MUM events around the world



*Mikro***Tik**

- Established 1996
- RouterOS created in 1997
- RouterBOARD created in 2002
- First MUM event in Prague 2006
- MUM in Indonesia had over 3100 people
- 25 events in 2017



The image shows a map of Europe with the country of Latvia highlighted in a bright green color. Overlaid on the map is the Mikrotik logo, which consists of a stylized 'M' with a crescent moon and star above it, followed by the word 'Mikrotik' in a bold, italicized sans-serif font. The word 'LATVIA' is also written in large, bold, black capital letters across the center of the map, partially overlapping the highlighted country.

Mikrotik

LATVIA

Edmunds Aperans

(sales, training)

Martins Strods

(support)

Antons Belajevs

(support)



STAFF

Schedule

9:00

Presentations

12:10

Lunch with tickets

13:40

Presentations

17:10

Raffle, beer

mt.lv/agenda

WiFi

SSID: MUM_China

Password: mikrotik

Special thanks



EDCwifi

New products

1 Gbit
over wireless

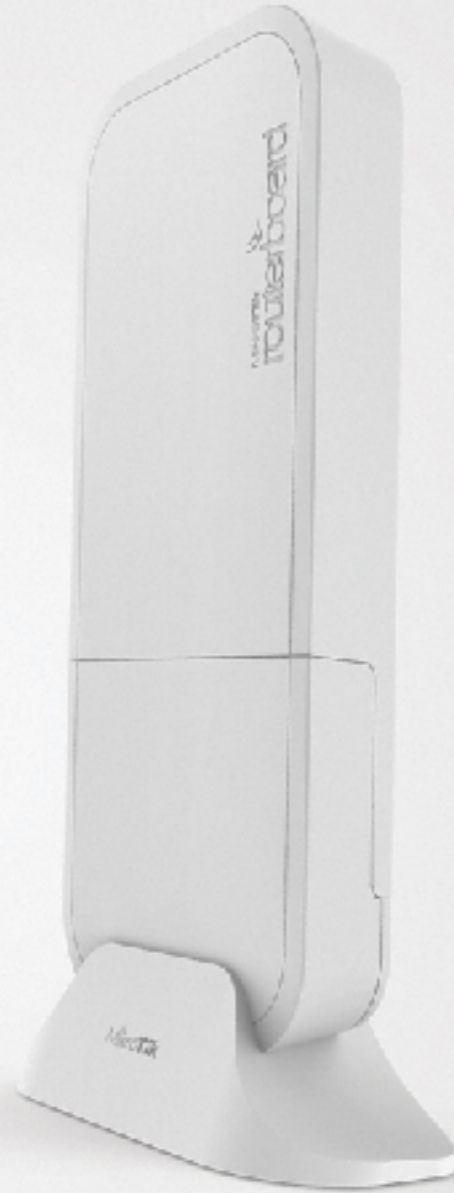
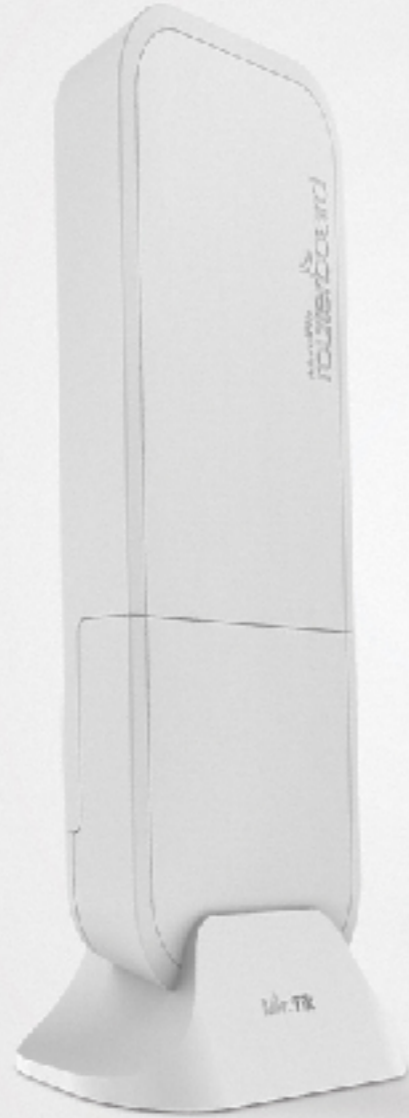
100m+
range

60GHz
radio

Gigabit
Ethernet

Paired
Secure Link
pre-configured

Powered by
IEEE 802.3af Passive
PoE, DC Jack

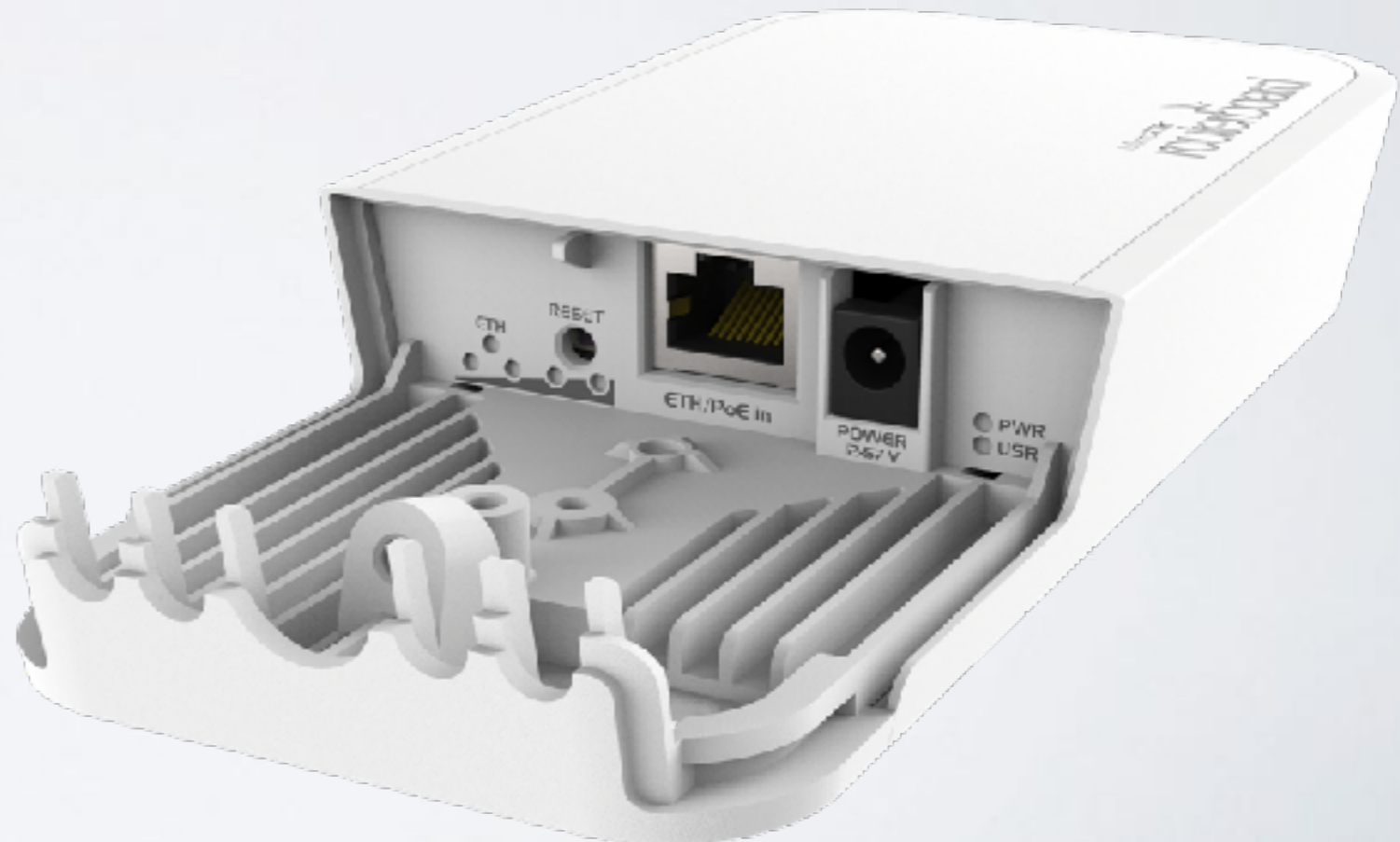


MikroTik

Wireless Wire

Wireless Wire

- 1 Gbps full duplex without wires
- 100 meters +
- 60 GHz beam-forming
- Paired Secure Link
Preconfigured
- \$198 kit



