



RECC Platform: Rugged Edge Compute and Communication solutions for the Industrial Industry

Edge compute, AI/ML, Mobile Routing, 4G/5G/Wifi6/LoRa, GNSS, Bluetooth
 *6Harmonics Controller & Orchestration (6HC) datasheet separate

The 6Harmonics Rugged Edge Compute & Communications (RECC) platform, is the ultimate mobile edge gateway designed to tackle the toughest challenges in the most demanding environments. Built to withstand extreme conditions and powered by cutting-edge technology, the RECC is the perfect platform for those industries that require reliable and efficient fixed and mobile computing/routing in the most difficult of places.



Key Features:

- **AI- and ML-Ready Platform:** With a choice of optional AI and ML modules through the m.2 interfaces, the RECC provides the perfect platform for enhanced performance in real-time analytics, automated decision-making processes, autonomous, and IoT device management. Examples Google® Coral M.2 / NVIDIA®
- **Edge Computing Power:** Equipped with a high-performance ARM-based processor, optimized for low latency and capable of running complex analytics and machine learning models at the edge using Docker containers environment.
- **Advanced Security:** Features state-of-the-art encryption, firewall, and secure capabilities to protect sensitive data against cyber threats. Optionally native Cisco® Cyber Vision.
- **Reliable Connectivity:** Designed for mission-critical mobile Edge Computing & Communications with a modular platform for easy integration into public/private, secure networks. Integrated Gigabit Ethernet switch for managed wire-speed Layer 2 (L2) networking. Secure Layer 3 (L3) routing on-board or through optional Cisco® ESR6300 embedded Router.
- **Comprehensive Network Gateway Features:** Includes NAT, firewall, VPN, etc., for secure and versatile network deployment and integration.
- **Advanced Broadcast Capabilities:** Supports Broadcast, Unicast, and Multicast over L2 over L3 networks, with optional Cisco® ESR6300 embedded Router.
- **Multi-Radio Connectivity:** Supports LTE/4G/5G, Wi-Fi 6, LoRa, and UHF TVWS technologies. It allows up to 3 simultaneous radio connections and accommodates dual SIM cards for uninterrupted connectivity, with automatic failover between the best available networks.
- ***Cloud Orchestration:** Purpose-built for managing devices, containers, and applications seamlessly, ensuring efficient operation and deployment.
- **Built-In Sensors and Services:** Includes an IMU for motion detection, data logging capabilities, GNSS-based location services, and BLE for location tracking for equipment and related personnel.
- **Rugged Design for Heavy-Duty Use:** Tailored for heavy equipment and harsh environments in sectors like mining, oil & gas, transportation, forestry, maritime and construction. Target Caterpillar® certified prior to general availability.
- **Remote IoT & Industry 4.0 Applications:** Ideal for real-time on-premises applications in various industries, offering a platform for local analytics and automation capabilities, even in isolated or offline environments.
- **Environmental Durability:**
 - Dual redundant power supplies supporting 10 to 60VDC and PoE++.
 - Operates in temperatures ranging from -40°C to +80°C.
 - Ingress protection rating of IP67 for dust and water resistance.

Applications:

Mining – Surface and Underground

The mining industry, characterized by its remote and harsh operational environments, demands technology that can withstand extreme conditions while delivering critical capabilities. The RECC platform meets these demands by providing a rugged, reliable communication foundation for underground and open-pit mines. Its edge computing and AI capabilities enable on-board processing of dispatch system, seismic data, lidar, radar, vehicle telemetry, proximity detection, driver fatigue, personnel tracking etc, ensuring that mining operations are safe, efficient, and environmentally compliant. By facilitating the real-time analysis of data from drilling, blasting, and transportation activities, the router plays a pivotal role in optimizing resource extraction and processing, thereby maximizing profitability and safety in mining operations.



O&G Onshore & Offshore

In the onshore oil and gas (O&G) sector, connectivity and real-time data processing are critical for optimizing operations, enhancing safety, and ensuring environmental protection. The RECC platform facilitates seamless communication for drilling and tank battery sites, field and central offices, and remote experts, allowing for immediate and automated data analysis and decision-making. Its rugged design ensures reliability in harsh environments, while its edge computing capabilities enable predictive maintenance, real-time monitoring and automation of drilling equipment, and the management of IoT devices. This not only maximizes operational efficiency but also reduces downtime and operational costs, making it an indispensable tool for onshore O&G operations. Offshore, the RECC platform is ideal for on-platform and off-platform installation in vessels of all types. This capability significantly enhances safety, operational efficiency, and environmental compliance on offshore platforms.



