

Mikrotik Wireless System Network Setup By Caryn Zacharias

For customers looking to set up their own wireless network. You can use 2 or more units to communicate and see information between vessels and equipment. This document explains the equipment needed to create this network and how to configure it. HYPACK has and still uses Ubiquiti Bullets. However, some of our users are not allowed to purchase the Ubiquiti units due the China being the country of origin. The Mikrotik units are made in Latvia and checks the purchase approval box for those customers.

PARTS

- Mikrotik: GrooveA 25ac
- Antenna
- POE (Power over ethernet)
- Power adapter
- Ethernet cable



COMPUTER SETUP

IP Address - the ethernet connection on the computer must be set to a static IP. It does not matter what IP is entered, it just cannot be set to a dynamic IP address. If you need to check this or change it, go to your Network & Internet settings on your computer. If Automatic

(DHCP) is showing as seen in the image below, you must click on edit to change this to manual and enter an IP address of your choice. (Example: 192.168.2.10)

∈ ≡ Net\	settings work & intern	et > Ethernet	-		Edit IP settings Manual V
Ģ	Ethernet 5 Not connected			^	On IP address 192.168.2.10
	Authentication settings		Edit		Subnet mask
	Metered connection Some apps might work differently to reduce data usage when you're connected to this network				255,255,255,0 Gateway
	Set a data limit to help co	ntrol data usage on this network			Preferred DNS
	IP assignment:	Automatic (DHCP)	Edit		DNS over HTTPS
	DNS server assignment:	Automatic (DHCP)	Edit		Sav

SOFTWARE FOR INITIAL CONNECTION AND SETUP FOR EACH UNIT

Download Router OS - WinBox

- 1. Go to: https://mikrotik.com/download
- 2. Click WinBoxXX dropdown arrow and choose your operating system (At the time of this write up, WinBox 4.0 beta17 was downloaded. I have listed WinBoxXX since there have been updates and newer versions are available for download).



- 3. Extract the download to a folder on your computer. Since it is a standalone program, it does not run through an installation wizard to be installed. The file just needs to be unzipped. (Right click on the WinBox_Windows.zip and choose Extract All...)
- 4. Go to where you have extracted the files and double click on the WinBox.exe file to open the Program.

CONNECT THE PARTS

- 5. Screw the Antenna on to the GrooveA unit.
- 6. Plug the ethernet cable into the bottom of the GrooveA unit. Screw the end cap on and push the grey watertight piece into the opening with the ethernet cable.
- 7. Plug the Ethernet cable into the POE
- 8. Plug the POE Ethernet into the Computer
- 9. Plug the POE into a Power Source.

WHAT TO EXPECT

When the unit has power, it will beep and light up.



CONFIGURING ACCESS POINT UNIT ("THE MASTER")

After the unit is connected, it is time to configure the Access Point (AP) unit. Go to where you extracted the WinBox.exe.

- 10. Double click on the WinBox.exe file to open the Program. Any unit connected will be displayed in the list.
- Select the unit from the list on the right. Enter the login information. Default Login: admin Default Password: no password - leave field blank
- 12. Either click connect or double click the unit in the list

VinBox 4.0beta16									-		>
тікготік									New W	inBox	Ξ
		يا	Select from: Neight	iors ~							
								Q Find Y	Filter 🔲		
			MAC Address	IP Address	Identity	Version	Board	Uptime	Boai≡	57 Actio	15
			D4:01:C3:FA:27:8E	0.0.0.0	MikroTik	6.49.15 (RBGrooveGA-52	00:05:36	bridç	Refresh	
Connect to	D4:01:C3:FA:27:8E										
Login	admin										
Password											
	Remember password										
Workspace	<none></none>	•									

<u>*Hint 1:*</u> If you do not have a static IP address set, you will get the following error when trying to connect to the unit:

ERR: Could not connect. MacConnection syn timeout.



