



- Cisco IOS® 5921 ESR
- EN50155 and EN45545 Certified
- Class TX Fanless with IP66
- Extended Connectivity
- Long-term Availability
- Highly Customizable

## Features

**Cisco IOS** - Features the Cisco 5921 Embedded Services Router (ESR), the IOS Software router that provides reliable network routing in extreme environments

**Certified** - Provides multiple certifications, including EN50155 (Rolling Stock), EN45545 (Fire & Smoke), and for selected cellular carriers

**Rugged** - Operates in extended temperature (EN50155 TX Class) while completely fanless and IP66 rated

**Extended Connectivity** - Cellular connectivity with carrier pre-certifications, dual Gigabit Ethernet, Wi-Fi 2.4/5.0GHz, BLE, CAN bus and GPS with Dead Reckoning

**Long-term Availability** - Designed for markets and applications where long-term availability and support is a must have requirement

**Highly Customizable** - Modular design that can be tailored to the application, including interfaces, connectors, and wireless connectivity options

## Description

The BoltMAR 20-28 delivers a Cisco 5921 Embedded Software Router in a rugged EN50155 device, enabling resilient radio connectivity on vehicles. It is the building block for on-demand networking in a wide range of applications, including commercial, industrial, homeland security, emergency response and mobile IoT.

Features include WAN optimization for improved performance and radio-aware routing (RAR), to manage critical traffic under degraded conditions, such as when radio link quality is compromised.

Installed on a vehicle, the BoltMAR 20-28 enables self-forming and self-healing networks that support a wide range of traditional and IoT services, such as remote sensor management, vehicle to vehicle communications, passenger high speed networks, on-board and track-side crew communications and much more.

The BoltMAR 20-28 supports one LTE cellular modem with dual SIM, to provide better roaming coverage and multiple carriers; it also offers dual Gigabit Ethernet, 802.11 a/b/g/n Wi-Fi, Bluetooth Low Energy, CAN bus and GPS with Dead Reckoning.

Designed for harsh environments, the BoltMAR 20-28 ensures the highest level of physical resilience, by employing rugged circular connectors and a fanless IP66 design that allows operation in Class TX temperatures (-40° to +70°C). The Class S2 power supply is very reliable, supporting 9VDC to 137.5VDC and being able to cope with 10ms power outages, while isolation of serial and digital I/O ports adds extra protection to the system.

Professional Services are available for the BoltMAR 20-28, such as design personalization and inclusion of new features and technologies, additional certifications, system development and production.

## Specifications

ROUTING	Software Router	Cisco 5921 Embedded Services Router (ESR)
	Routing Protocols	Routing Information Protocol (RIP) Versions 1 and 2, Open Shortest Path First (OSPF) – Enhanced Interior Gateway Routing Protocol (EIGRP)-IP, Border Gateway Protocol (BGP) – Cisco Discovery Protocol, IP Policy Routing – IP Multicast Protocol Independent Multicast (PIM) Versions 1 and 2 – Internet Group Management Protocol (IGMP) Versions 1, 2, and 3 – IP Multicast Load Splitting, Cisco Group Management Protocol (GMP)
	Radio-Aware Routing	Optimizes IP routing over fixed or temporary radio networks, Factors radio link metrics into route calculations – Immediately recognizes and adapts to changes in network neighbor status – Supports Dynamic Link Exchange Protocol (DLEP), Supports Router Radio Control Protocol (R2CP) – Supports RFC 5578 (authored by Cisco)
	Mobile Ad-Hoc Networks	OSPFv3 enhancements for mobile ad-hoc networks
PROCESSOR	CPU	Atom E3845, 1.91GHz, Quad Core
MEMORY	RAM	4GB 1333MHz (DDR3L-ECC)
STORAGE	Embedded	8GB eMMC
	Other	1x microSD Slot (User Accessible)
I/O INTERFACES	Ethernet	2x 10/100/1000Mbps - M12 X-coded Connector
	USB	2x USB 2.0 Noise and Surge Protected, 1x USB 2.0 (Service Panel)
	Serial	1x RS-232/RS-422/RS-485 (9 Wires) Isolated, 1x TTL Console (Service Panel)
	CAN 2.0B	1x CAN bus 100mA with 5V Power Out, Isolated
	Digital I/O	4x Digital Input, 4x Digital Output, 1x Odometer, 1x Ignition Key (All DI/O EN50155 Isolated)
	Video	1x Micro HDMI (Service Panel)
EXPANSION	MiniPCIe Slots	3x Full/Half-Size Mini PCIe Slots (PCIe/USB, USB)
RADIO INTERFACES	Cellular	1x LTE Cat 4 Modem
	GPS	GPS/QZSS/GLONASS/BeiDou/Galileo with Dead Reckoning
	Wi-Fi / BT	802.11b/g/n, 4.0 BLE
	Antennas (External)	2x SMA Cellular, 2x RP-SMA Wi-Fi/Bluetooth, 1x SMA GPS
OTHER	RTC	Yes, with SuperCAP (up to 2 Months Retain), Fast Reboot Support
	System Watchdog	Yes, Discrete Chip
	TPM	Factory Option: TPM 1.2/2.0
	Sensors	Accelerometer, Temperature
	LEDs	1x Power, 3x MiniPCIe Slot, 2x Programmable (Dual Color Green/Amber)
	Buttons	1x Reset, 1x Programmable (Service Panel)
	SIM Slot	2x Single SIM, Switchable for Bandwidth Aggregation and Carrier/Cellular Backup (Service Panel)
POWER	Input	Wide Input Range EN50155 Class S2 (9V - 137.5V)
	Consumption	30W Max
ENVIRONMENT	Operating Temp.	TX according to EN50155
	Storage Temp.	- 40 to +85°C
CERTIFICATIONS	Regulatory	CE, FCC, ISED
	Safety	EN 62368, UL 60950 (§)
	Vertical	EN50155, EN45545 (Fire and Smoke)
	Environmental	RoHS2, REACH
	Wi-Fi / BT Radio	CE (RED), FCC, ISED
	Cellular Radio	CE (RED), FCC, ISED, PTCRB, AT&T
	Ingress	IP66
MECHANICAL	Enclosure	Material: Aluminium - Color: Black Anodized
	Dimensions	268x141x85mm (LxWxH), with Connectors

(§) UL, NRTL listing Factory Option.

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