Heavy Equipment

The realm of heavy equipment operations also spans construction, agriculture, and forestry, where the RECC platform monitors and can automate safety and operations. It enables real-time tracking of equipment locations, operating conditions, and performance metrics. With robust connectivity options, it ensures that heavy equipment is always connected, allowing for remote diagnostics, software updates, automation and operational adjustments on the fly. This not only enhances productivity but also reduces the need for physical travel to equipment locations, optimizing resource allocation, and minimizing downtime across operations.



Technical Specifications:

Wireless Specifications

3GPP® Interface	Supports 4G/5G FDD and TDD sub-6 (FR1) bands in SA and NSA mode
3GPP® Frequencies (Region specific)	5G bands: <ul style="list-style-type: none"> • NSA: n1, n2, n3, n5, n7, n8, n20, n25, n28, n30, n38, n40, n41, n48, n66, n71, n75, n77, n78, n79 • SA: n1, n2, n3, n5, n7, n8, n20, n25, n28, n30, n38, n40, n41, n48(CBRS), n66, n71, n75, n77, n78, n79 LTE bands: <ul style="list-style-type: none"> • B1, B2(B25), B3, B4(B66), B26(B5, B18, B19), B7, B8, B12(B17), B13, B14, B20, B28, B29(DL), B30, B32(DL), B34, B38, B39, B40, B41, B42, B43, B46(LAA), B48(CBRS), B66, B71
3GPP® Transmit Power	+23dBm / port
Wi-Fi Interface	Industrial-grade Wi-Fi 6 (802.11ax) supporting 2T2R and MU-MIMO
Wi-Fi Frequencies	2.4GHz / 5GHz
Wi-Fi Channel Bandwidth	2.4GHz: 20, 40MHz 5GHz: 20, 40, 80, 160MHz
Wi-Fi Wireless Security	WPA/WPA2/WPA3

External Interfaces

3GPP® interfaces	2x 4.3-10 RF connectors for 4G 4x 4.3-10 RF connectors for 5G
USIM	2x micro (3FF) USIM trays – Externally accessible
Wi-Fi interfaces	2x 4.3-10 RF connectors
GNSS or BLE 5.2	1x TNC
Giga-bit Ethernet	5x M16 Ethernet connectors (including 1x 802.3bt Type 4 (++))

Computational Specifications

Processing	NXP Layerscape 1046A SoC, Quad-core ARM A72 1.6GHz processor
Memory	8 GB DDR4
Storage	32GB flash storage
Clocking	Onboard RTC (Real-time Clock)
Real-time OS	6H Linux with Yocto
Docker Engine	Enterprise Edition (EE)
Inertia	Onboard IMU

Software and Services

Management Interfaces	SSH, HTTPS, SNMP v2c/3, RESTCONF/NETCONF
Containerized Applications	Support for: <ul style="list-style-type: none"> · OCI-compliant application containers · Public or customer-specified container repositories · Local volume mounting for persistent data and configuration storage

Networking Capabilities

Layer 2 - Switching	Embedded 5-port Gigabit switch with 2.5Gbps uplink to Arm SoC 802.1p/q capable Layer 2 bridging of LAN and Wi-Fi interfaces
Layer 3 – Routing	Custom static routing tables NAT'ing gateway functionality to route between WAN and LAN
Wi-Fi	Layer 2 bridging between Ethernet LAN ports and Wi-Fi Capable of operating in either AP or Station mode
Optional - Cisco® ESR6300 Embedded Router	350Mbps IPSEC routing throughput capable
IOS XE Universal	Release 17.1.1 or later
IOS XE Autonomous boot up mode for Unified image	
Network Advantage License	Default 50 Mbps; Optional Performance 250 Mbps or Boost Uncapped
Flex subscription for CUBE, CME or SRST licenses	1 seat
Network Plug-n-Play Connect for zero-touch device deployment	

Electrical Specifications

Input Power	50-56V 803.3bt (PoE++) and/or 10 to 60 VDC (pending PoE OUT optional)
Power Consumption	Maximum available power from POE supply is 71W, and 150W from DC input (Vin>20V)
Interface Protection	EMC ESD Surge Over-voltage Reverse Polarity