13. Once connected, if you see the RouterOS Default Configuration window (as shown below). Click 'OK' to leave the defaults. If you click 'Remove Configuration' you will be starting from scratch.

admin@D4:01:C3:FA	:27:4D (MikroTik) GrooveA 52 ac WinBox			-		×
М тікготік	Workspace: <none> ~ Q</none>	w WinBox 🗠	~ ~ ③	Safe Mode	22 25	Ξ
🚀 Quick Set						
CAPSMAN						
Interfaces		<u> </u>	_			
T Wireless	RouterOS Default Configuration					
}-f Bridge	The following default configuration has been installed on your router:					
PPP	Welcome to DeviterOSI					
Switch	1) Set a strong router password in the System > Users menu					
🎝 Mesh	2) Upgrade the software in the System > Packages menu 3) English fravial on untrusted networks					
<u>v4</u> IP →	4) Set your country name to observe wireless regulations					
MPLS >	WISP Bridge:					
💢 Routing 🔷 >	* wireless and LAN interfaces are bridged;					
🚯 System 🔷	wlan1 Configuration: mode: ap-bridge:					
CA Queues	band: 5ghz-a/n/ac;					
- Dot1X	tx-chains: U; rx-chains: 0;					
Files	installation: outdoor;					
📋 Log	wpa2: no; ht-extension: 20/40/80mhz-XXXX;					
P- New Terminal	LAN Configuration:					
& RADIUS	Remove Configure	ation OK				
🔓 Tools 🔹 👌	Renove configur					
(Partition						

14. Click Quick Set.



- 15. A new Quick Set window will open.
- 16. Click the dropdown arrow and choose "PTP Bridge AP".

admin@D4:01:C3:FA:	27:8E (MikroTik) Groov	eA 52 ac WinBox		
🕅 тікготік	Workspace: < non	e) • 🗇 5 Q		
🊀 Quick Set	Cuick Set	WISP AP Y		υ X
2 CAPSMAN	-	CPE	ACTIVE	
Interfaces	MA	PTP Bridge AP	C3:FA:27:8F	Wireless
🕵 Wireless	Use Access	PTP Bridge CPE		Wireless Clients
Bridge		WISP AP		Configuration
PPP		Home AP	WPA2	Bridge
Switch	✓ Wireless Cl	Basic AP		VPN
Strain Mesh	~ Configurat	Home Mesh		System
v4 IP >	^ Bridge	CAP		

17. Wireless:

a. You can leave the Network Name as is or change it. Example Below: "MikroTik-FA278F" was changed to "HYPACK".

🚀 Quick Set PTP Bridge	AP ~	🚀 Quick Set PTP Bridge AP 👻				
	ACTIVE	ACTIVE				
 Wireless 		∧ Wireless				
Wireless Protocol	• 802.11 nstreme nv2	Wireless Protocol 💿 802.11 💿 nstreme 💿 nv2				
Network Name	HYPACK	Network Name MikroTik-FA278F				
Frequency	auto 🗸	Frequency ¹ auto	~			

b. Leave the remaining options as the defaults.

0 1	
Quick Set PTP Bridge	AP ~
	ACTIVE
Wireless	
Wireless Protocol	802.11 nstreme nv2
Network Name	НУРАСК
Frequency	auto
Band	5GHz-A/N/AC ~
Channel Width	20/40/80MHz XXXX ~
Country	united states3 ~
Antenna Gain	6
MAC Address	D4:01:C3:FA:27:8F

<u>*Hint 3:*</u> If you need to change the band to 2.4GHz, please see the Troubleshooting Section.

- c. Security This is a wireless connection; anyone will be able to access if you do not set a password.
 - i. Enable WPA2
 - ii. Enable Encryption aes ccm (default)
 - iii. Enter a Wifi Password.

All units coming from HYPACK will be set to HypackXylem56. This Wifi Password does not have to be set to the same admin password, however, we have chosen to use the same password for everything.

Security	WPA 🕑 WPA2
Encryption	🛃 aes ccm 💿 tkip
WiFi Password	••••••

- 18. **Configuration**: Setting the IP address for the unit
 - a. Set the radial button to 'Static'
 - b. Enter the IP address

All units coming from HYPACK, the Access Point "The Master" units will be set to 192.168.1.21.

 Configuration 		
Address Acquisition	Automatic 💽 Static	
IP Address	192.168.1.21	
Netmask	255.255.255.0 (/24)	•
Gateway	+	
DNS Servers	+	

19. **System**: Set a password to protect your setup.

Route	andentity	IVIRIOTIK	·
		Check For Updates	Reset Configuration

For all units coming from HYPACK, the password will be set to HypackXylem56.

WEB BROWSER

Once the device is setup, you do not need to use the standalone program anymore. You can connect to the device using a web browser now.

Open a web browser.

Enter the IP address you just set (192.168.1.21).

Enter Login and Password.

