

RailBox v2 series

High performance railway router, with WiFi 6 / WiFi 6E and LTE 4G / 5G connectivity for Onboard and Trackside communications



- Single or dual radio WiFi and cellular :
 - > WiFi 802.11ax MIMO 4T4R dual band 2.4 GHz and 5GHz
 - > Optional 4G LTE or 5G cellular radio depending on model
- 2 Ethernet ports 2.5Gb/s
- Multi-functions router AP, client, mesh
- Advanced AP features :
 - > Load balancing, band steering, Rogue AP Detection, HotSpot 2.0
- Advanced roaming feature with less than 0.1% packet loss
- NMS WaveManager
- EN50155, EN45545 certified router :
 - > Ultra-wide 24 to 110 VDC (EN50155 nominal) or PoE+
 - > Dual insulated redundant power supply input



Introduction

RailBox is a rugged device designed for railway and light rail applications. It can be mounted in trains, subways, trams or in any equipment that requires robustness and high bandwidth for innovative services on the move.

RailBox can be implemented by system integrators and rail vehicle manufacturers who are seeking to establish reliable, efficient and agile network for:

- Uninterrupted train-to-trackside communications (CBTC, CCTV, VoIP, preventive maintenance, PIS...)
- Train and carriage coupling to establish an end-to-end Ethernet and IP backbone
- Passenger services like onboard WiFi, videostreaming, entertainment, infotainment...
- High Speed data offload at the station or depot

The device relies on the multi-streams MU-MIMO and beamforming technology that contributes to an expanded coverage, higher data throughput and increased radio link reliability.

It fulfills the most severe requirements in terms of operating environment: from -25°C to +70°C (extended : -40°C to +70°C), shock and vibration proof, protection against dust and water projections (IP66).

RailBox V2 is an evolution of the Railbox, with exactly the same footprint (same dimensions and same connectors). This allows a smooth and cost-efficient upgrade of customers already equipped with Railbox products.

Technical characteristics overview

Ethernet interface	2-port Gigabit Ethernet 100/1000/2500 auto-sensing, up to 5 Gbps link aggregation, water and vibration proof rapid connect 8-point M12 X-coded connectors (CAT-6A) plug & play mode & auto MDI/MDIX cross-over, optional Ethernet bypass that redirects the network traffic in case of device or power supply failure (for daisy chain topologies)	
Radio interfaces	Radio 1: WiFi Radio 2: none or WiFi or cellular	
Radio connectors	3 to 8 QMA connectors (no antenna provided) depending on the model	
WiFi radio	Radio card 802.11n: MCS0-7, 3 streams (6.5 to 450 Mbps) Radio card 802.11ac wave 1: MCS0-9, 3 streams (6.5 Mbps to 1.3 Gbps) Radio card 802.11ac wave 2: MCS0-9, 4 streams (6.5 Mbps to 1.73 Gbps) Radio card 802.11ax: MCS0-11, 4 streams (6.5 Mbps to 4.8 Gbps)	
Operating frequencies	Supports all ISM and UNII bands, 2.4 and 5GHz Supports HT20, HT40, HT80, HT160 Supports DFS and TPC Supports 5.925 to 7.125 Ghz (WiFi 6E)	
Radio max transmit power	Up to 24dBm (aggregate), depending on radio card model	
Cellular radio LTE cat 6	Max. downlink 300Mbps / 50Mbps uplink under LTE-A	
	EMEA LTE-FDD B1/B3/B5/B7/B8/B20/B28/B32 LTE-TDD B38/B40/B41 2xCA : B1+B1/B5/B8/B20/B28; B3+B3/B5/B7/B8/B20/B28; B7+B5/B7/B8/B20/B28; B20+B32; B38+B38; B40+B40; B41+B41 WCDMA B1/B3/B5/B8	
Operating frequencies	North America/Mexico LTE-FDD B2/B4/B5/B7/B12/B13/B25/B26/B29/B30/B66 LTE-TDD B41 2xCA B2+B2/B5/B12/B13/B29; B4+B4/B5/B12/B13/B29; B7+B5/B7/B12/B26; B25+B5/B12/B25/B26; B30+B5/B12/B29; B66+B5/B12/B13/B29/B66; B41+B41 WCDMA B2/B4/B5 GNSS GPS/GLONASS/BeiDou (Compass) /Galileo	
Cellular Interface	(U)SIM x 2	
	5G SA Sub-6	DL 2.4 Gbps; UL 900 Mbps
	5G NSA Sub-6	DL 3.3 Gbps; UL 600 Mbps
Cellular radio 5G	LTE	DL 1.6 Gbps; UL 200 Mbps
	WCDMA	DL 42 Mbps; UL 5.76 Mbps
	5G NR	NSA n1/n2/n3/n5/n7/n8/n12/n13/n14/n20/n25/n26/n28/n29/n30/n38/n40/n41/n48/n66/n71/n75/n76/n77/n78/n79 SA n1/n2/n3/n5/n7/n8/n12/n13/n14/n20/n25/n26/n28/n29/n30/n38/n40/n41/n48/n66/n71/n75/n76/n77/n78/n79
Operating frequencies	LTE LTE-FDD B1/B2/B3/B4/B5/B7/B8/B12/B13/B14/B17/B18/B19/B20/B25/B26/B28/B29/B30/B32/B66/B71 LTE-TDD B34/B38/B39/B40/B41/B42/B43/B48 LAA B46 (only support 2 x 2 MIMO) UMTS WCDMA B1/B2/B4/B5/B8/B19 GNSS GPS/GLONASS/BeiDou (Compass)/Galileo	
Cellular Interface	(U)SIM x 2	

