



MUM South Africa

November 2017



- Established 1996
- RouterOS created in 1997
- RouterBOARD created in 2002
- First MUM event in Prague 2006
- MUM in Indonesia had 3000 people
- 34 events in 2016



A map of Europe with Latvia highlighted in green. The Mikrotik logo is overlaid on the map, centered over Scandinavia. The word LATVIA is written in large, bold, black capital letters across the center of the map, positioned over Poland and Belarus.

**Mikrotik**

**LATVIA**

More than 160 MUM events around the world





**Karlis Oga**

(sales)

**Maris Bulans**

(support)

**Sergejs Boginskis**

(support, training)

STAFF

# Schedule

|       |                    |
|-------|--------------------|
| 10:00 | Presentations      |
| 12:45 | Lunch with tickets |
| 14:15 | Presentations      |
| 17:00 | Raffle, beer       |

**[mt.lv/agenda](http://mt.lv/agenda)**

# WiFi

**SSID: MUM\_ZA**

**Password: mikrotik**

# MUM Live

[www.youtube.com/mikrotik](http://www.youtube.com/mikrotik)



# Special Thanks



New products





1 Gbit  
over wireless

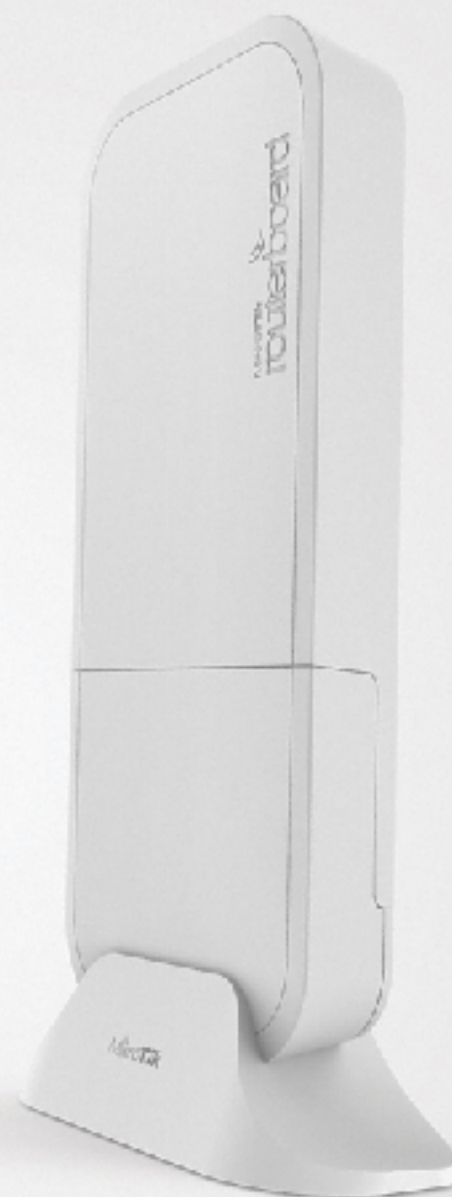
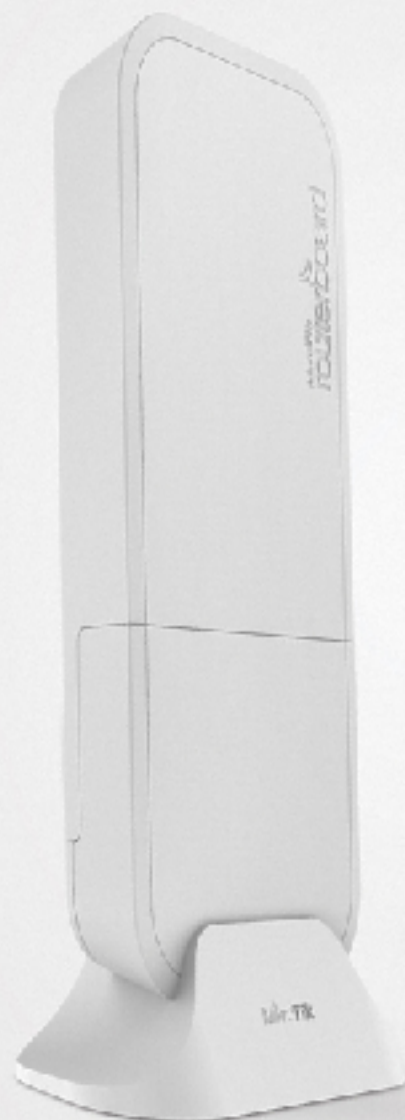
100m+  
range