LHG 60G

- 1 Gbit full duplex (wire speed)
- Works in 60 GHz spectrum
- Familiar LHG design
- Quad-core ARM CPU
- Low cost and low weight
- Targeted for longer distances than 100 m



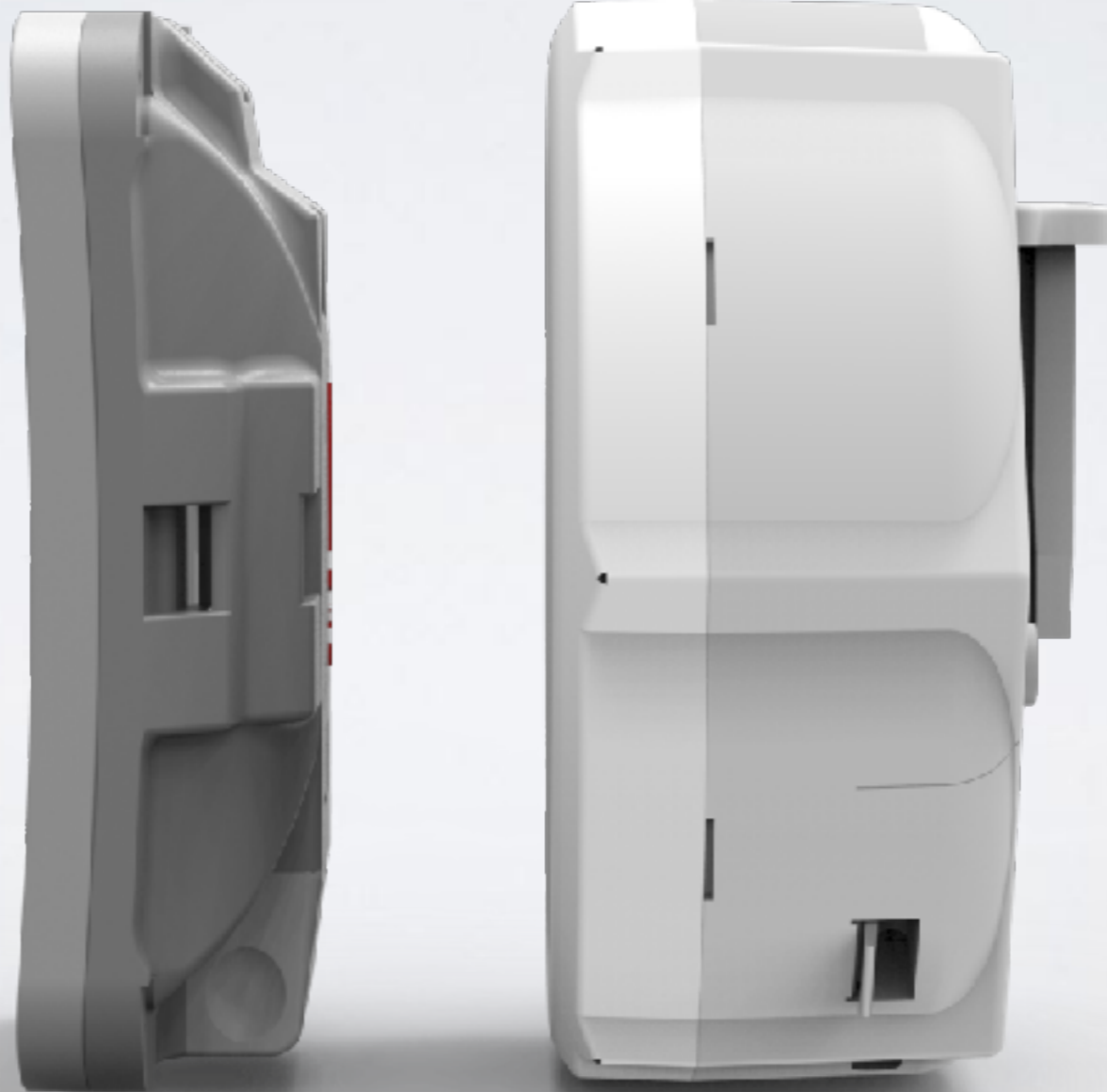
cAP lite

- Small and light 2.4 GHz AP
- Case can be changed
- Print your own case
- Designed for hotels and other public places for Internet access
- Price \$29





SXTsq series



SXTsq Lite5

- 5GHz 802.11 a/n dual chain
- Compact and lightweight
- Two times thinner
- 16 dBi antenna gain
- 12 km wireless link
- Low cost and low weight
- Price \$46



SXTsq 5

- 5GHz 802.11 a/n dual chain
- Compact and lightweight
- Two times thinner
- 16 dBi antenna gain
- 15 km wireless link
- Low cost and low weight
- Price \$49

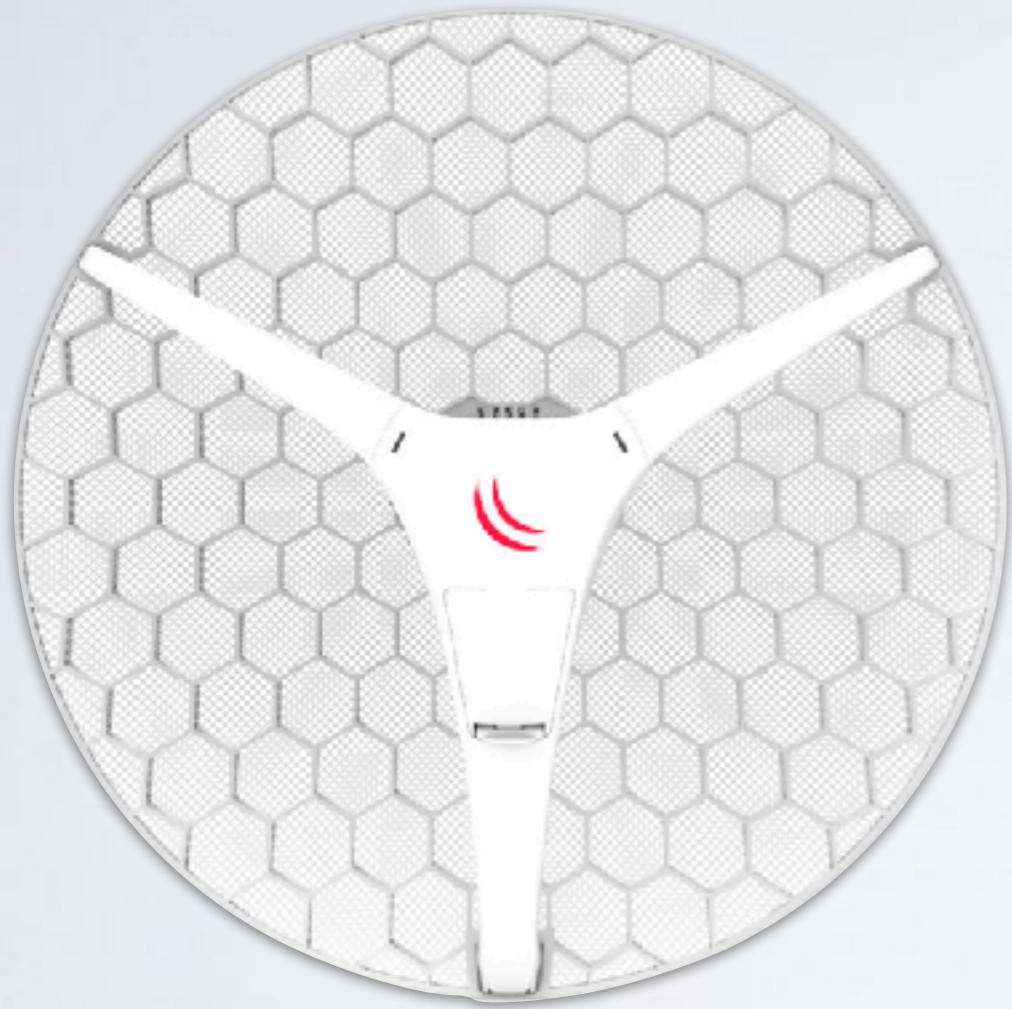


SXTsq 5 ac

- 5GHz 802.11 a/n/ac dual chain
- Compact and lightweight
- Two times thinner
- 16 dBi antenna gain
- 15 km wireless link
- Low cost and low weight
- Price \$55



New LHG series!



