

# Ibex-4000 Series

# WESTERMO

RAILWAY ACCESS POINT WITH WI-FI 6(E) TRIPLE RADIO



## KEY FEATURES

- IEEE 802.11ax compliant with 4x4 Multi-user MIMO
- Up to three Wi-Fi 6(E) modules
- Supports 2.4/5 GHz Wi-Fi 6 and 6 GHz Wi-Fi 6E
- Backwards compatible with 802.11 a/b/g/n/ac
- 160 MHz maximum channel bandwidth
- BMC - Baseboard Management Controller
- Dual 2.5/10 Gigabit Ethernet on M12 X-coded connectors
- Ethernet bypass relays / antenna combiners
- Ultra-wide-range power supply 24 to 110 VDC
- Dual PoE+/PoE++ power supply
- Built-in cyber security with TPM 2.0
- Maintenance-free design
- IP54 protection class
- -40 °C to +70 °C (85 °C) operating temperature
- EN 50155 compliant

## TYPICAL APPLICATIONS

- Passenger Wi-Fi
- Passenger Entertainment
- Passenger Information
- Ticketing System
- Fleet Management
- Video Surveillance

## HIGH-END WIRELESS COMMUNICATION

The Ibex-4000 is a member of a family of robust wireless communication access points for railway applications. It is particularly designed to meet requirements of rolling stock applications. With the assistance of the access point, multiple mobile Wi-Fi-compatible devices in a passenger train or subway have the possibility to communicate with the internet or access local data, such as timetable information and multimedia data.

### BACKBONE CONNECTIVITY

On the fixed network side, the access point features two 2.5 or 10 Gigabit Ethernet ports (downwards compatible). The bypass relay ensures a high-speed connection even if the access point is powered down.

### BASEBOARD MANAGEMENT CONTROLLER

The Baseboard Management Controller (BMC) offers you intelligent monitoring and analysis of the boot process, temperature and voltage limits and creates logs in its own memory. In the event of a deviation from the specified parameters, various actions are available as a reaction. The

BMC thus improves the reliability, efficiency and security of the access point.

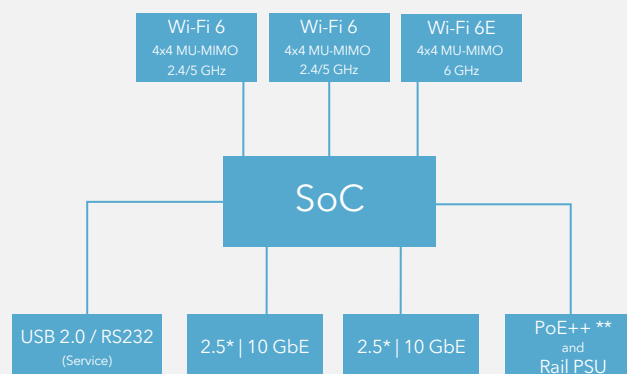
### MULTIPLE POWER OPTIONS

The Ibex-4000 provides flexible powering options either via an internal power supply (24 V to 110 V, EN 50155) or via dual Power-over-Ethernet (PoE++). PoE++ can be supplied via LAN 1 and LAN 2.

### USER-INTERFACE AND SECURITY FEATURES

The Ibex-4000 firmware provides a comfortable management interface via a web service. Besides global setup parameters, the open-source software OpenWrt allows the configuration of the radio interfaces, including the login dialog, as well as the setup of the built-in fully configurable stateful firewall. The access point configurations as well as the management firmware can be updated remotely. The TPM 2.0 module ensures a variety of tasks, such as secure authentication with secure key management and cryptographic functions as well as secure boot processes. TPM increases device security by protecting against unauthorized manipulation.