All the brand names mentioned in this document are trademarks. ACKSYS is constantly looking at ways to improve its products.

The current specifications may therefore be modified without notice and the characteristics set out herein should not be construed as creating any contractual obligation. All the products featured herein are designed and manufactured in Europe.

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Technical characteristics overview

Security	Firewall, DoS, https, MAC filtering, WPA/WPA2/WPA3-Personal & Enterprise (IEEE 802.1X/RADIUS), tunnels L2 (GRE), VPN (OpenVPN, IPsec), SNMP V3, Rogue AP detector
WiFi Modes	AP, client, MESH (IEEE 802.11s), infrastructure, AD-HOC, fast roaming (less than 30 ms), WMM QoS
WiFi Services	Hot Spot 2.0, Wireless Load Balancing (load balancing, band steering, client roaming control, association control per SSID)
ACKSYS enhanced features	Connect Before Break, Smart Redundant Carriage Coupling
Ethernet networking	Frames filtering, bridging, repeater, STP/RSTP, VLAN, DHCP (server & client), DNS relay, IPv6 compliant
Ethernet routing	Multicast (PIM), IP redundancy (VRRP), static routes, NAT router, router, carriage coupling system (SRCC)
Administration	http, https, SNMP agent (V1, V2C, V3), WaveManager administration software, save / restore configuration key (C-Key)
LEDs Signaling	Radio: quality, activity and status Ethernet: link 100/1000/2500, activity Power: on-off
Alarms & Inputs	A 3-pin Waterproof M8 connector with: <ul style="list-style-type: none"> - one solid state relay output warning (with configurable action), 1 Form A, 60VDC 80mA max - one input for external device control 24VDC max
Power supply	Dual insulated redundant input (1500V insulation, M12 connectors 4-pole A-coded) 24 to 110 VDC (EN50155 nominal), with ground lug. PoE + (IEEE 802.3at Type 2 Class 4) model with ground lug also available.
Consumption	22W typical power consumption (dual radio), 25W max
Dimensions & weight	compact shockproof rugged aluminium enclosure, (L: 80 x l: 175 x h: 57 mm), 900g Removable fixing plate: 4-point fixing plate with ground lug (L: 80 x l: 225 x h: 4 mm), 200g
Standards and certifications	CE (RED) <ul style="list-style-type: none"> Safety: EN 62368-1:2014+A11, EN62311 EMC: EN 301 489 [-1], [-17] Radio: EN 300 328 (2.4 GHz), EN 301 893 (5 GHz, DFS) EMC: EN 50155, EN 50121-3-2 Environmental: <ul style="list-style-type: none"> • Shocks and vibration: EN 61373 (CAT 1 CLASS B) • Climatic: EN60068-2 [-1, -2, -30] • Fire/smoke: EN45545-2 (HL3), NF F16-101 (M1F1), NFPA 130

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Ordering references

RailBox/RRXB Single or dual WiFi Access Point or LTE-A or 5G gateway for railway and mobile applications, shipped with a fixing plate (already mounted).