60GHz  
radio

Gigabit  
Ethernet

Paired  
Secure Link  
pre-configured

Powered by  
VIA/Passive  
PoE, DC Jack

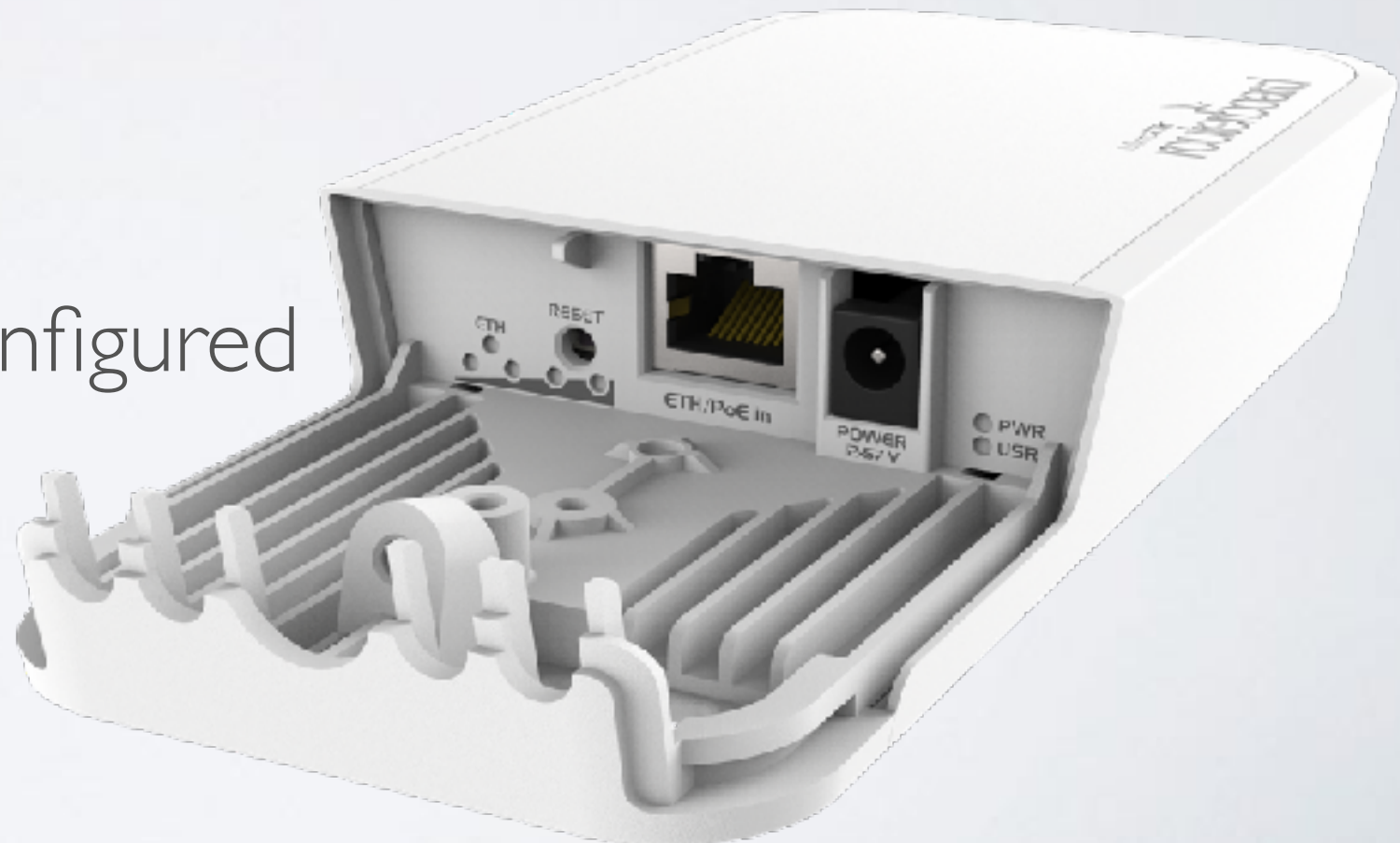


MikroTik

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

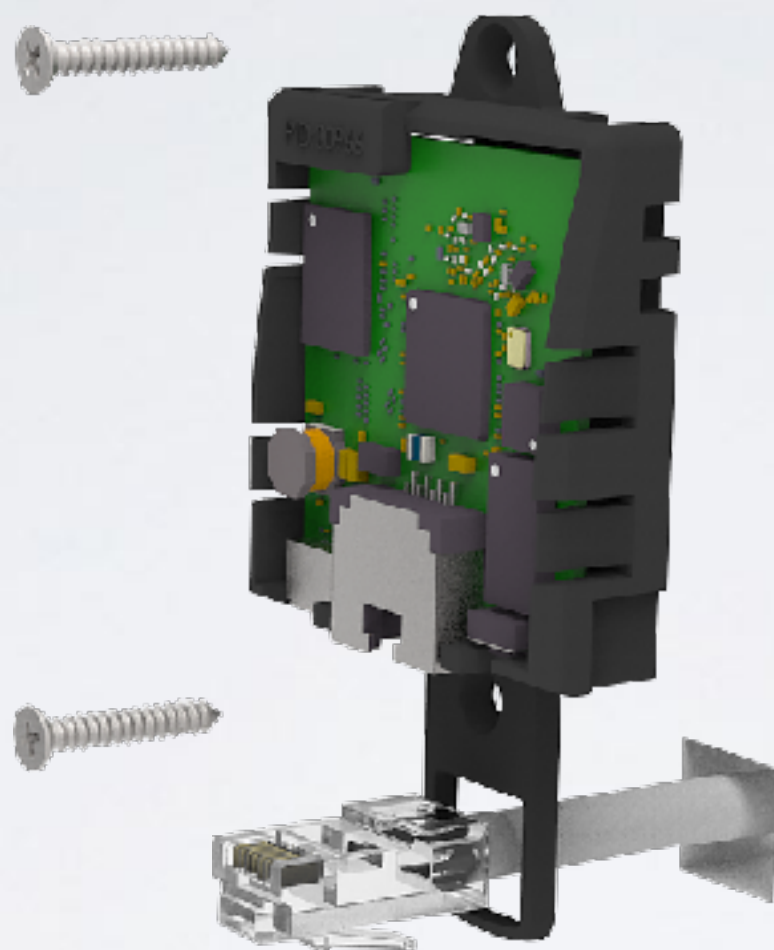


# cAP lite

- 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
- \$29 kit







# DynaDish 6 and SXT 6

- Great for use in less used 6 GHz spectrum
- Same familiar designs



\$99



\$179



# SXTsq Lite5

- Compact and lightweight
- Two times thinner!
- 16 dBi antenna
- 12 km wireless link
- Low cost and low weight
- Kit price \$46



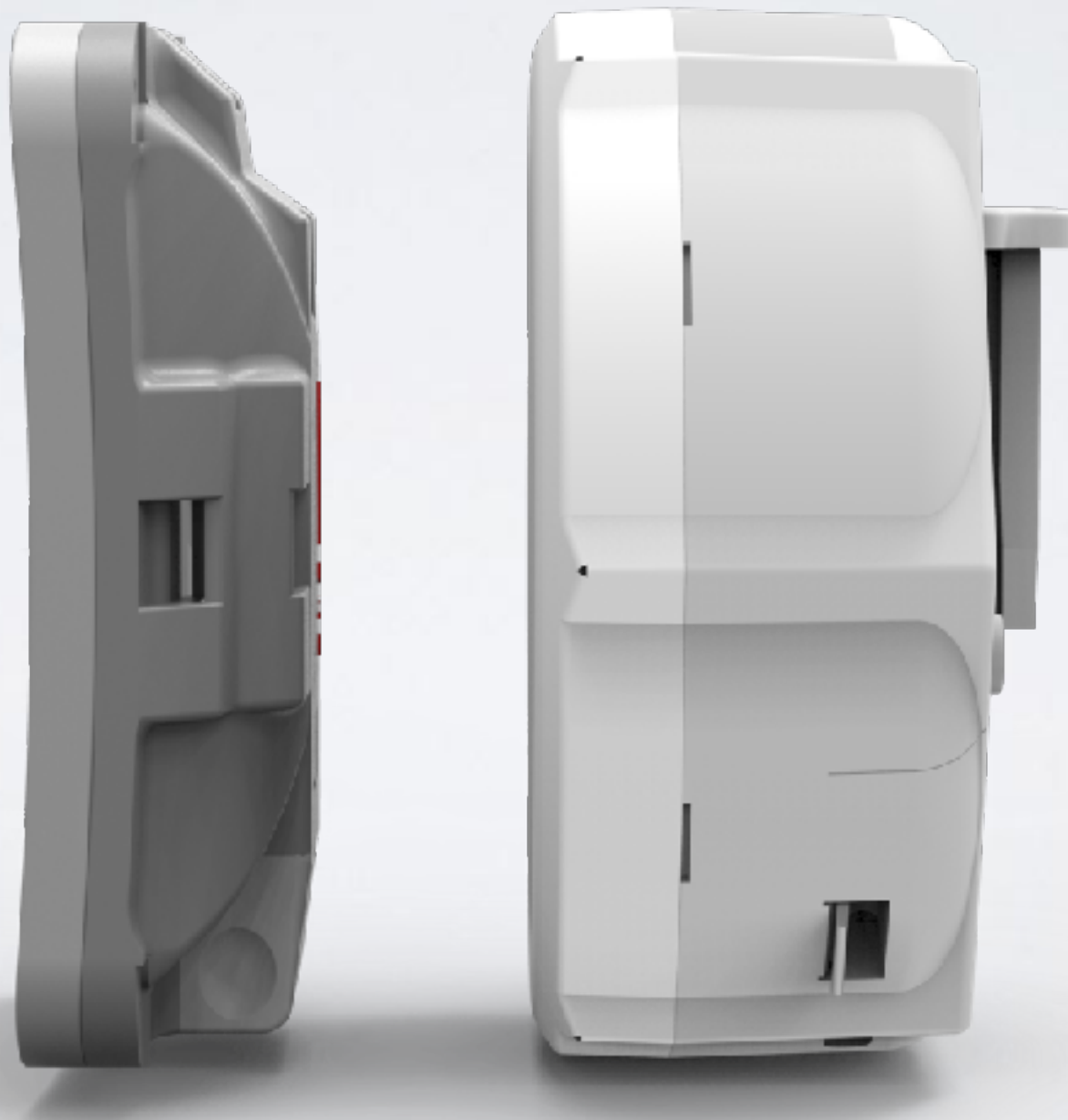


# SXTsq 5

- Compact and lightweight
- Two times thinner!
- 16 dBi antenna
- 15 km wireless link
- Low cost and low weight
- Kit price \$49



# SXTsq series

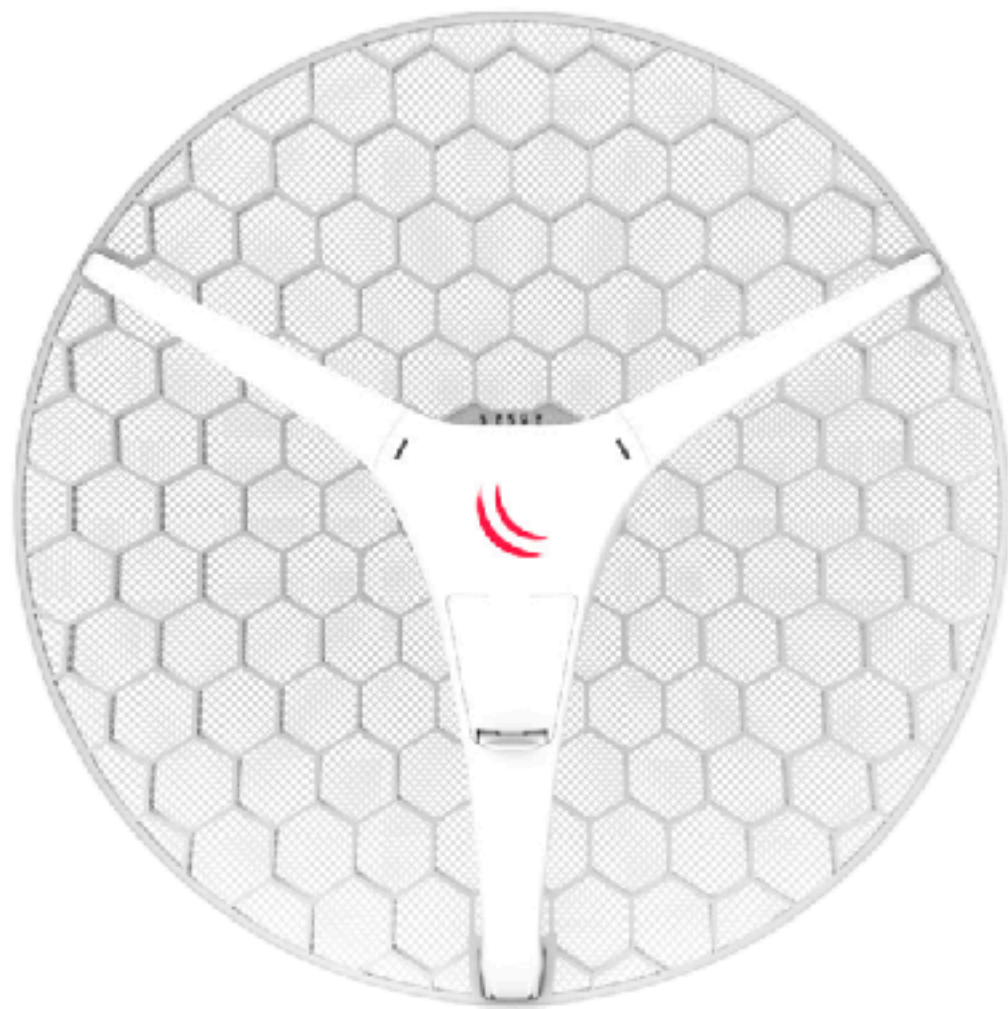


# SXTsq 5 ac

- Compact and lightweight
- Ethernet Gigabit
- 16 dBi antenna
- 15 km wireless link
- Low cost and low weight
- Kit price \$55



# New LHG!



LHG XL HP5



LHG HP5



LHG 5



# LHG HP5

- 630 mW
- 20 km full speed link
- Familiar LHG design
- Low cost and low weight
- Kit price \$69