C A Not s	ecure 192.168.1.21	A* 🟠 🗘
		1
		Mikrotik
	RouterOS v6.49.15	
	You have connected to a router. Administrative access only. If this device is not in your possession administrator.	n, please contact your local network
	WebFig Login:	
	Login: admin	
	Password:	
	Winbox Telnet Graphs License Help	
		© mikrotik

← C ▲ Not secur	re 192.168.1.21/webfig/				C) 2 ²	🛈 🗞 🖓
RouterOS v6.49.15 (stable)				Quick Set	> WebFig Ter	minal 🙎 📓
					PTP Bridge	AP V Quick Set
active						
		Wireless				Configuration
Wireless Protocol			Address Acquisition	Static O Automat	c	
Network Name	HYPACK		IP Address	192.168.1.21		
Frequency	auto VMHz		Netmask	255.255.255.0 (/24)	~	
Band	5GHz-A/N/AC 🗸		Gateway	•		
Channel Width	20/40/80MHz XXXX ~		DNS Servers	•		
Country	united states3 ~					System
Antenna Gain	6 dBi		Router Identity	MikroTik		
MAC Address	D4:01:C3:FA:27:8F				Check For Updates	Reset Configuration
Use Access List (ACL)						Password
Security	WPA WPA2					Apply Configuration
Encryption	aes ccm tkip					
WiFi Password	HypackXylem56 Hide					
192.168.1.21/webfig/#Interfaces		Wireless Clients				

CONFIGURING ADDITIONAL UNIT(S) ("THE CLIENT(S)")

Follow the steps from the beginning of this document unit you get to the Quick Set step.

- 1. Connect the next GrooveA unit to the computer
- 2. Open Windbox.exe

- 3. Click Quick Set
- 4. Click the dropdown arrow and choose "PTP Bridge CPE"

🔟 admin@D4:01:C3:FA:	27:4D (MikroTik) G	rooveA 52 ac WinBo	x		
🕅 mikrotik	Workspace: <	none> • 🕣 1	Q		
🊀 Quick Set	🚀 Quick Set	WISP AP			c ×
CAPSMAN		CPE	ACTIVE		
Interfaces	~ Wireless	PTP Bridge AP			Wireless
🔶 Wireless	Wireles	PTP Bridge CPE	2.11 nstreme nv2		Wireless Clients
Bridge	Net	WISP AP	ik-FA274E		Configuration
PPP		Home AP		~	Bridge

5. Wireless: Leave defaults

Quick Set PTP Bridge	CPE ~		ت×
	ACTIVE		
Wireless			Wireless
Band	5GHz-A/N/AC	~	Configuration
Channel Width	20/40/80MHz XXXX	~	System
Country	united states3	~	
Antenna Gain	6		

- 6. **Configuration**: Setting the IP address for the unit
 - a. Set the radial button to 'Static'
 - b. Enter the IP address

For all units coming from HYPACK, the "client" units will be set to 192.168.1.20 (22, 23, etc).

 Configuration 	
Address Acquisition	Automatic 💽 Static
IP Address	192.168.1.20
Netmask	255.255.255.0 (/24) ~
Gateway	+
DNS Servers	+

7. **System**: Set a password to protect your setup. For all units coming from HYPACK, the password will be set to HypackXylem56.

CHECKING IF THE UNITS ARE COMMUNICATING

1. Open the web browser.

\leftarrow	C A Not see	ure 192.1	168.1.20/webfig/					Ø A [™] ☆	() ζ≦	¢ه ۲		, (
Rout	terOS v6.49.15 (stable	e)						Quick Set	WebFig Ter	minal	2	
									PTP Bridge	∋ CPE ✔	Quick	Set
active	e											
						Wireless				Confi	gurati	ion
	Band	5GHz-	A/N/AC V				Address Acquisition	Static Automatic	c			
	Channel Width	20/40/	80MHz XXXX 🗸				IP Address	192.168.1.20				
	Country	united	states3 🗸				Netmask	255.255.255.0 (/24)	~			
	Antenna Gain	6	dB	ii			Gateway	-				
	Address	Network Name	Channel	Protocol		Signal Strength	DNS Servers	-				
PRB	D4:01:C3:FA:27:8F	HYPACK	5745/20-Ceee/ac(24d	802.11	-35						Syste	em
Р	34:98:B5:E8:BE:4C		5785/20-eeCe/ac(24d	802.11	-66	IIII	Router Identity	MikroTik Client				
									Check For Updates	Reset Co	nfigurati	ion
										F	Password	±
										Apply Co	nfigurati	ion
-												
H												
							3					