## BLOCK DIAGRAM



\* with bypass relays

\*\* PoE++ can also be supplied with 2x PoE+ ports

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### TECHNICAL DATA

PHYSICAL INTERFACES	
System Architecture	Quad-Core LS 1046A ARM Cortex-A72 CPU 1.4 GHz, 2 GB RAM, 8 GB eMMC, 128 MB NOR Flash
Software	Linux based OpenWrt
Antenna	QLS connectors
LAN	2x 2.5/10 GbE, M12 8-pin female X-coded
USB/Serial Port	M12 8-pin female A-coded, USB 2.0, RS232
Power Input	M12 4-pin male A-coded
Reset Switch	available at service connector on front panel

ELECTRICAL SPECIFICATIONS	
Power Supply	24 to 110 VDC, wide-range power supply Dual PoE+, Class-4 powered device, IEEE 802.3at Dual PoE++, Class-6 powered device, IEEE 802.3bt (compliant to EN 50155)
Interruptions of Voltage Supply	EN 50155, Class S2
Power Consumption	40 W. typ., 50 W. max.

ENVIRONMENTAL CONDITIONS	
Ambient Temperature	Class OT4, -40.. +70 °C (85 °C) operating -40.. +85 °C storage
Humidity	max. 95 % non-condensing operating and storage
Altitude	Class AX, up to +2000 m
PCB Protection	conformal coating

RELIABILITY	
MTBF	approx. ~255.000 h (acc. to IEC 62380)
Mission Profile	40 °C ambient temperature, 75 % working time ratio with 365 days annual cycle

MECHANICAL SPECIFICATIONS	
Dimensions	130 mm x 100 mm x 218 mm (w h d)
Weight	up to 3300 g
Housing	IP54, aluminum, wall-mount, conductive cooling

### OPTIONS

Modules	Wi-Fi 6 (4x4) MU-MIMO 2.4 / 5 GHz Wi-Fi 6E (4x4) MU-MIMO 6 GHz
Antenna Connectors	QLS to SMA adapter
Antenna Combiners	Build-in combined for 2.4 / 5 GHz as only 4x QLS (4x4) on the frontpanel
Bypass Relais	for variants with 2.5 GbE
Order numbers on standard configuration sheet and <a href="http://www.eltec.com">www.eltec.com</a>	

### MODULES

WI-FI INTERFACE IEEE 802.11 a/b/g/n/ac/ax	
Transfer Rates	up to 4804 Mbps @ 5/6 GHz and 1147 Mbps @ 2.4 GHz
Frequency Range	2.412 GHz to 2.472 GHz, or 4.920 GHz to 5.875 GHz, or 5.925 to 7.125 GHz selectable band
RF	Up to 12 RF antennas, 4x4 MU-MIMO technology
Encryption	OPEN, AES, TKIP, WPA, WPA2-PSK/EAP, WPA3-PSK/EAP, mixed modes, OWE
Operational Feature	up to 512 clients per module

### SOFTWARE

OPERATING SYSTEM FEATURES	
OS	Linux based OpenWrt
Wireless Encryption	OPEN, AES, TKIP, WPA, WPA2-PSK/EAP, WPA3-PSK/EAP, mixed modes, OWE
Remote Management	SNMP V1/V2/V3, telnet, SSH, http, https
Routing	WLAN bridge, AP mode, Client mode, WLAN mesh 802.11s, LACP, DFS support, VLAN 802.1q, LLDP 802.1AB, QoS 802.1p, 802.11k, 802.11r and 802.11v seamless client roaming
VPN	OpenVPN, IPSec, GRE
SSID's	up to 16 SSID's (effective)
Network Link Management	link prioritization, load balancing, link aggregation
Security	stateful firewall with multi-level client/AP isolation, rouge AP detection, authentication 802.1x

### STANDARDS AND SPECIFICATIONS

Directive (EU) 2016/797	EN 50155 (IEC 60571)
	EN 45545-2 (HL 1 to HL 3)
	EN 61373 (Category 1, Class B)
RED - 2014/53/EU	EMC
	radio spectrum
	health & safety
USA	FCC Title 47 CFR Part 15
	NFPA-130