CyBox AP-R

Industrial and Mobile IEEE 802.11a/b/g/n Dual Radio

Wireless Access Point

- ↪ Designed for harsh Industrial and Mobile Applications
- ↪ EN50155 Compliant
- ↪ Rack Mount Solution

Main Features

- IEEE802.11a/b/g/n compliant
- Simultaneous operation on 2.4 GHz and 5 GHz frequencies possible
- Integrated 2-port Gigabit Ethernet switch
- Designed for harsh industrial and mobile applications
- -25 to +70 °C operating temperature
- EN 50155 compliant
- Integrated firmware for management and configuration

Description

The CyBox AP-R is a member of the CyBox family of robust industrial Ethernet access points for rack mounting. It is particularly designed to meet requirements of rolling stock applications. With the assistance of the access point, multiple mobile WLAN compatible devices in a passenger train, long distance bus or subway have the possibility to communicate with the Internet or access local data, such as time table information, videos, etc. The built-in configurable firewall ensures that mobile clients cannot gain access to other clients in the WLAN. Another important use case is the construction of wireless network backbones in train retrofit programs.

The CyBox AP-R is capable of hosting two independent WLAN radios, allowing operation of flexible wireless network configurations, including different frequency bands. The WLAN interfaces are fully compliant to IEEE 802.11a/b/g/n, allowing a maximum wireless transmission rate of 300 Mbps on each interface. On the fixed network side, the access point features two 10/100/1000 Mbps Ethernet ports with auto-negotiation and TX-crossover. The ports are internally connected to an unmanaged switch and can be used either for redundancy to increase the availability of service or to connect a second access point for better radio illumination. The switch works independently from the access point CPU, so that internal failures do not influence the packet forwarding between the two Ethernet ports.

The CyBox AP-R provides very flexible powering options. It can be supplied by a local 24 to 110 VDC power source; the power input is fully compliant to EN 50155 and tolerates an input voltage range from 16.8 V to 154 V. The CyBox AP-R tolerates power interruptions up to 10 ms, making it compliant to EN 50155, Class S2. As a second source of supply the CyBox AP-R provides an IEEE802.3af compliant PoE input for Class 3 powered device mode. Its capability to supply power to a second CyBox AP-R, if it is connected to the downlink port is a unique feature. This setup allows supplying two access points over PoE and providing extended wireless illumination using just one CAT-X cable; a noticeable cost saving factor especially in retrofit programs.

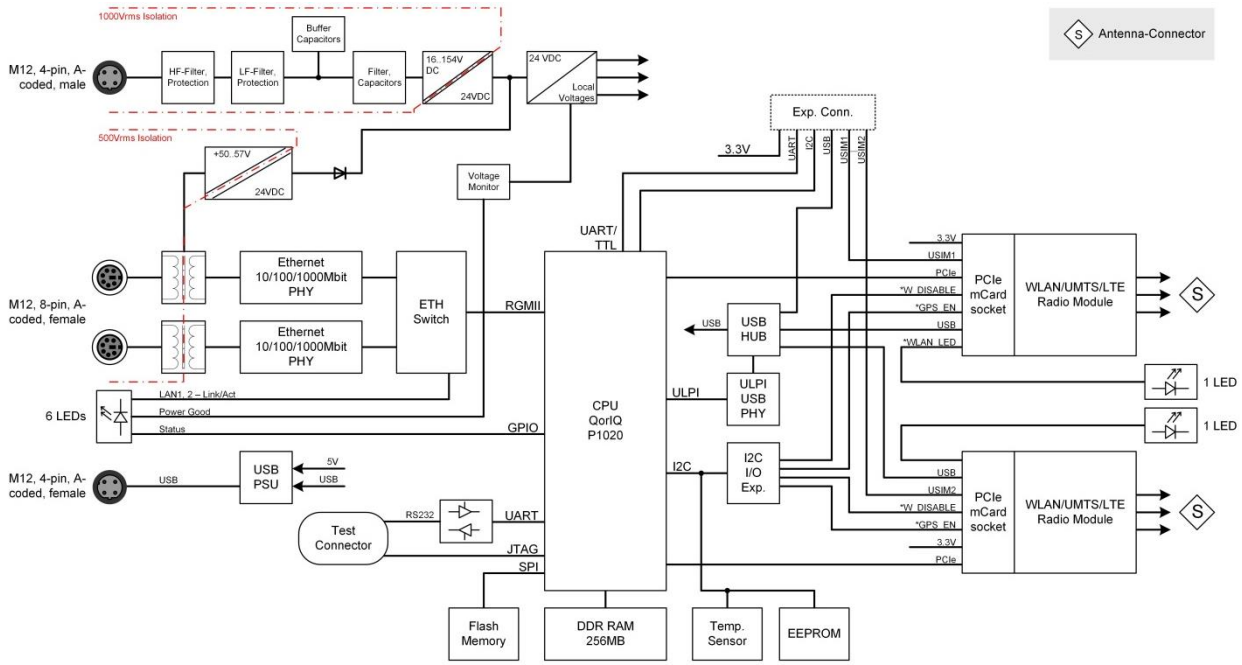
The dimensions of the robust IP40 housing allow two devices to be mounted side by side in a standard 19" rack; a space saving deployment in larger installations. It does not require forced air cooling in temperature ranges between -25 and +70 °C (EN 50155, Class T3) and has no maintainable parts inside. The CyBox AP-R is especially suited for use in rugged environments with regard to shock and vibration according to applicable EN 61373 industry standard. Its electrical and mechanical robustness is supported by industry standard M12 connectors for Ethernet, power supply input and USB, and TNC connectors for the RF interfaces.