# LHG XL HP5

- 630 mW
- 40 km full speed link
- 27 dBi antenna
- Familiar LHG design
- Low cost and low weight
- Kit price \$79





# LHG 2

- 18 dBi grid antenna
- 802.11b/g/n dual chain
- Nv2 TDMA
- Familiar LHG design
- Kit price \$58



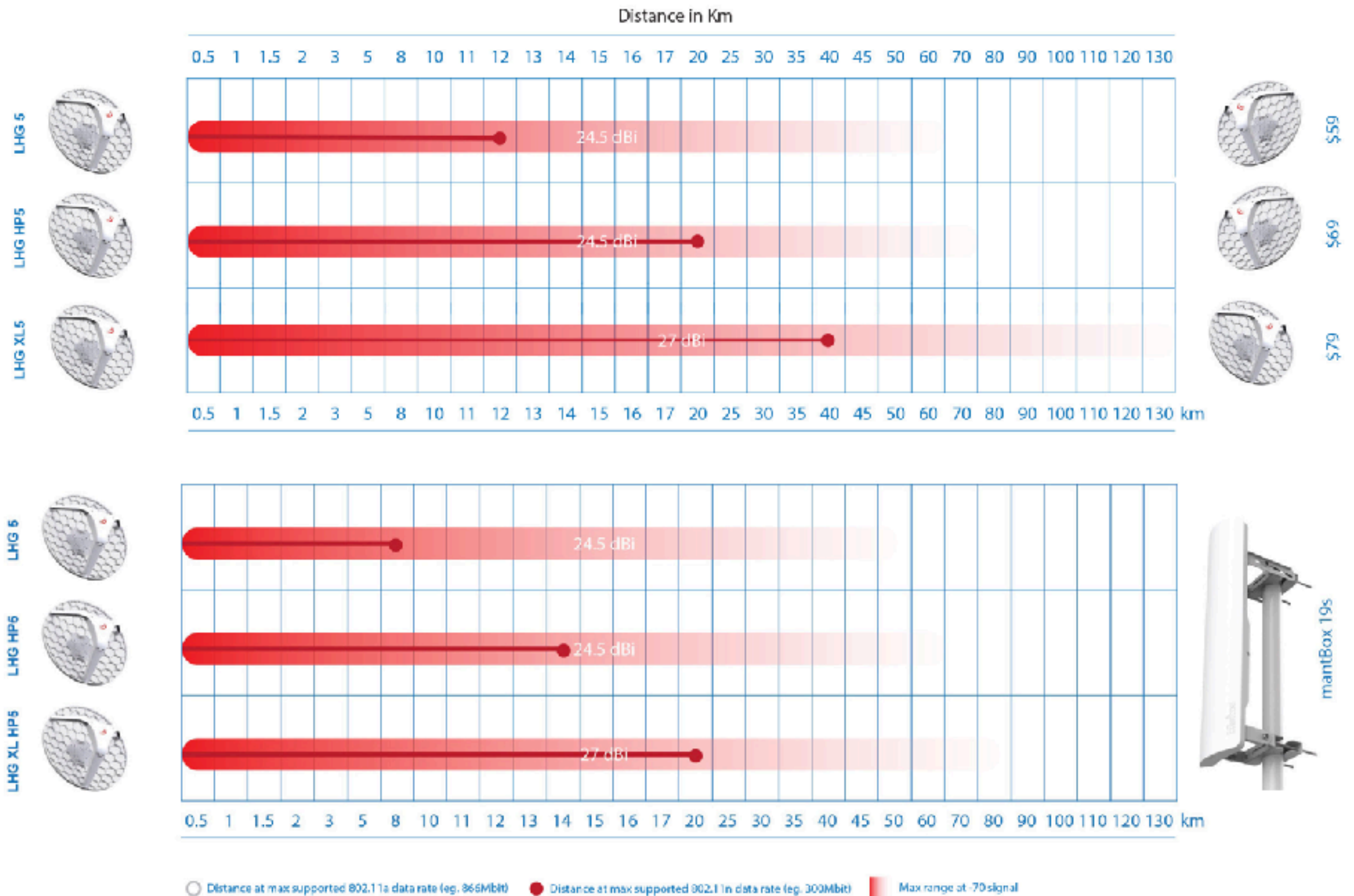
# LHG 5 ac

- 24.5 dBi antenna
- Gigabit Ethernet
- Familiar LHG design
- Low cost and low weight
- Kit price \$89





# New LHG!



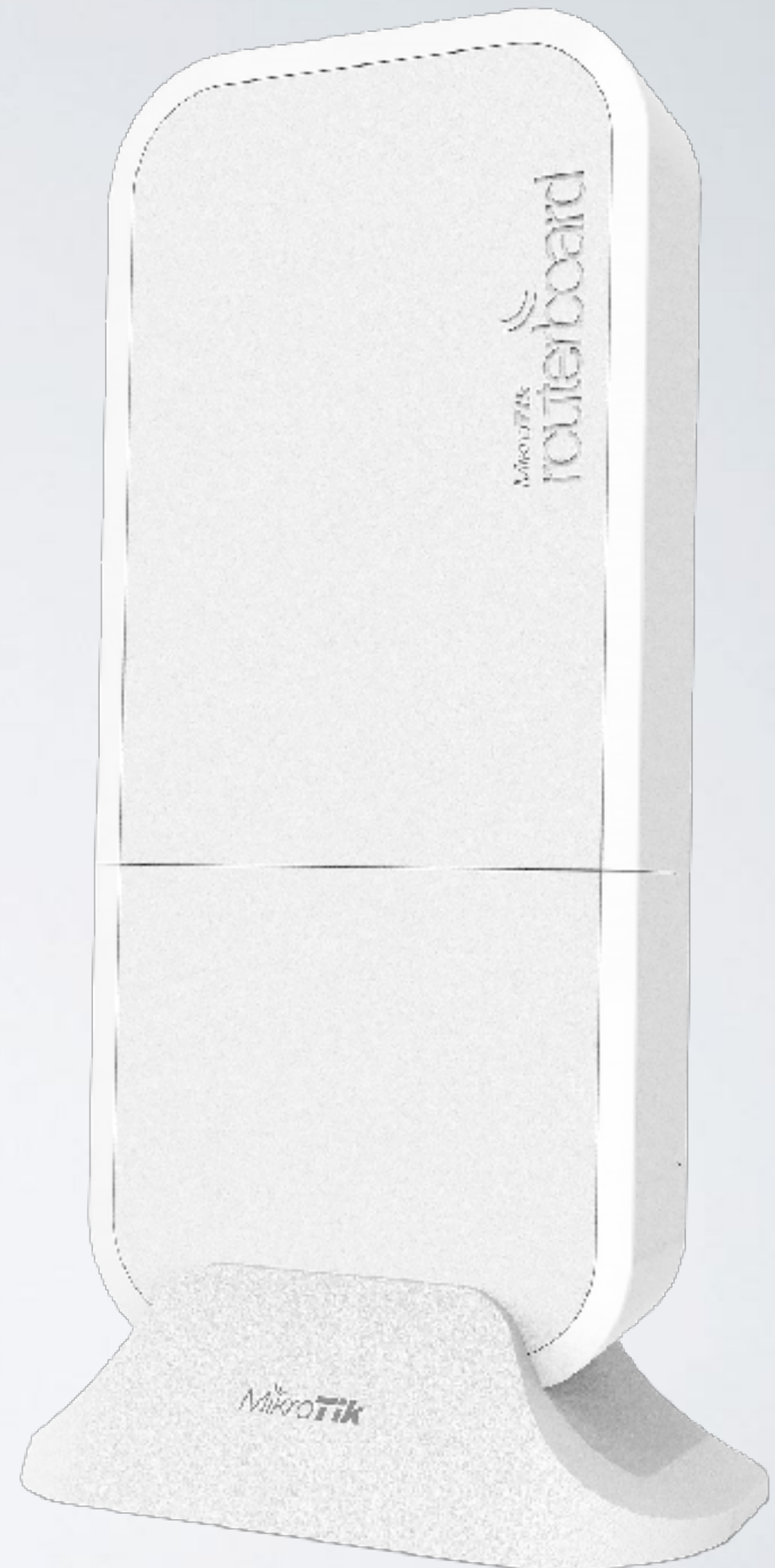
# wAP R

- 2.4 GHz AP
- miniPCI-e slot for 3G/4G
- PoE, power jack, automotive connector
- Kit price \$79



# wAP LTE KIT

- Wireless AP for LTE
- EU/Int. version supports LTE bands 1, 2, 3, 7, 8, 20, 38, 40
- 2G, 3G, LTE supported
- Optional external antennas
- Comes with a stand mount
- Kit price \$119





# LtAP mini

- 2.4 GHz AP in a rugged case
- miniPCle for LTE
- Built-in GPS
- Serial port
- Ethernet port
- Perfect for cars or outdoor mobile applications





# LtAP

- 2x miniPCle
- Built-in 2.4 GHz AP
- MMIPS Mediatek CPU 880MHz
- 2x MMCX connectors
- 1 Gbps ethernet port
- Built-in GPS







# Woobm

- Wireless out of band management
- Connect to your device and get serial access over wireless
- Price \$16



# mUPS

- Gigabit PoE injector
- Power supplied by PoE or jack
- RouterBOARD could be powered by battery
- \$29 (without battery)



# wsAP ac lite

- Mount into standard EU or US electrical sockets
- Dual band ac (2.4 and 5 GHz)
- Phone jack passthrough
- Two LAN ports
- One of them is PoE out port
- USB port