2. Select the HYPACK Network and enter the Wifi Password.

	Address	Network Name	Channel	Protocol		Signal Strength	
PRB	D4:01:C3:FA:27:8F	HYPACK	5745/20-Ceee/ac(24d	802.11	-38		
,	34:98:B5:E8:BE:4C	NETGEAR_OR	5785/20-eeCe/ac(24d	802.11	-66		
>	34:98:B5:E8:BE:92	NETGEAR_OR	5785/20-eeCe/ac(24d	802.11	-75		
					-50 dB -60 dB -70 dB -80 dB		
-							
						10:54:	
- Si	ignal Strength cur	: -38 dB	avg: -38 dB		max: -	10:54: 19 dB	
- Si	ignal Strength cur Network Name	: -38 dB	avg: -38 dB		max: -	10:54: 19 dB	
– Si	ignal Strength cur Network Name WiFi Password	: -38 dB HYPACK HypackX	avg: -38 dB	Hide	max: -	10:54: 19 dB	

View of transmit and receive signal.

🚺 🔲 G mikrotik - G	oogle Search	× 🕒 WebFig	×	+				-	ð
C 🔺 Not se	cure 192.168.1.	20/webfig/					0 4 @	~	
outerOS v6.49.15 (stabl	e)					Quick Set	WebFig Ter	minal	2
							PTP Bridge	CPE 🗸 🕻	Quick
tive									
	ß			Wireless				Config	jurati
Status	connected to	ess			Address Acquisition	● Static O Automa	tic		
AP MAC	D4:01:C3:FA	:27:8F			IP Address	192.168.1.20			
Network Name	НУРАСК				Netmask	255.255.255.0 (/24)	~		
Tx/Rx Signal Strength	-41/-39 dBm				Gateway	•			
Tx/Rx CCQ	88/92 %				DNS Servers	-			
Signal To Noise	59 dB								Syste
Wireless Protocol	802.11				Router Identity	MikroTik Client			
	Mul M	m	-40 dB				Check For Updates	Reset Con	nfigurati
			-64 dB =76 dB					Pa	assword
11:37:44	11:38:44	11:39:45	-88 dB 11:40:45	11:41:46				Apply Con	nfigurati
Rx Signal cu Tx Signal cu	r: -39 dB r: -41 dB	avg: -43 dB avg: -45 dB	max: -34 dB max: -37 dB						
in organise to the				Disconnect					

3. All the LED's on the Client unit should light up to show signal strength.



Note: The AP unit did not show signal strength lights during our office setup.



4. Go to a CMD window and ping both IP address to verify communication. You can also ping other IP addresses you might be connecting to. Example: GPS system, etc.

🕾 C:\WINDOWS\system32\cmd. × + v
Approximate round trip times in milli-seconds: Minimum = Oms, Maximum = 3ms, Average = Oms
C:\Users\HYPACK>ping 192.168.1.20
Pinging 192.168.1.20 with 32 bytes of data: Reply from 192.168.1.20: bytes=32 time=2ms TTL=64 Reply from 192.168.1.20: bytes=32 time<1ms TTL=64 Reply from 192.168.1.20: bytes=32 time<1ms TTL=64 Reply from 192.168.1.20: bytes=32 time<1ms TTL=64
Ping statistics for 192.168.1.20: Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), Approximate round trip times in milli-seconds: Minimum = 0ms, Maximum = 2ms, Average = 0ms
C:\Users\HYPACK>ping 192.168.1.21
Pinging 192.168.1.21 with 32 bytes of data: Reply from 192.168.1.21: bytes=32 time=2ms TTL=64 Reply from 192.168.1.21: bytes=32 time=1ms TTL=64 Reply from 192.168.1.21: bytes=32 time<1ms TTL=64 Reply from 192.168.1.21: bytes=32 time<1ms TTL=64
<pre>Ping statistics for 192.168.1.21: Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), Approximate round trip times in milli-seconds: Minimum = 0ms, Maximum = 2ms, Average = 0ms</pre>
C:\Users\HYPACK>

TROUBLESHOOTING HINTS

HINT 1:

If you do not have a static IP address set, you will get the following error when trying to connect:

ERR: Could not connect, MacConnection syn timeout

Connect to

D4:01:C3:FA:27:8E

Login

admin

ERR: Could not connect. MacConnection syn timeout.

HINT 2:

How to reset the unit: Hold the rest button and plug the ethernet cable in. All LED lights will light up.

Default login:

- Username: Admin
- Password: (no password)

HINT 3:

If you need to **change the band from 5GHz to 2.4GHz**, you must also reduce the channel width.

Example: set Channel Width first and then you can set the band. If you attempt to set Band First without reducing the Channel Width, it will automatically return to 5GHz.

Band	2GHz-B/G/N ✓	
Channel Width	20/40MHz XX	~