LHG 2

- 25 dBm transmit
- 18 dBi antenna gain
- 802.11 b/g/n dual chain
- Familiar LHG design
- Price \$58



LHG HP5

- 28 dBm transmit
- 24.5 dBi antenna gain
- 802.11 a/n
- 20 km full speed link
- Familiar LHG design
- Low cost and low weight
- Price \$69



LHG 5 ac

- 25 dBm transmit
- 24.5 dBi antenna gain
- 802.11 a/n/ac dual chain
- Gigabit Ethernet
- Familiar LHG design
- Low cost and low weight
- Kit price \$89



LHG XL 2

- 25 dBm transmit
- 21 dBi antenna gain
- 802.11 b/g/n
- Familiar LHG design
- Low cost and low weight
- Price \$68



LHG XL HP5

- 28 dBm transmit
- 27 dBi antenna gain
- 802.11 a/n
- 40 km full speed link
- Familiar LHG design
- Low cost and low weight
- Price \$79



LHG XL 5 ac

- 25 dBm transmit
- 27 dBi antenna gain
- 802.11 a/n/ac
- Familiar LHG design
- Low cost and low weight
- Price \$99



wAP R

- Wireless 2.4 GHz AP
- miniPCI-e slot for 3G/4G card
- Optional external antennas
- Automotive connector
- Comes with a stand mount
- Price \$79



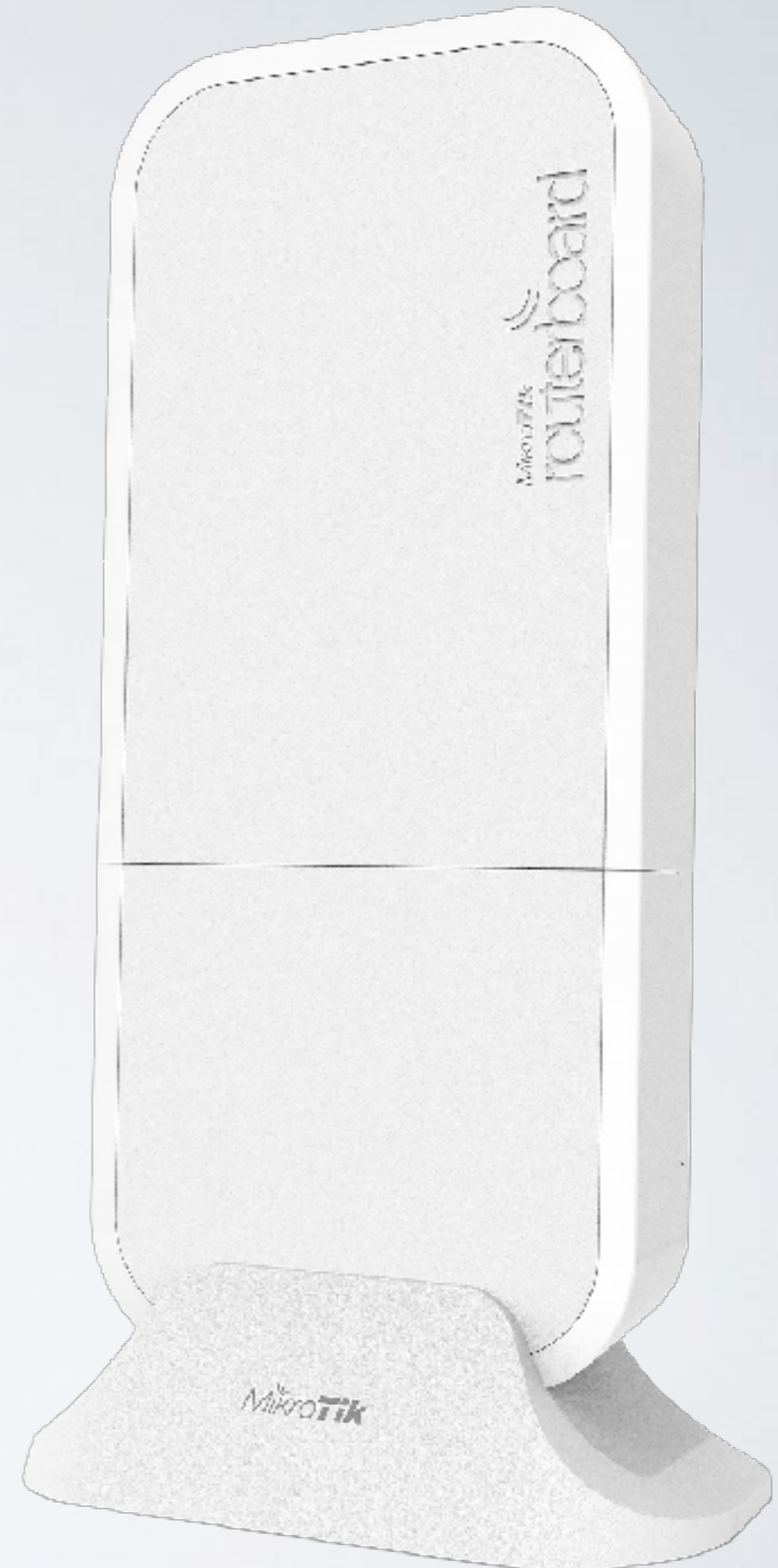
R11e-LTE

- 2G, 3G, LTE support
- International version supports LTE bands 1, 2, 3, 7, 8, 20, 38, 40
- US version available
- International version \$75
- US version \$69



wAP LTE KIT

- RI | e-LTE card included
- Price \$119



NOW

LtAP mini

- 2.4 GHz AP in a rugged case
- miniPCle for LTE
- Built-in GPS
- Optional external antennas for GPS and LTE
- Serial port
- Perfect for outdoor and mobile applications





LtAP

- 2.4 GHz AP in a rugged case
- 2x miniPCIe for LTE
- Built-in GPS
- Optional external antennas for GPS and LTE
- Serial port
- Perfect for outdoor and mobile applications
- 1 Gbps Ethernet port