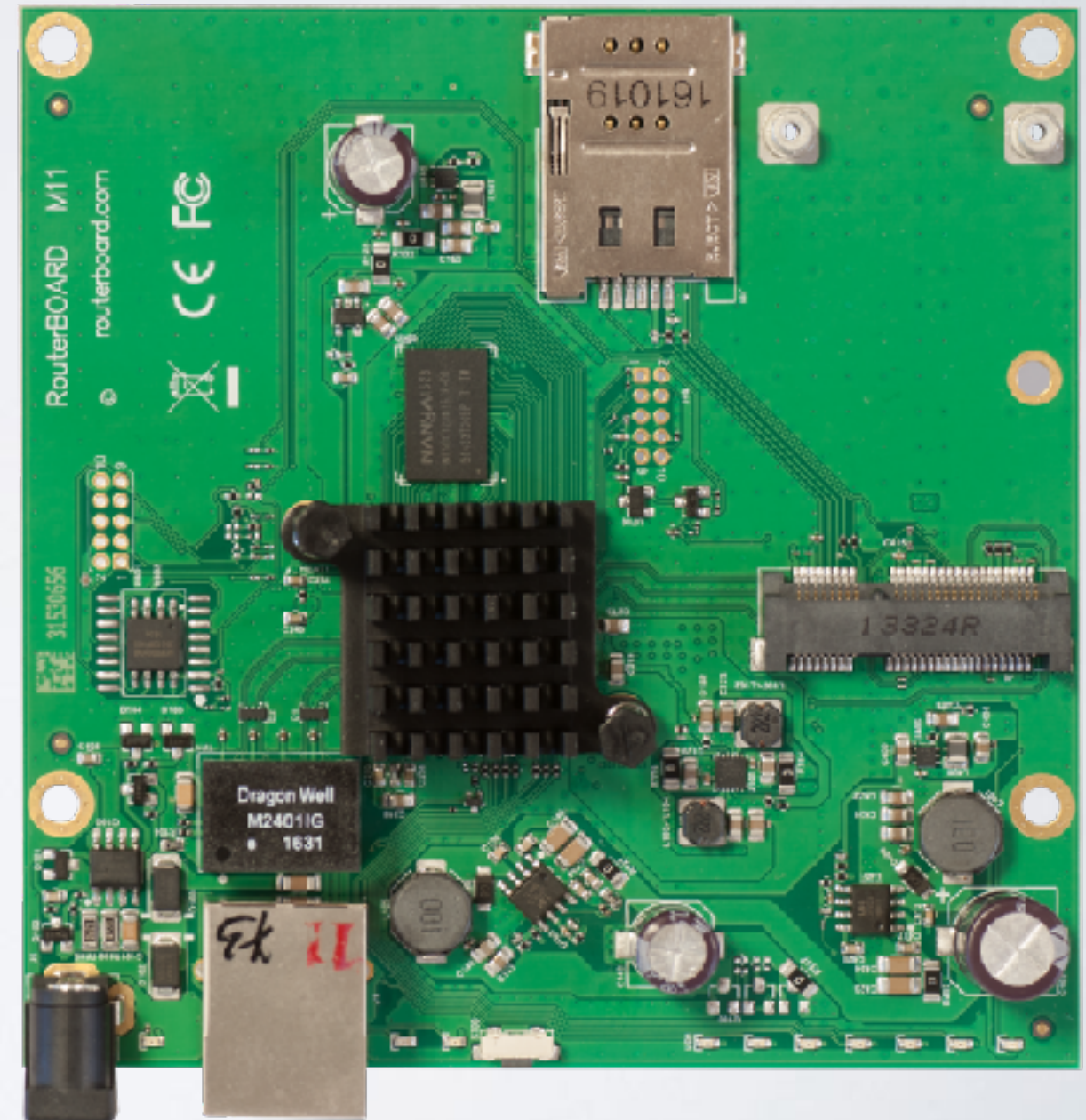






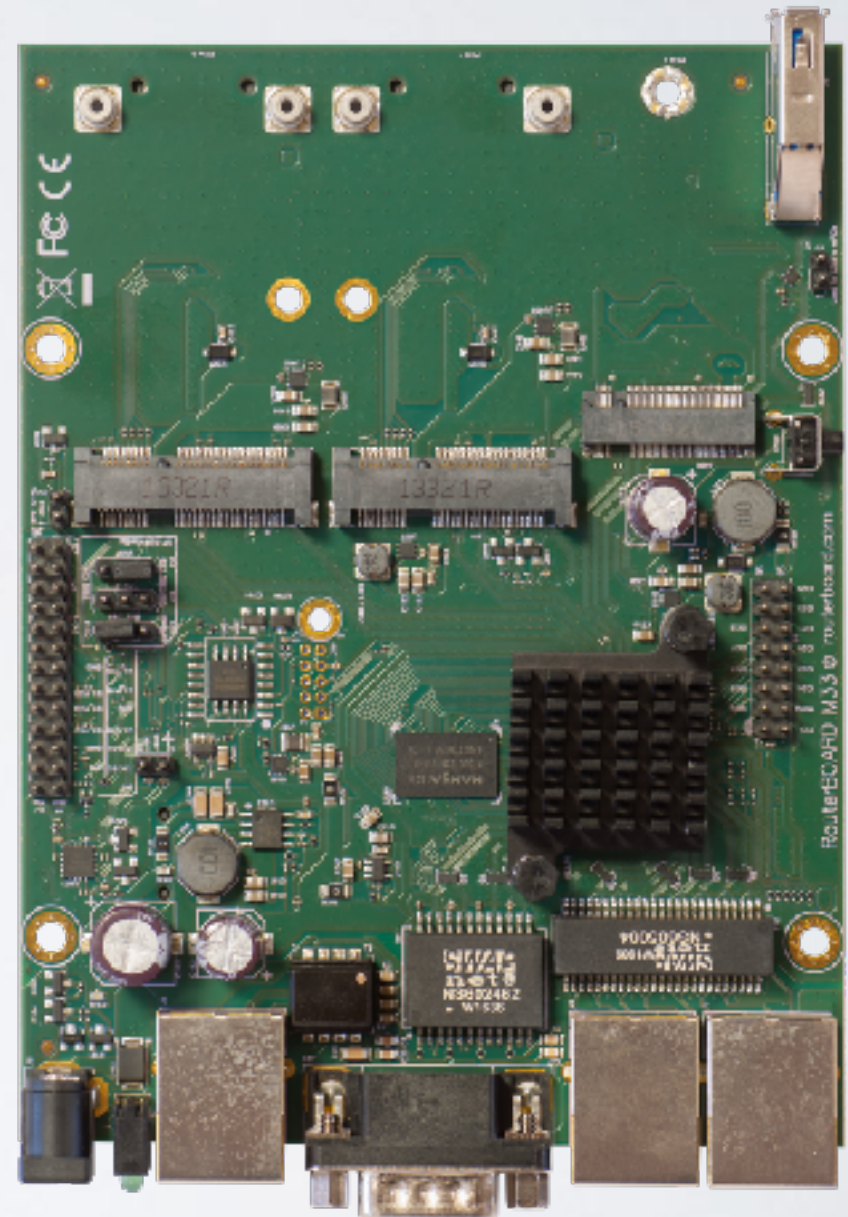
# MIIG

- Four core 880 MHz CPU
- 1 miniPCle slot
- 1 Gigabit Ethernet
- Upgrade for RB411
- \$39



# M33G

- Four core 880 MHz CPU
- 3 Gigabit Ethernet
- 2 miniPCle slots
- 1 M.2 slot
- USB 3.0 and serial port
- Upgrade for RB433





# S+RJ10

- SFP+ to ethernet
- 6-speeds (10/100/1G/2.5G/5G/10G)
- 2.4 W
- Works with all MikroTik SFP+
- \$65