RailBox/RRXB			
Radio 1 coding	Radio 2 coding	Power supply coding	Bypass coding
0 = No radio (possible only if the 2nd radio coding is 7) 1 = WiFi 802.11n (fast roaming, Mesh), -25°C to +70°C 2 = WiFi 802.11ac, -40°C to +75°C (+85°C for 10 mn, EN 50155 class TX) 5 = WiFi 802.11n (fast roaming, Mesh), -40°C to +75°C (+85°C for 10 mn, EN 50155 class TX) 6 = WiFi 802.11ac Wave 2 (+85°C for 10 mn, EN 50155 class TX) D = WiFi 802.11ax 2.4GHz and 5GHz, -40°C to +70°C (+85°C for 10 mn, EN 50155 class TX) E = WiFi 6E (6 GHz band)	0 = No radio 1 = WiFi 802.11n (fast roaming, Mesh), -25°C to +70°C 2 = WiFi 802.11ac, -40°C to +75°C (+85°C for 10 mn, EN 50155 class TX) 5 = WiFi 802.11n (fast roaming, Mesh), -40°C to +75°C (+85°C for 10 mn, EN 50155 class TX) 6 = WiFi 802.11ac Wave 2 (+85°C for 10 mn, EN 50155 class TX) 7 = 4G LTE (monde) + GNSS, -40°C à +70°C D = WiFi 802.11ax 2.4GHz and 5GHz, -40°C to +70°C (+85°C for 10 mn, EN 50155 class TX) E = WiFi 6E (6 GHz band) R = 4G LTE cat 6 + GNSS U = 5G	A = +24VDC to +110VDC (EN 50155 nominal) P = PoE+ (IEEE 802.3 at Type 2 Class 4)	0 = No Bypass Y = Bypass <i>The Ethernet bypass redirects the network traffic in case of device or power supply failure (useful for daisy chain network topologies)</i> Note: Bypass is not compatible with PoE model.

RailBox model (X = A or P B = 0 or Y)	Radio 1	Radio 2	Number of radio connectors	Type
RailBox/20XB	802.11ac wave 1	none	3	WiFi
RailBox/22XB	802.11ac wave 1	802.11ac wave 1	6	WiFi
RailBox/60XB	802.11ac wave 2	none	4	WiFi
RailBox/66XB	802.11ac wave 2	802.11ac wave 2	8	WiFi
RailBox/D0XB	802.11ax	none	4	WiFi
RailBox/DDXB	802.11ax	802.11ax	8	WiFi
RailBox/DRXB	802.11ax	LTE cat 6	7	WiFi + cellular
RailBox/DUXB	802.11ax	5G	8	WiFi + cellular
RailBox/E0XB	WiFi 6E	none	4	WiFi
RailBox/EEXB	WiFi 6E	WiFi 6E	8	WiFi

WiFi Specifications

	802.11n	802.11ac wave 1	802.11ac wave 2	802.11ax
Number of streams	3	3	4	4
Radio max transmit power	24 dBm	24 dBm	24 dBm	24 dBm
WiFi radio data rate	450 Mbps	1.3 Gbps	1.73 Gbps	4.8 Gbps
Radio QMA connectors	3	3	4	4

Cellular Specifications

	LTE cat 6	5G
Radio max transmit power	24 dBm	26 dBm
Radio QMA connectors	3	4
Cellular radio data rate	Downlink 300 Mbps Uplink 50 Mbps	Downlink 4,5 Gbps Uplink 2,9 Gbps
GNSS	GPS, GLONASS, BeiDou/Compass, Galileo	

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