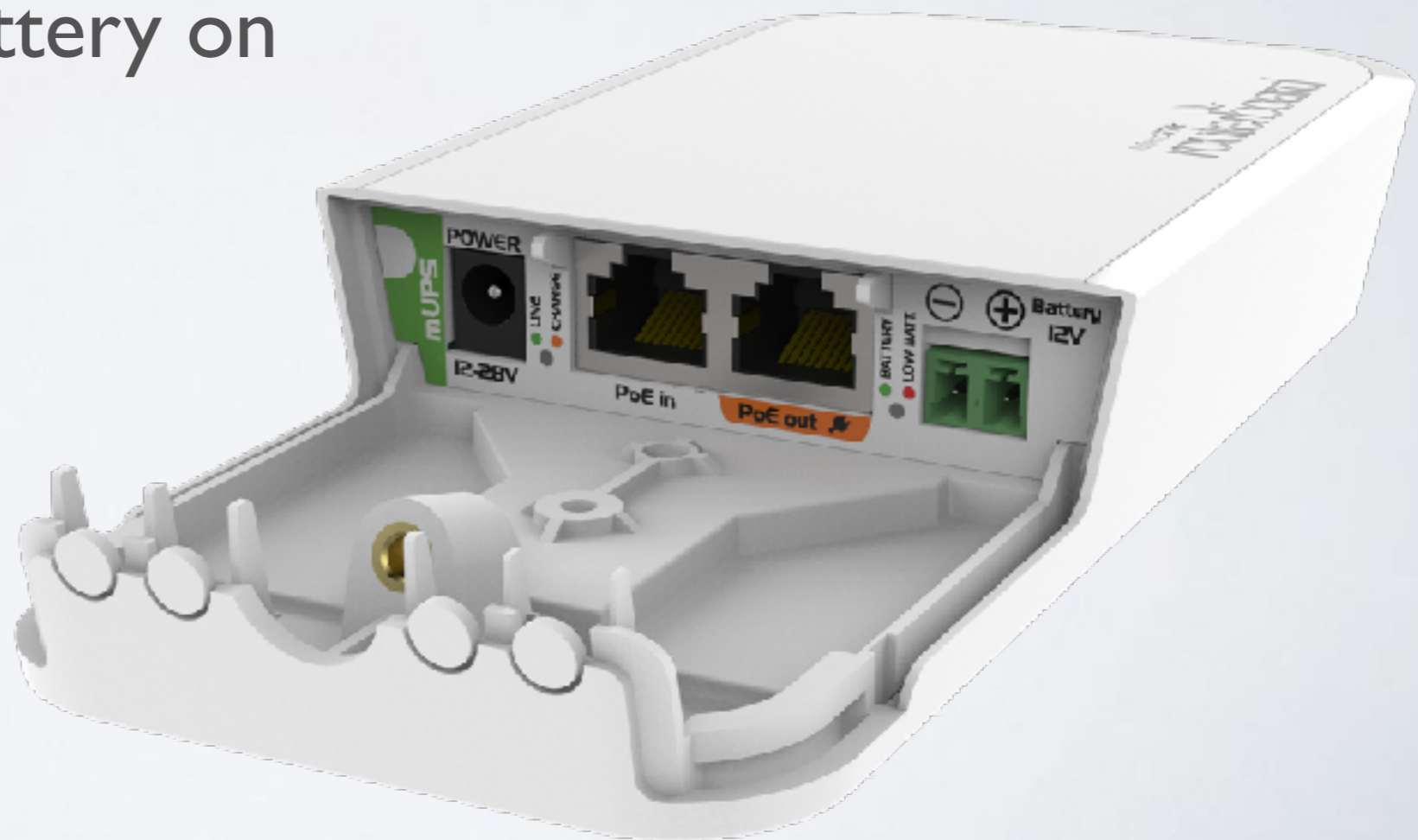
Woobm

- Serial console over wireless
- WEB interface
- Simultaneous station and AP
- Price \$16



mUPS

- Gigabit PoE injector
- Power supplied by PoE, jack or battery
- Auto switch to battery on power loss
- Price \$29

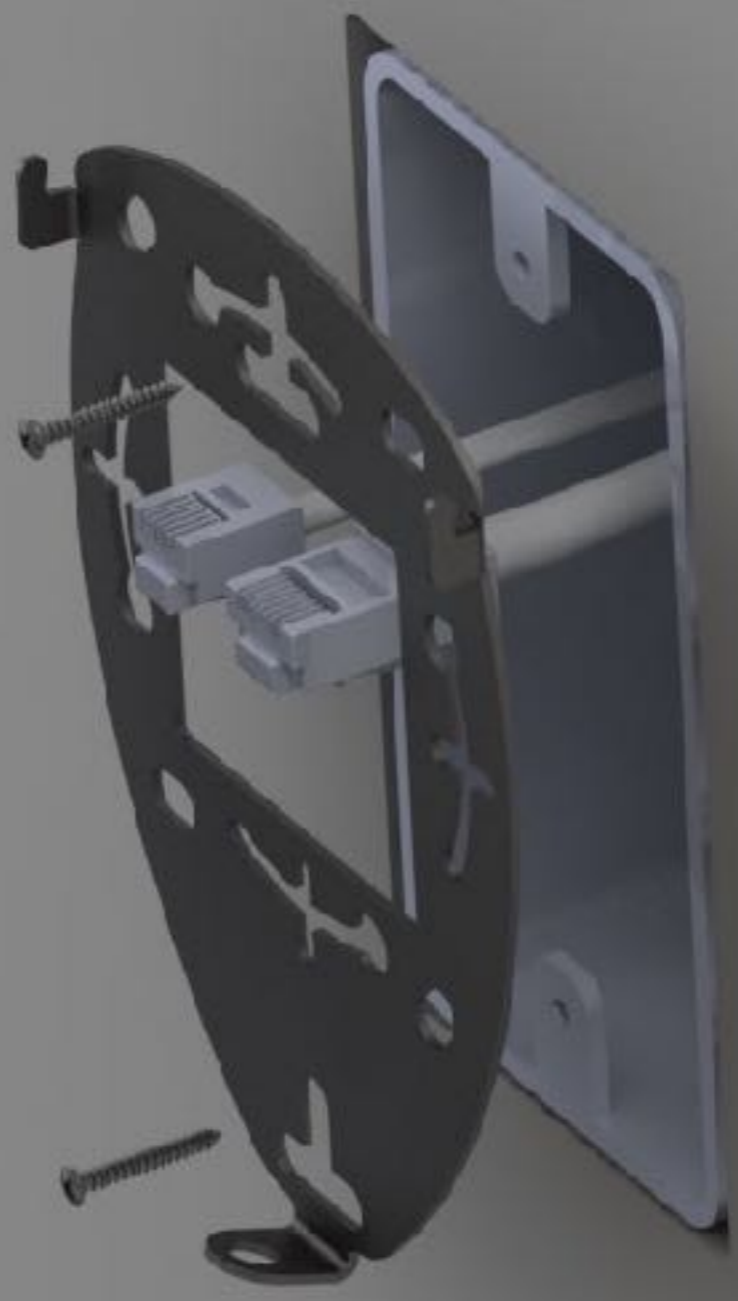


wsAP ac lite

- Mount into electrical socket
- Dual band (802.11a/b/g/n/ac)
- Phone line passthrough
- Three Gigabit Ethernet
- PoE out
- USB