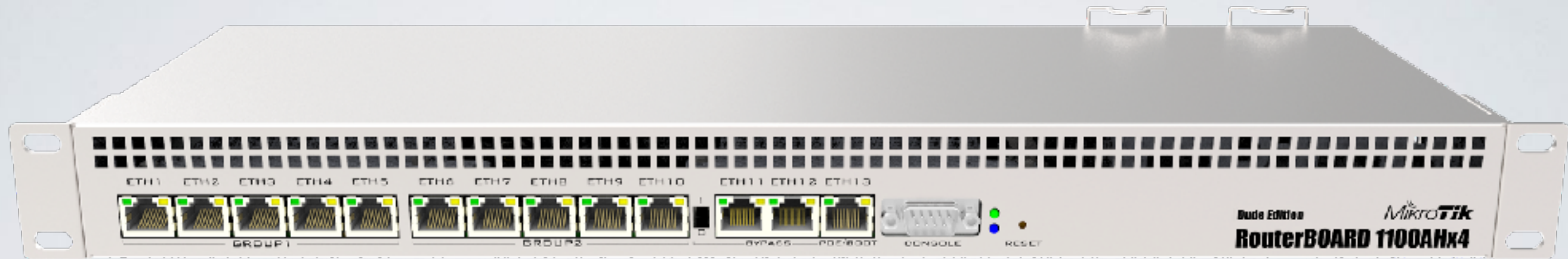




# PW48V

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

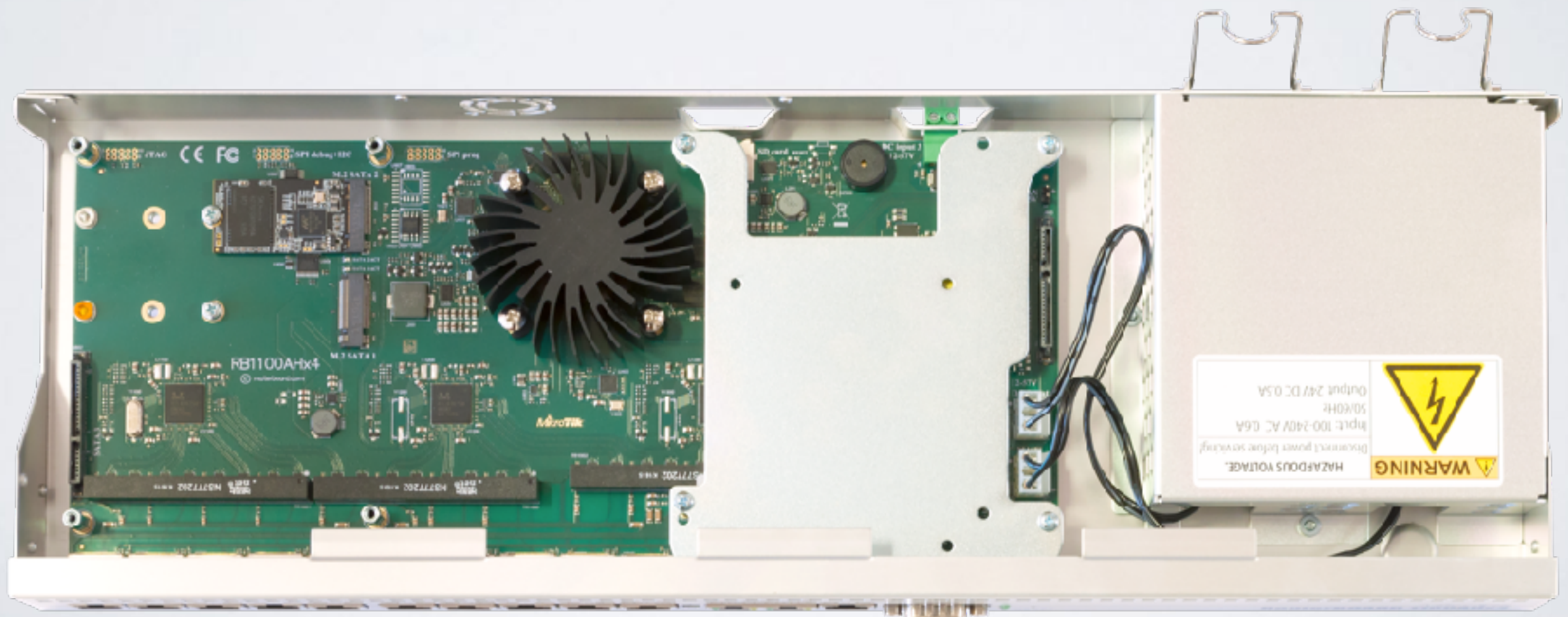




# RB 1100AHx4

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

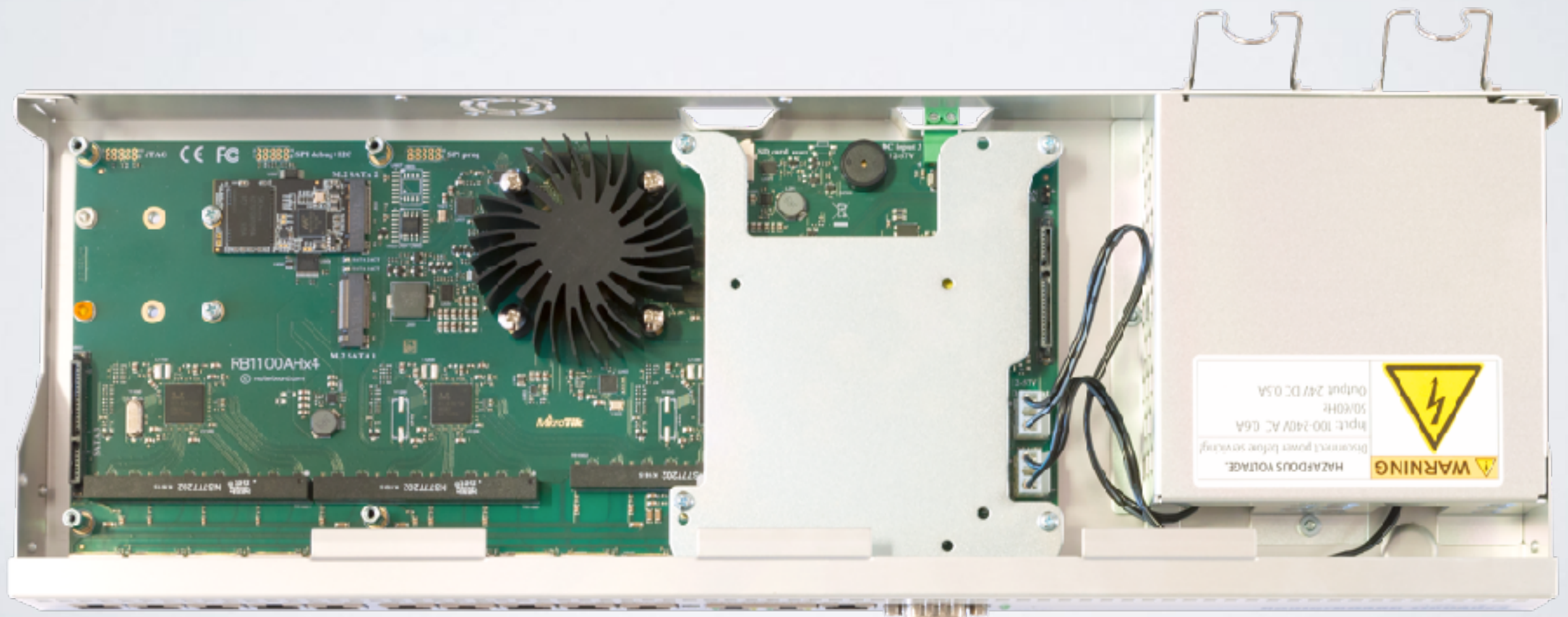
Annapurna Alpine AL21400 CPU with four Cortex A15 cores  
clocked at 1.4 GHz