The CyBox AP-R firmware provides a comfortable management interface through http service. Besides global setup parameters the software allows complete configuration of the WLAN interfaces, such as channel selection, SSID, encryption keys and firewall setup. Access point configurations can be up- and downloaded and the complete management firmware can be upgraded.

The CyBox AP-R provides the possibility to read its configuration data from a USB memory device that can be attached via M12 connector; a prerequisite for quick and easy installation in the field.

A unique feature of the firmware is provided with the Inter Carriage Connection Protocol, which resembles a bridging algorithm that has been developed by ELTEC to automatically establish and maintain a wireless LAN backbone for trains. Such wireless backbones can be used in retrofit applications, where there is no possibility to add Ethernet cables through the car coupling. The challenge is to establish and maintain such connections in an environment, which is unstable and exposed to external sources of disturbances, such as train re-configuration, connection losses or other trains on neighbour tracks.

Block Diagram



Technical Data

WLAN Interfaces

RF	2 RF signal inputs, 2T2R MIMO technology
Operating Frequency	11b/g/n ISM Band: 2.400 ~ 2.4835 GHz 11a ISM Band: 5.180GHz ~ 5.825 GHz
Transmission Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: 40MHz bandwidth: up to 300Mbps
Output Power	802.11a: 12 dBm ± 2 dBm@54 Mbps 802.11b: 17 dBm ± 2 dBm@11 Mbps 802.11g: 16 dBm ± 2 dBm@54 Mbps 802.11gn HT20: 15 dBm ± 2 dBm @ MCS7 802.11gn HT40: 14 dBm ± 2 dBm @ MCS7 802.11an HT20: 12 dBm ± 2 dBm @ MCS7 802.11an HT40: 11 dBm ± 2 dBm @ MCS7
Receive Sensitivity	802.11a: -76 dBm ± 2 dBm @ 54 Mbps 802.11b: -85 dBm ± 2 dBm @ 11 Mbps 802.11g: -76 dBm ± 2 dBm @ 54 Mbps 802.11gn HT20: -75 dBm ± 2 dBm @ MCS7 802.11gn HT40: -72 dBm ± 2 dBm @ MCS7 802.11n HT20: -74 dBm ± 2 dBm @ MCS7 802.11n HT40: -71 dBm ± 2 dBm @ MCS7
Encryption	AES, TKIP, WEP
Security	Visible / invisible SSID 64-bit and 128-bit WEP encryption, WPA / WPA2-personal and enterprise Firewall

Physical Interfaces

Antenna	2 x 2 TNC connectors
LAN	10/100/1000BaseT(X) uplink port, M12 A-coded 10/100/1000BaseT(X) downlink port, M12 A-coded
USB Port	M12, A-coded
Power Input	24 to 110V VDC local supply on M12 A-coded
LED Indicators	Power, Fault, LAN 1, LAN 2, WLAN 1, WLAN 2
Reset Switch	Available on the front cover (access protected)

Standards

- IEEE 802.11a/b/g/n for Wireless LAN
- IEEE 802.11i for Wireless Security
- IEEE 802.3 for 10BaseT
- IEEE802.3u 100BaseTX and 100Base FX
- IEEE 802.3ab for 1000BaseT
- IEEE 802.3at for Power-over-Ethernet IEEE 802.3af
- IEEE 802.1Q VLAN

III Specifications

Mechanical Specifications

Dimensions: 220 mm x 43 mm x 250 mm (w x h x d)
Weight: 1000 g
Steel IP40 housing, prepared for rack-mounting

Electrical Specifications

Supply voltage for local supply: 24 to 110 VDC nominal (16.8 to 154 V max.), compliant to EN 50155 Class S2 optionally or PoE Class 3 powered device according to IEEE 802.3af
Power consumption: 8 W typ., 12 W max.

Environmental Conditions

Temperature range (operation): -25..+70 °C (EN 50155, Class T3)
Temperature range (storage): -40..+85 °C
Relative humidity (operation): max. 90 % non-condensing
Relative humidity (storage): max. 95 % non-condensing
Altitude: -300 m to + 2000 m
Climatic tests according to EN 68068
Shock and vibration tested according to EN 61373, Category 1, Class B
Conformal coating

EMC (R&TTE)

Compliant to the following standards:

- EN 55011 (radio disturbance)
- EN 50121-3-2 (conducted RF immunity)
- EN 61000-4-2 (ESD)
- EN 61000-4-3 (electromagnetic field immunity)
- EN 61000-4-4 (burst)
- EN 61000-4-5 (surge)

WLAN radios compliant to:

- ETSI EN 300 328
- ETSI EN 301 893
- ETSI EN 301 489-1
- ETSI EN 301 489-17

Safety

Flammability: compliant to

- EN45545 (HL 1 to HL 4)
- DIN5510 (1 to 4) for use in technical cabinets
- BS6853 & GM/RT2130, categories II, Ib Ia, A, B, OC1, OC2, OC3 and OC4
- NFF 16 102, categories B, A2 and A1

Options

- Single WLAN Interface

Standard Configurations

Article No.	WLAN Modules	RF Connector
CYAPR-1000Vo	2x 802.11n	TNC

Accessories

- Rack mounting kit (side by side)

Related Products

- CyBox AP-W – Wireless Access Point for wall mounting
- CyBox AP-D – Wireless Access Point for DIN-tail mounting

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