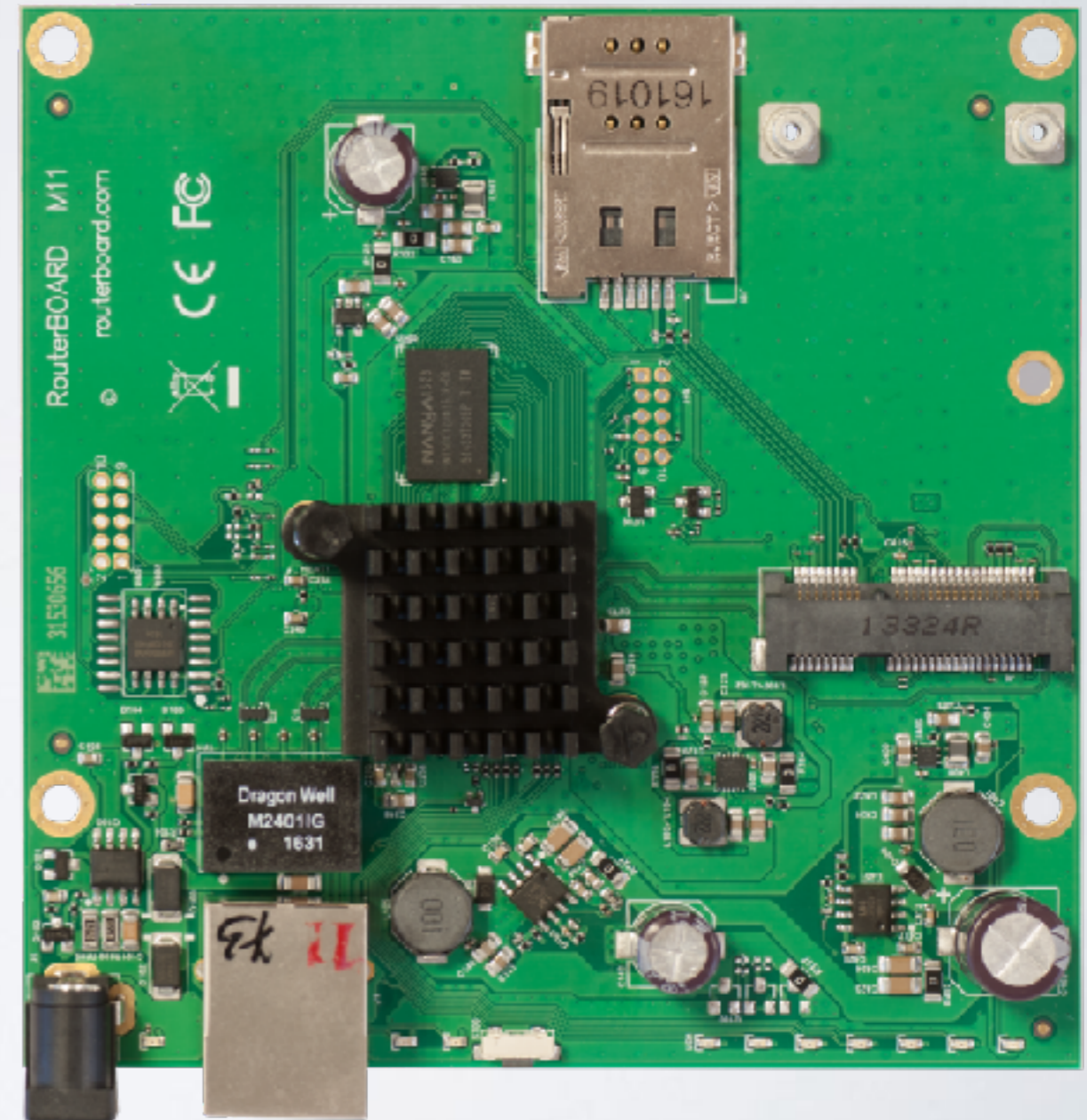






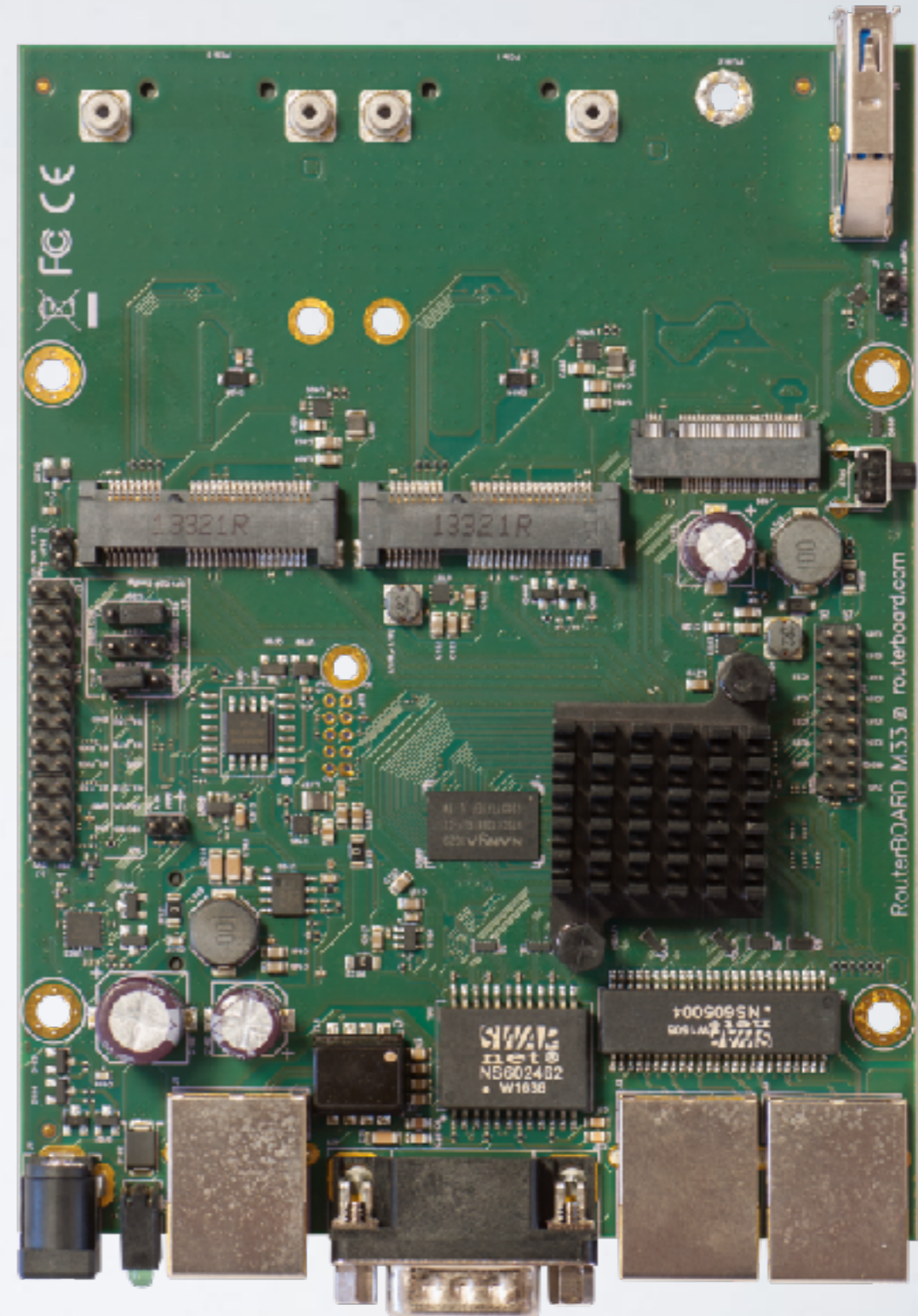
MIIG

- Four core 880 MHz CPU
- miniPCIe slot
- Gigabit Ethernet
- Upgrade for RB411
- Price \$39



M33G

- Four core 880 MHz CPU
- 2x miniPCIe slots
- 3 Gigabit Ethernets
- M.2 slot
- USB 3.0 and serial port
- Upgrade for RB433
- Price \$49



LDF 5 ac

- 25 dBm transmit
- 802.11 a/n/ac
- Low cost and low weight
- For use with satellite dish
- Price \$58