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

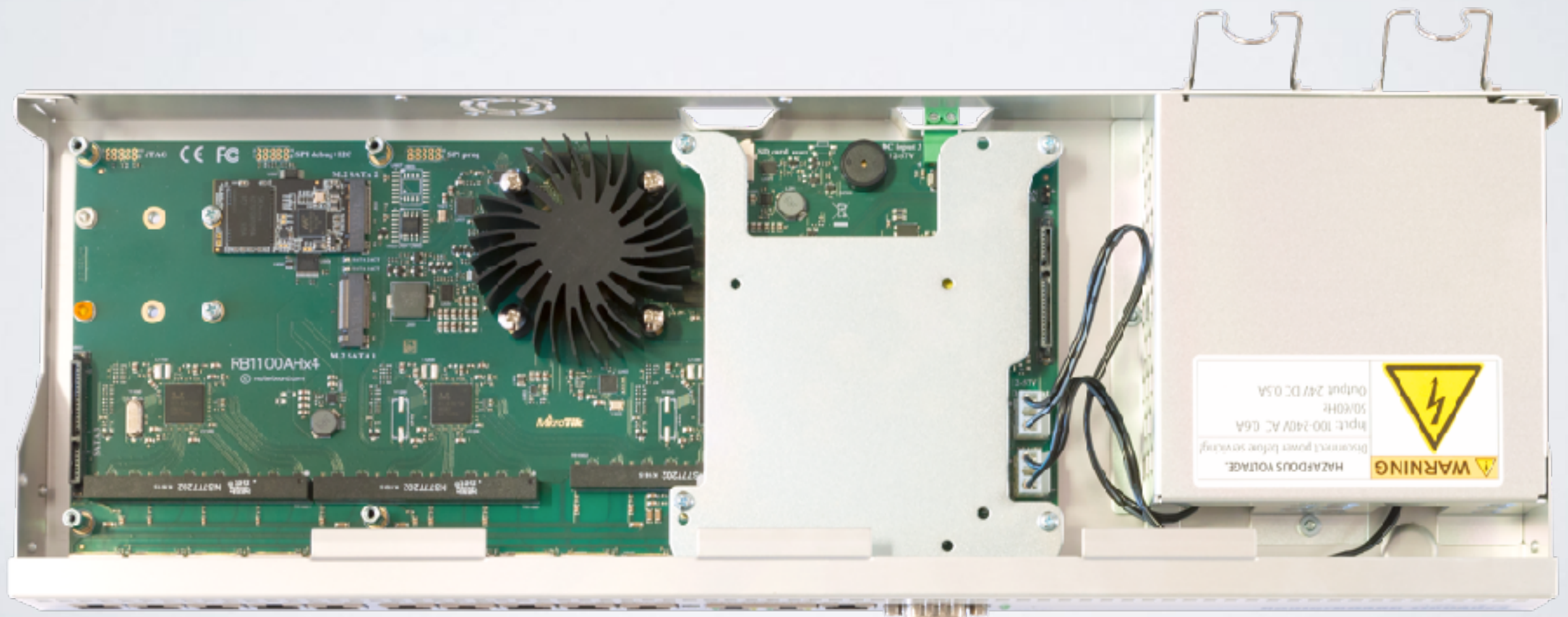
- Two SATA3 ports





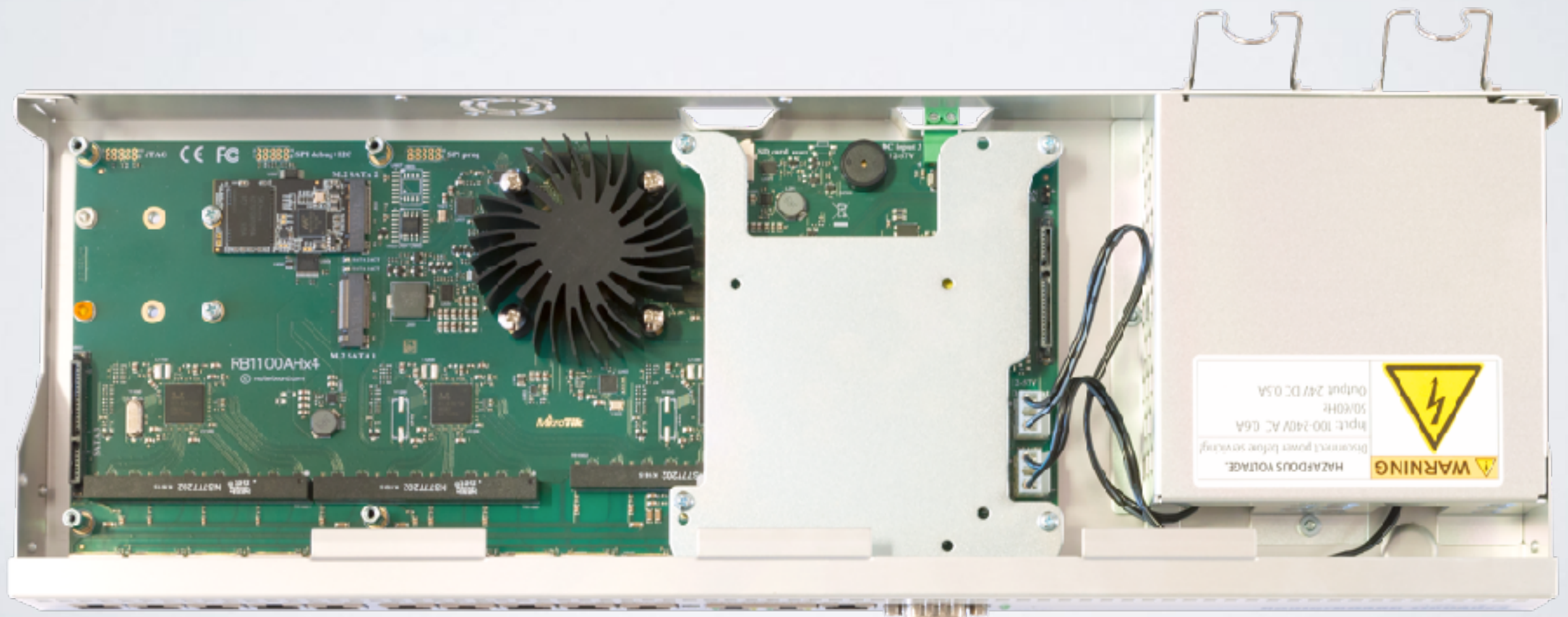
Annapurna Alpine AL21400 CPU with four Cortex A15 cores clocked at 1.4 GHz

- Two SATA3 ports
- Two M.2 ports



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

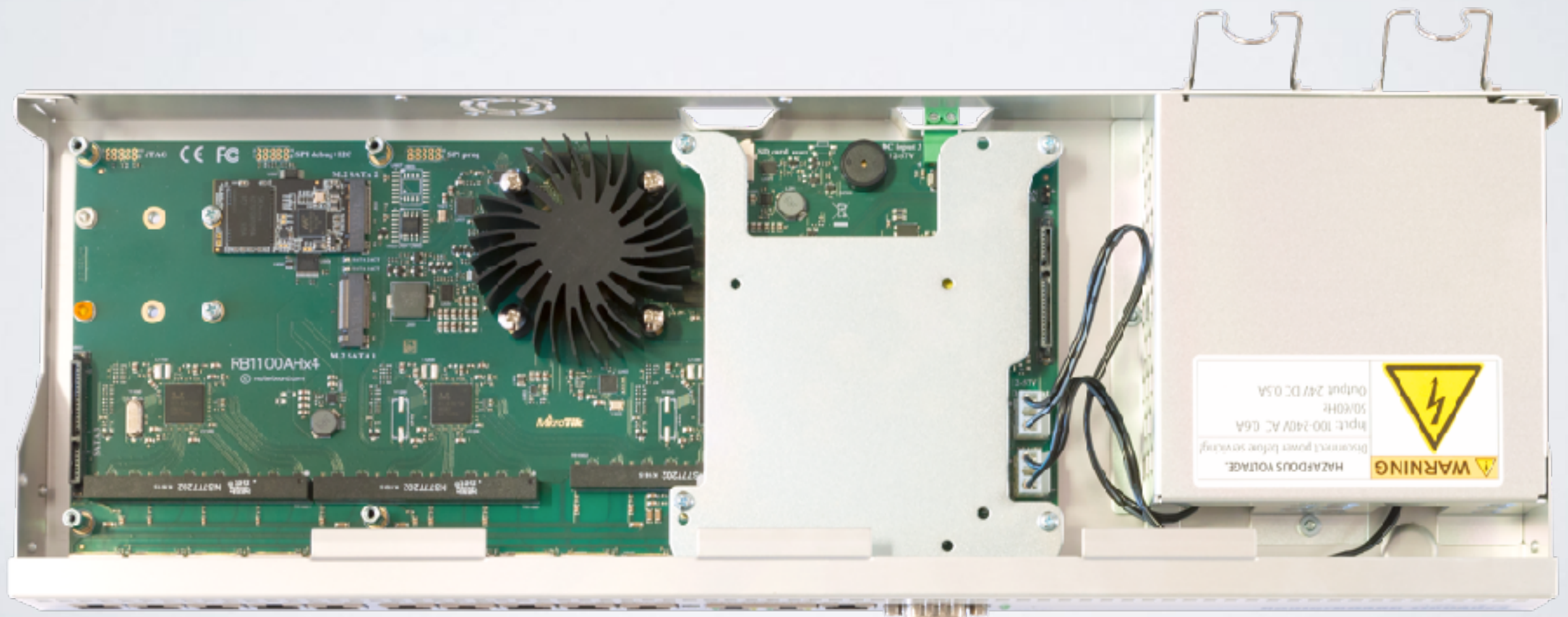
- Two SATA3 ports
- Two M.2 ports
- 60 GB SSD included





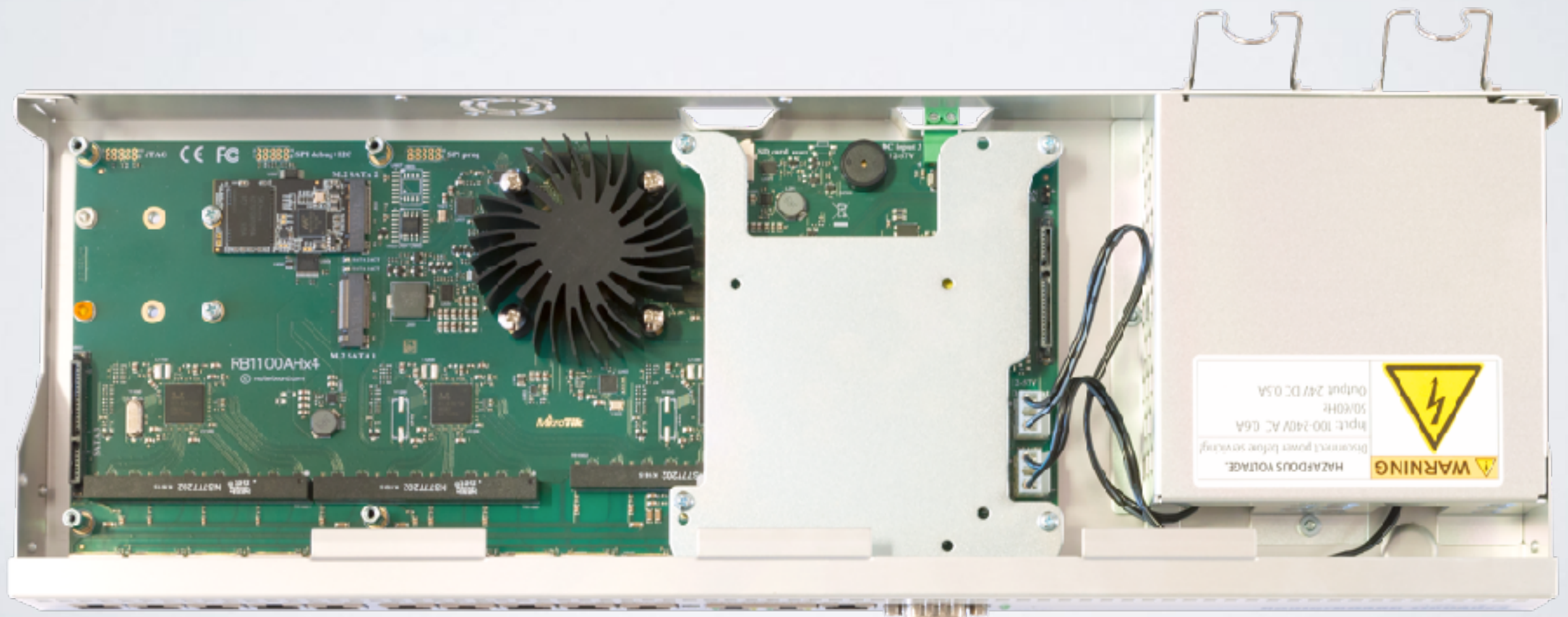
Annapurna Alpine AL21400 CPU with four Cortex A15 cores clocked at 1.4 GHz