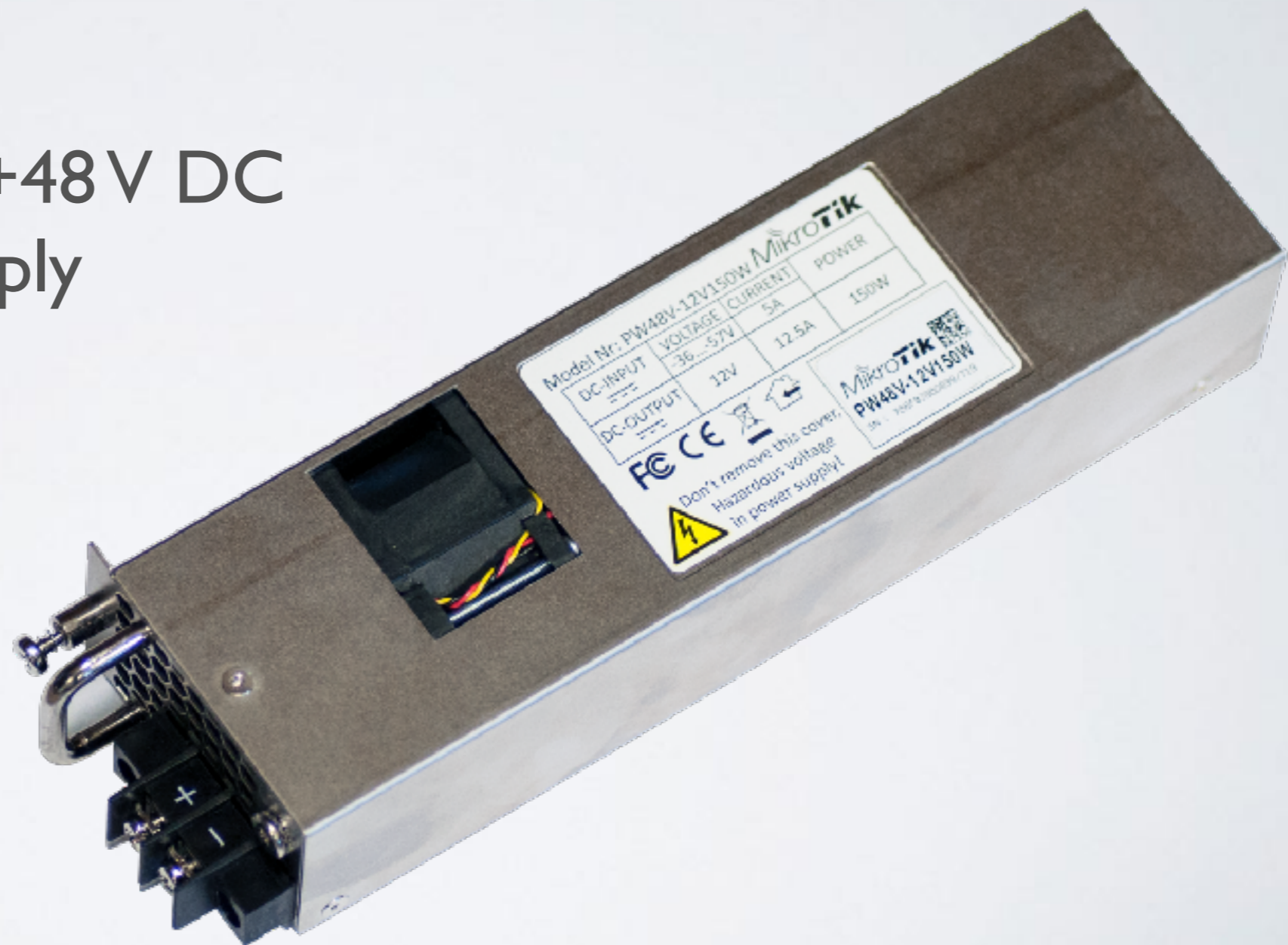
S+RJ10

- SFP+ to Ethernet
- 10/100/1G/2.5G/5G/10G
- 2.4 W
- Works with all MikroTik SFP+
- Price \$65

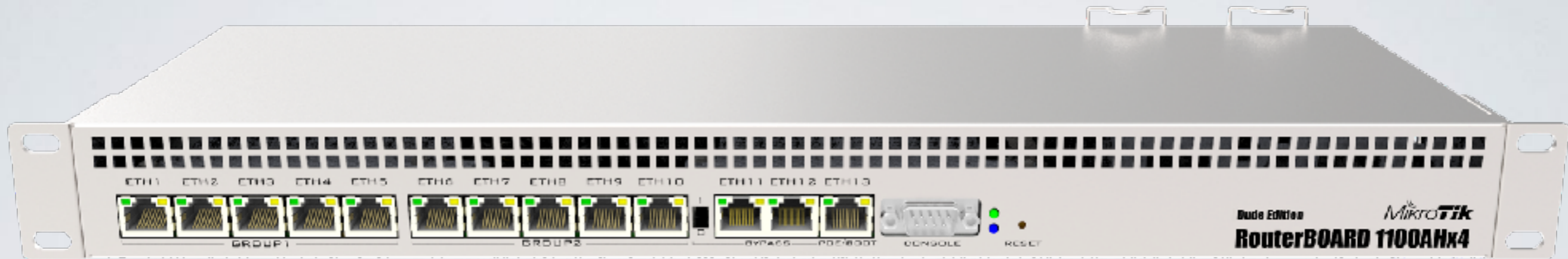


PW48V

- Hot Swap -48 and +48 V DC telecom power supply
- For CCR1072
- Price \$100



NOW

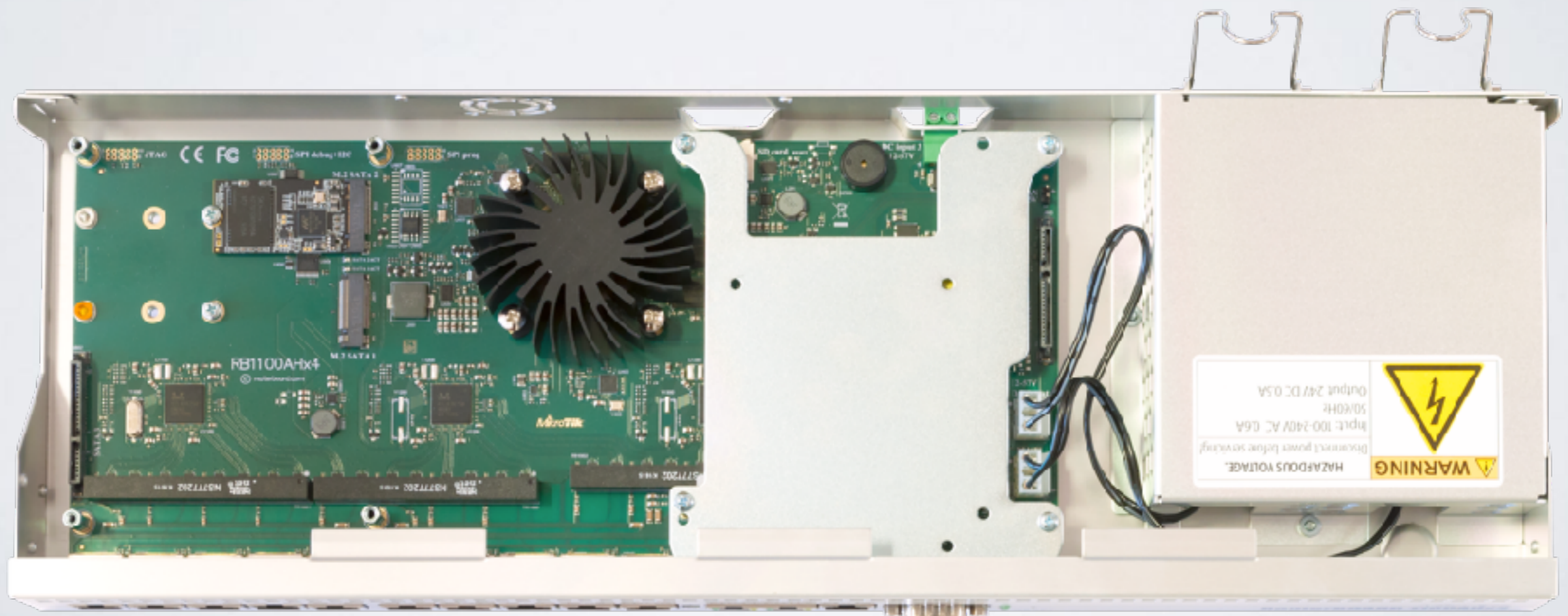


RB 1100AHx4

The timeless classic upgraded with
a new quad core CPU and more

Annapurna Alpine AL21400 CPU with four Cortex A15 cores clocked at 1.4 GHz

- Two SATA3 ports
- Two M.2 ports
- 60 GB SSD included
- Hardware accelerated IPsec
- -48 V DC telecom power
- Dual PSU