- Two SATA3 ports
- Two M.2 ports
- 60 GB SSD included
- Hardware accelerated IPSec



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

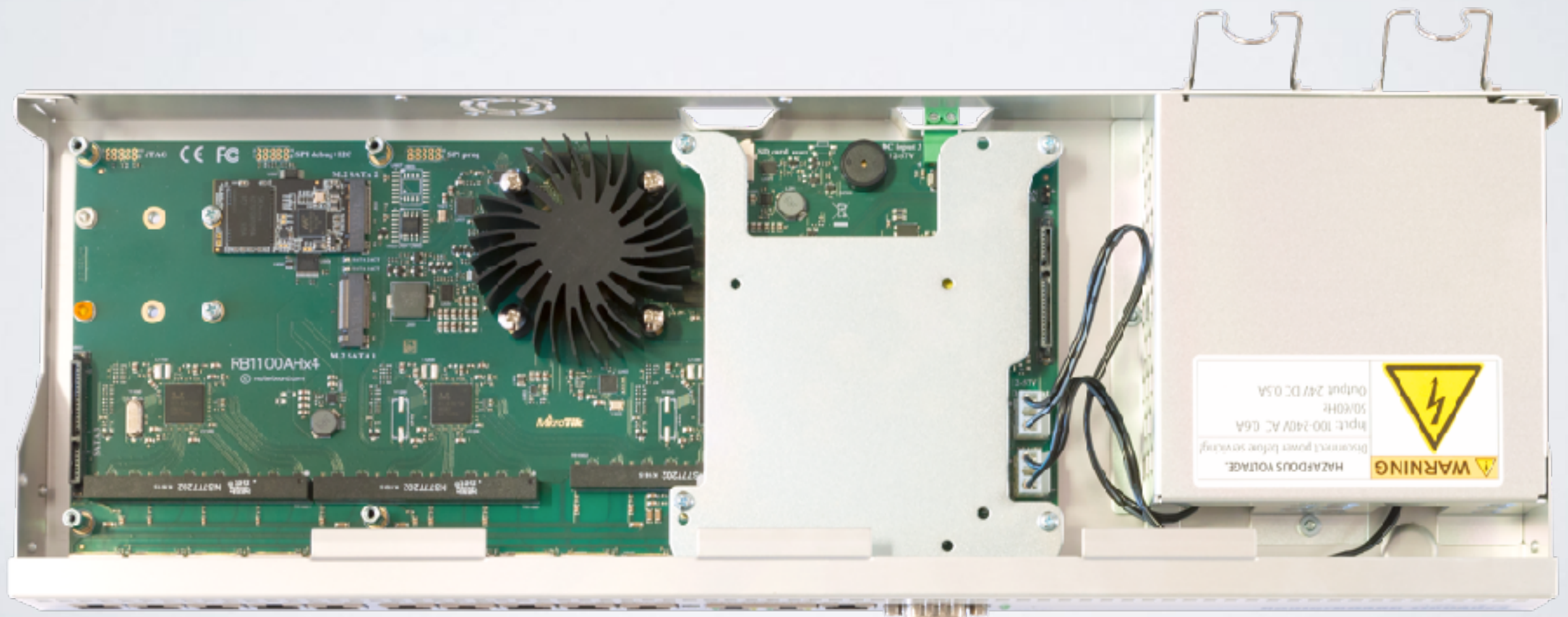
- Two SATA3 ports
- Two M.2 ports
- 60 GB SSD included
- Hardware accelerated IPSec
- -48 V DC telecom power





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 I 00AHx4 - \$299**
- **RBI I 00AHx4 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







# CRS317-1G-16S+

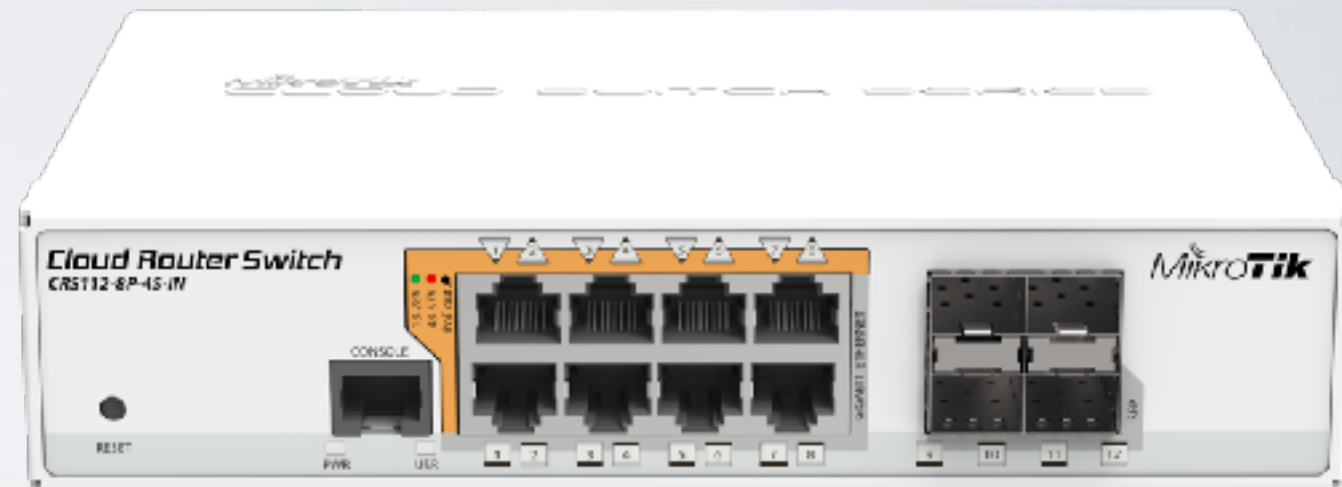
High performance SFP+ switch

# CRS317-1G-16S+

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

# CRS112-8P-4S

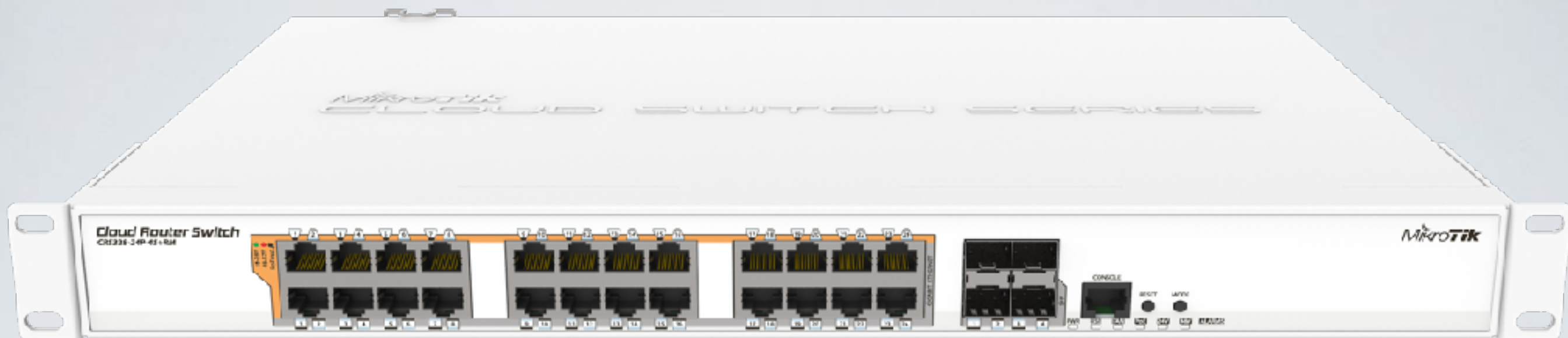
- PoE out 802.3af/at
- Eight Gigabit ethernet ports
- 4 SFP ports
- Separate PSU for passive or 802.3af/at PoE out
- Low voltage PSU included
- Per port auto detection of PoE standard



# CRS328-24P-4S+RM

Smart PoE out switch





# CRS328-24P-4S+RM

Smart PoE out switch

# 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    |
| P1          | 1 Gbit          | US\$45  |
| P10         | 10 Gbit         | US\$95  |
| P-Unlimited | Unlimited       | US\$250 |

- 60 day trial available
- Purchased license can be transferred

# CHR

## Licensing

1

Licence

System ID: 6LR1ZP/utuJ

Level: free

Next Renewal At:

Deadline At:

☐ Limited Upgrades

OK

Generate New ID

Renew Licence

Renew Licence

Account: mymikrotikcomaccount

Password: \*\*\*\*\*

Level: P1

Start

Stop

Close

done

2

Licence

System ID: 6LR1ZP/utuJ

Level: P1

Next Renewal At: Jan/10/2016 21:59:59

Deadline At: Feb/09/2016 21:59:59

☐ Limited Upgrades

OK

Generate New ID

Renew Licence

WinBox → System → License



# CHR

## Licensing

3

The screenshot shows the MikroTik client portal. The top navigation bar includes links for Home, Buy, About, Jobs, Hardware, Software, Support, Training, and Account (which is circled in red). Below the navigation bar is a blue header with 'My account' and a 'Log out MikroTik' link. The left sidebar contains a 'Toggle menu' button and several sections: ACCOUNT INFORMATION (Home, Balance, Edit account details, MUM registration history, Hardware orders), WEB ORDERS (Your orders and invoices, Purchase a RouterOS license key), ROUTEROS KEYS (Search and view all keys, Request key from another account, Transfer prepaid keys (21), Make a demo key, Make a key from prepaid key (21)), and CHR LICENCES (All CHR keys, CHR orders and invoices, Transfer CHR prepaid keys). The 'CHR LICENCES' section is highlighted with a red rounded rectangle. A red arrow points from the 'Account' link in the top navigation bar to the 'CHR LICENCES' section. Another red arrow points from the 'CHR LICENCES' section to the 'Visit upcoming MUM events!' section. The main content area displays 'Welcome, MikroTik!', 'Account notices' (with a message about 5 prepaid license keys), and 'Visit upcoming MUM events!' with a list of events: Indonesia in Yogyakarta (Oct 27 - 28), Brazil in Maceio, Alagoas (Nov 9 - 10), Uruguay in Montevideo (Nov 13), and South Africa in Cape Town (Nov 24).