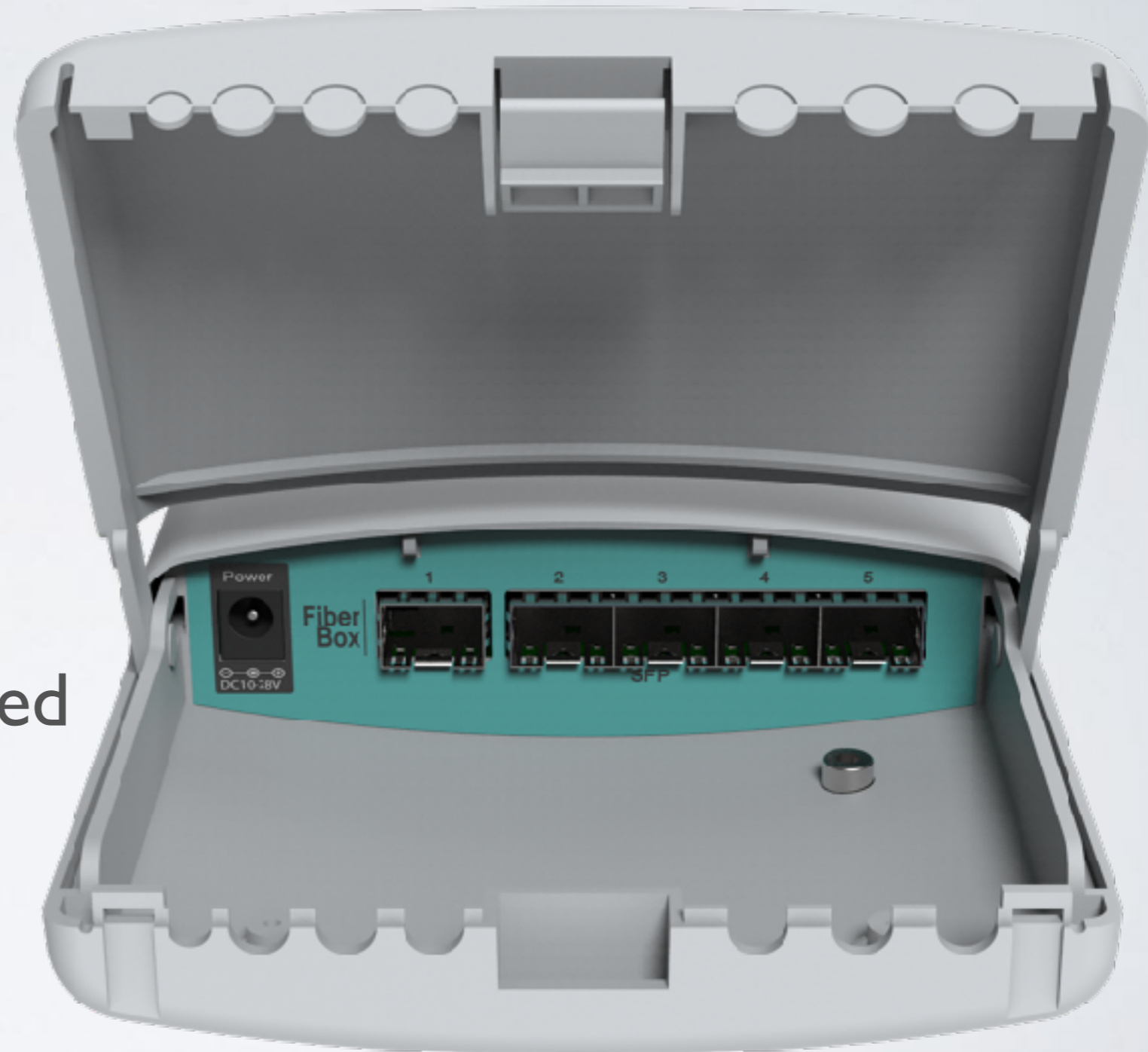
- 5.5 million PPS
- 7.5 Gbps
- IPsec up to 2.2 Gbps with AES128
- Overclock up to 2 GHz

Two editions

- **RBI I00AHx4 - \$299**
- **RBI I00AHx4 Dude edition**
2x M.2, 2x SATA3 and 60 GB SSD disk -
\$349

FiberBox

- Weatherproof case
- 5 SFP ports
- RJ45 SFP (S-RJ01) included
- \$79



NOW



CRS317-1G-16S+

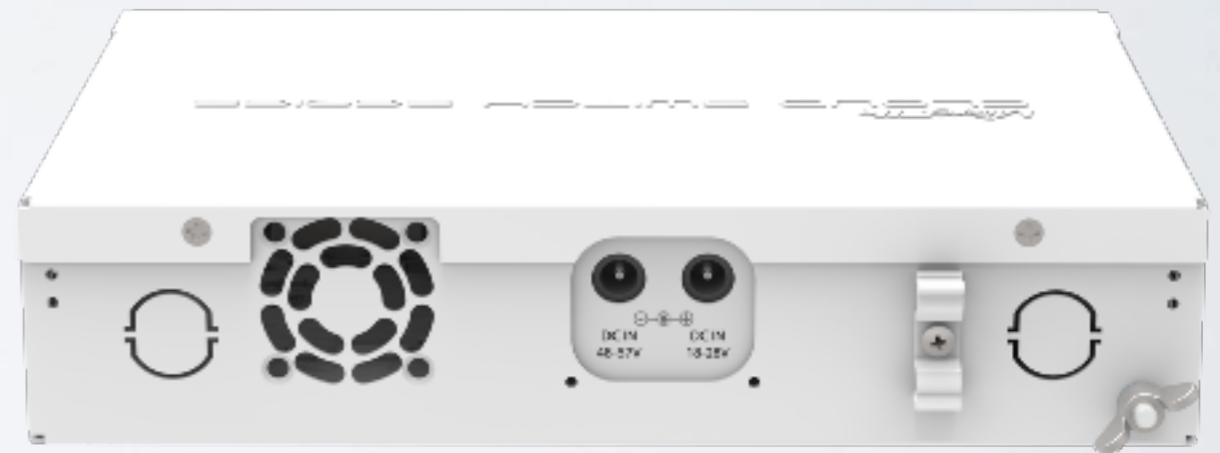
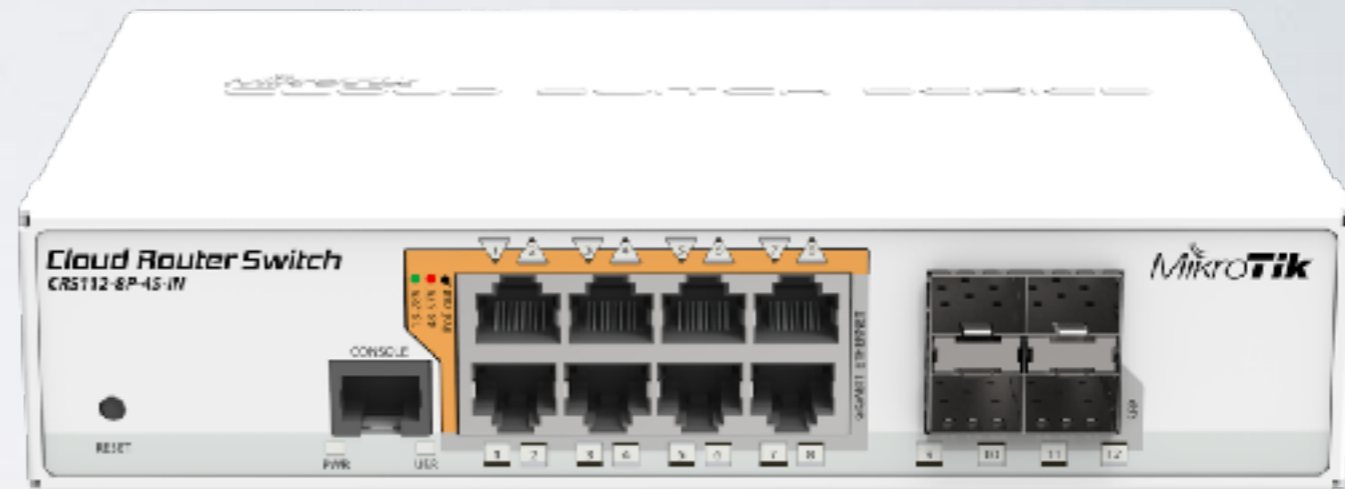
High performance SFP+ switch