**MikroTik**

Home Buy About Jobs Hardware Software Support Training **Account**

**My account** Log out MikroTik

≡ Toggle menu

**ACCOUNT INFORMATION**  
Home  
Balance  
Edit account details  
MUM registration history  
Hardware orders

**WEB ORDERS**  
Your orders and invoices  
Purchase a RouterOS license key

**ROUTEROS KEYS**  
Search and view all keys  
Request key from another account  
Transfer prepaid keys (21)  
Make a demo key  
Make a key from prepaid key (21)

**CHR LICENCES**  
All CHR keys  
CHR orders and invoices  
Transfer CHR prepaid keys

**Welcome, MikroTik!**

**Account notices**

Prepaid keys: You have 5 prepaid license keys available

**Visit upcoming MUM events!**

-  **Indonesia in Yogyakarta,**  
Oct 27 - 28
-  **Brazil in Maceio, Alagoas,**  
Nov 9 - 10
-  **Uruguay in Montevideo,**  
Nov 13
-  **South Africa in Cape Town,**  
Nov 24

[mikrotik.com/client](https://mikrotik.com/client)

# CHR

## Licensing

4

### User keys

Show entries

10

Search

| System ID   | Issued     | Expires | Level         | Transfer                 | Action                  | Status                                                                                | Note                                                                                  |
|-------------|------------|---------|---------------|--------------------------|-------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| vmxAucZ7VtK | 2016-05-31 | ---     | P1-Perpetual  | <a href="#">Transfer</a> | <a href="#">Upgrade</a> |  |  |
| OMaZwuXjj4N | 2016-04-04 | ---     | P10-Perpetual | <a href="#">Transfer</a> | <a href="#">Upgrade</a> |  |  |
| Cm8ATgygn2H | 2017-09-13 | ---     | P-Unlimited   | <a href="#">Transfer</a> |                         |  |  |
| +OfzKswA4TC | 2017-08-24 | ---     | P10-Perpetual | <a href="#">Transfer</a> | <a href="#">Upgrade</a> |  |  |
| 4Mc+U51oLoN | 2016-06-10 | ---     | P1-Perpetual  | <a href="#">Transfer</a> | <a href="#">Upgrade</a> |  |  |
| 10971UBIKZK | 2015-12-28 | ---     | P1-Perpetual  | <a href="#">Transfer</a> | <a href="#">Upgrade</a> |  |  |
| JPyotBTRsJK | 2015-12-09 | ---     | P10-Perpetual | <a href="#">Transfer</a> | <a href="#">Upgrade</a> |  |  |

[mikrotik.com/client/cloudhosting](https://mikrotik.com/client/cloudhosting)

# CHR

## Licensing

5

### Upgrade system license

System ID

AuykNnBPF/E

Level

P1-Perpetual (\$ 45.00 )

Upgrade key

1Gbit per interface (\$45 one time payment)

You have following prepaid balance keys available to purchase a CHR license:

- P1-Perpetual - 5 keys

[mikrotik.com/client/cloudhosting](https://mikrotik.com/client/cloudhosting)

# CHR

## Licensing

6

### Payment

| You have selected           | System ID   |
|-----------------------------|-------------|
| P1-Perpetual                | AuykNnBPF/E |
| Total price: <b>\$54.45</b> |             |

Pay using deposit (left: \$100)

Pay using CC

Pay using PayPal

Pay using Balance key (5)

**Note:** Price includes VAT 21% because you have specified EU country as your residence. To avoid this you have to enter your VAT registration number in your account settings.

[mikrotik.com/client/cloudhosting](https://mikrotik.com/client/cloudhosting)



# 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
- 246 entries in total!

# LTE passthrough

- Bridge over LTE to the connected device
- IPv4/IPv6 to the connected device
- On LTE device **only modem configuration**
- For one device only
- Specific modems are supported

# Bridge functions

- 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



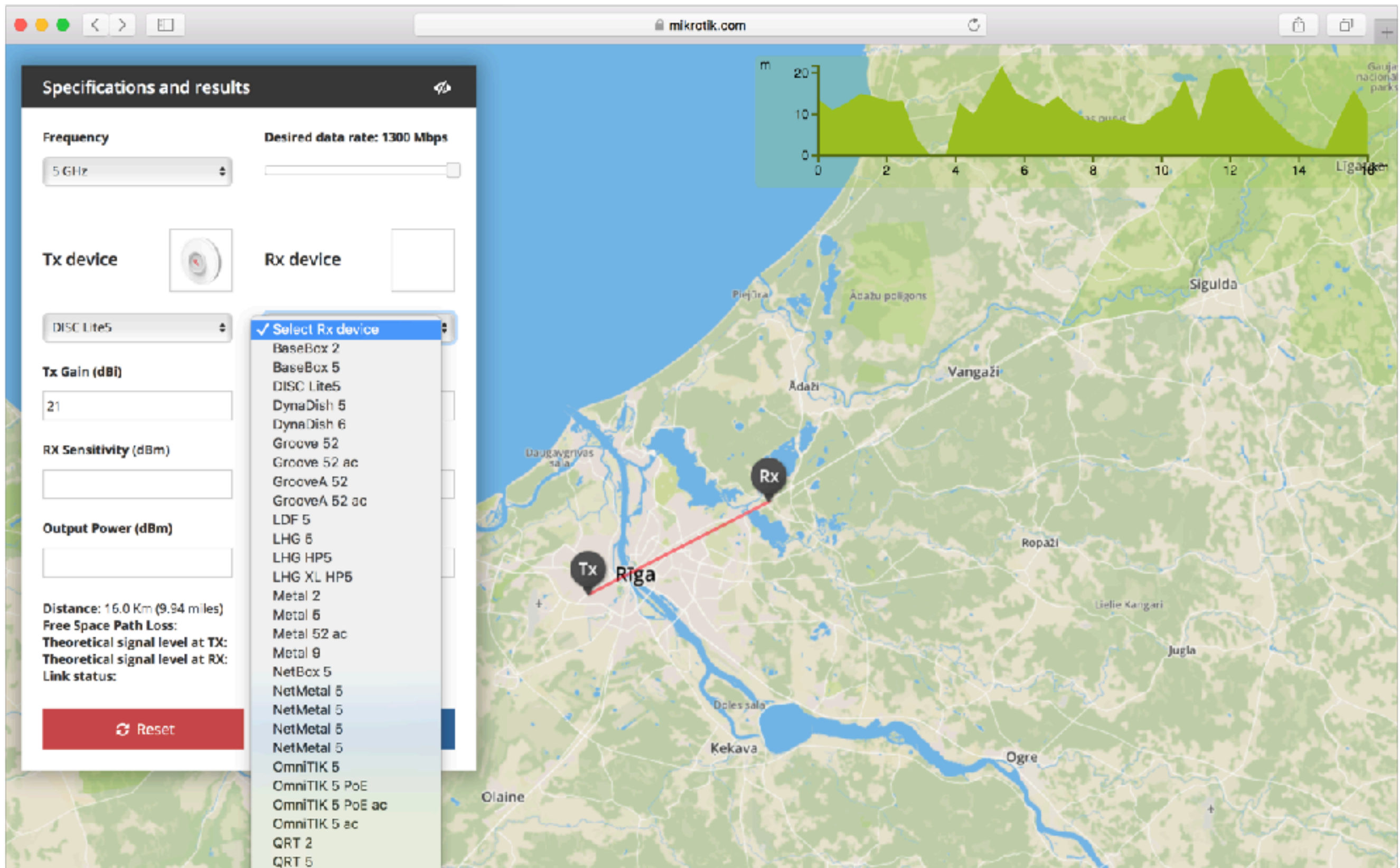
# IPsec results

## 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



# 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](http://wiki.mikrotik.com)
- Email [support@mikrotik.com](mailto:support@mikrotik.com)
- Attend a training class or join and Academy class in a University

# After the MUM

- All presentations - [mum.mikrotik.com](http://mum.mikrotik.com)
- Videos - [youtube.com/mikrotik](http://youtube.com/mikrotik)
- License for paid and voucher registrations will be sent by an e-mail





MikroTik

The image features the Mikrotik logo, which consists of the word "Mikro" in a stylized, italicized sans-serif font, followed by "Tik" in a bold, italicized sans-serif font. Above the "i" in "Mikro" are three curved lines representing signal waves. The entire logo is rendered in a dark gray color and is positioned on a light gray background. Below the logo, there is a faint, semi-transparent reflection of the logo itself.