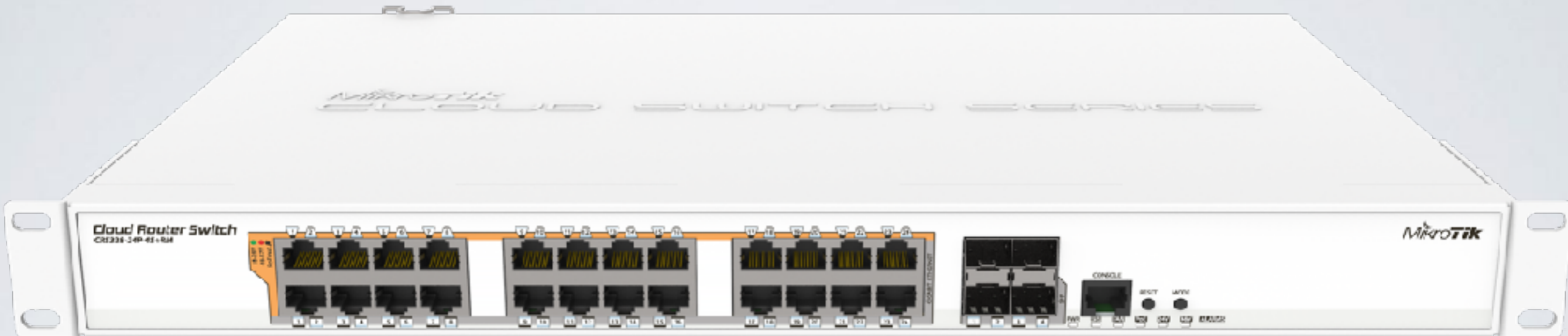
CRS317-1G-16S+

- 16 SFP+ ports
- Next generation switching chip
- Hardware-based Spanning Tree Protocol
- Dual boot - SwOS or RouterOS
- \$399

CRS112-8P-4S

- PoE out 802.3af/at
- Eight Gigabit Ethernet ports
- ports
- 4 SFP ports
- Per port auto detection of PoE standard
- Separate PSU for passive and/or 802.3af/at PoE out





CRS328-24P-4S+RM

CRS328-24P-4S+RM

- Dual boot - SwOS or RouterOS
- 24 port with PoE out function
- Supports 802.3af/at and passive output
- Per port auto detection of PoE standard
- Four SFP+ ports for 10 GbE
- One 100-240 V IEC connector

All products

- Included free software upgrades for life
- Run the same RouterOS or SwOS software
- For more information see:
<https://mikrotik.com/products>

NEWS IN ROUTEROS

CHR

Cloud Hosted Router

- RouterOS version tailored for running in virtual environments
- Runs on VMware, Workstation, VirtualBox, ESXi, HyperV, KVM, XenServer, etc.
- Cloud services - Amazon, Azure and others
- CHR available as OVA (Open Virtual Appliance)

CHR

Use cases

- Firewall for your cloud services
- VPN server in the cloud
- The Dude monitoring server
- Simulate networks for learning or training purposes
- And many more

CHR

Licensing

License	Speed limit per	Price
Free	1 Mbit	FREE
PI	1 Gbit	US\$45
PI0	10 Gbit	US\$95
P-Unlimited	Unlimited	US\$250

- 60 day trial available
- Purchased license can be transferred

RouterOS changelog

- 6.40 - 161 entries
- 6.40.1 - 14 entries
- 6.40.2 - 10 entries
- 6.40.3 - 28 entries
- 6.40.4 - 33 entries
- 6.41 - 195 entries

LTE passthrough

- Bridge over LTE to the connected device
- IPv4/IPv6 to the connected device
- Router requires only modem network configuration
- For single local device only
- Only specific modems are supported

Bridge features

- Hardware based MSTP support for CRS3xx devices
- Software based MSTP support for other RouterOS powered devices
- Hardware IGMP snooping for CRS
- Software IGMP snooping for other RouterOS powered devices

TR069 client

- RouterOS data model based TR-181 issue 2 amendment 11
- Works with AVSystem, Axiros, FriendlyTech and GenieACS servers
- Installed as a separate package
- Recommended to use with HTTPS

TLS hostname matching

- Allows to filter TCP traffic
- Accepts GLOB syntax for wildcard matching
- Matcher will not be able to work hostname if TLS handshake frame is fragmented

IPsec results

IPsec test results

RB750Gr3		RB750Gr3 IPsec throughput					
Mode	Configuration	1400 byte		512 byte		64 byte	
		kpps	Mbps	kpps	Mbps	kpps	Mbps
Single tunnel	AES-128-CBC + SHA1	42.6	477.1	56.9	233.1	55.2	28.3
256 tunnels	AES-128-CBC + SHA1	42.9	480.5	49.5	202.8	51.3	26.3
256 tunnels	AES-128-CBC + SHA256	42.9	480.5	49.5	202.8	51.3	26.3
256 tunnels	AES-256-CBC + SHA1	32.0	358.4	49.1	201.1	49.2	25.2
256 tunnels	AES-256-CBC + SHA256	32.0	358.4	49.1	201.1	49.2	25.2

1. All tests are done with Xena Networks specialized test equipment (XenaBay), and done according to RFC2544 (Xena2544)
2. Max throughput is determined with 30+ second attempts with 0,1% packet loss tolerance in 64, 512, 1400 byte packet sizes
3. Test results show device maximum performance, and are reached using mentioned hardware and software configuration, different configurations most likely will result in lower results

Wireless link calculator

The screenshot displays a web-based wireless link calculator interface. The browser address bar shows "mikrotik.com". The interface is divided into several sections:

- Specifications and results:** This section contains input fields for:
 - Frequency:** 5 GHz
 - Desired data rate:** 1300 Mbps
 - Tx device:** DISC Lite5
 - Rx device:** A dropdown menu is open, listing various antenna models such as BaseBox 2, BaseBox 5, DISC Lite5, DynaDish 5, DynaDish 6, Groove 52, Groove 52 ac, GrooveA 52, GrooveA 52 ac, LDF 5, LHG 6, LHG HP5, LHG XL HP5, Metal 2, Metal 6, Metal 52 ac, Metal 9, NetBox 5, NetMetal 5, NetMetal 5, NetMetal 5, NetMetal 5, OmniTIK 5, OmniTIK 5 PoE, OmniTIK 5 PoE ac, OmniTIK 5 ac, QRT 2, and QRT 5.
 - Tx Gain (dBi):** 21
 - RX Sensitivity (dBm):** (empty field)
 - Output Power (dBm):** (empty field)
- Results:** Located at the bottom of the specifications panel, it shows:
 - Distance: 16.0 Km (9.94 miles)
 - Free Space Path Loss:
 - Theoretical signal level at TX:
 - Theoretical signal level at RX:
 - Link status:
- Map:** A topographic map showing a link between a transmitter (Tx) in Riga and a receiver (Rx) in a rural area. A red line indicates the path. A 3D terrain profile is overlaid on the map, showing elevation in meters (0 to 20) along the path. The map includes labels for various locations like Rīga, Vangaži, Sigulda, and Ropaži.

Detect Internet

- Automatic interface functionality detection

```
[[sergejs@3B12_SergejsGW_CCR1036] > interface detect-internet state print
```

#	NAME	STATE
0	sfp1	no-link
1	ether1	no-link
2	ether2	no-link
3	ether3	no-link
4	ether4	no-link
5	ether5	lan
6	ether6	lan
7	ether7	lan
8	ether8	internet
9	bridge1	lan

```
[[sergejs@3B12_SergejsGW_CCR1036] > █
```

Need help?

- Ask a local distributor
- Hire MikroTik consultant
- Read the manual wiki.mikrotik.com
- Email support@mikrotik.com
- Attend a training class or join and Academy class in a University

After the MUM

- All presentations - mum.mikrotik.com
- Videos - youtube.com/mikrotik
- License for paid and voucher registrations will be sent by an e-mail

The logo for Microtik features the word "Microtik" in a stylized, italicized font. The "Micro" portion is in a lighter weight, while "tik" is in a bold, italicized weight. Above the letter "i" in "Micro" are three curved lines that suggest motion or a signal. The entire logo is rendered in a dark gray color and is reflected on a light gray surface below it.

*Micro**tik***