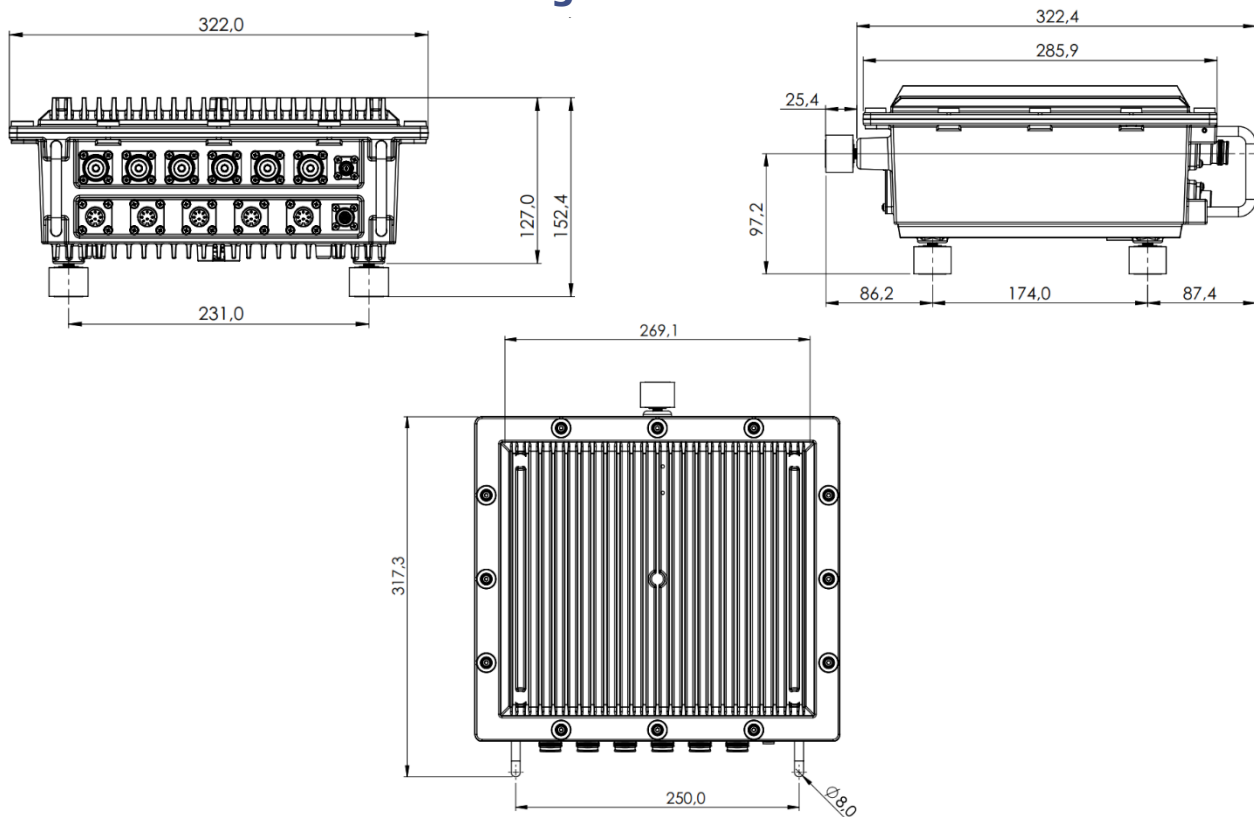
Mechanical and Environmental Specifications

Dimensions	250 mm x 180 mm x 50 mm (9.84" x 7.09" x 1.97")
Weight	7.8 kg (17.2 lbs.)
Operating Temperature	-40°C to +80°C ambient – Passive-only cooling
Operating Humidity	Up to 99% humidity (condensing)
IP Rating	IP 67
Corrosive environment protection	H2S Salt Spray
Vibration and Shocks	MIL-STD-810H CAT (pending)
Mounting options	Surface H/V, DIN, Pole
Calculated MTBF	Tbd HDBK-217Plus™: 2015, Notice 1

Wireless and Safety Approvals (Pending)

Wireless (will vary by region and options selected)	<p>LTE FCC ID: R17FN990A40 LTE IC: 5131A-FN990A40 Wi-Fi FCC ID: XPYJODYW337 Wi-Fi IC: 8595A-JODYW377 EN 301 489-17 EN 300 328 EN 301 893 EN 302 502</p>
Safety	<p>EN 60950 IEC 950 UL 60950-1 CSA 22.2 No. 60950-1 UL 579/IEC 60529 IP67 rated for outdoor use UL 1449/IEC 60664-1 CE</p>

Dimensions – Technical Drawing:



Ordering, Warranty and Support:

Model	Sales Order Code	Compute Host Rev 0	5-Port GE	POE++ IN	DC-IN	5G-4x4 4G 2x2	Wi-Fi 6 2x2	GNSS	BLE 5.2	Cisco® ESR6300	Industrial
RME-1000	RME-1000-01	ARM A72 Quad-core 1.6 GHz Clk 8 GB DDR4	Y	Y	Y	Y	Y	Y			Y
RME-1010	RME-1010-01	ARM A72 Quad-core 1.6 GHz Clk 8 GB DDR4	Y	Y	Y	Y	Y	Y		Y	Y
RME-1000	RME-1000-02	ARM A72 Quad-core 1.6 GHz Clk 8 GB DDR4	Y	Y	Y	Y	Y		Y		Y
RME-1010	RME-1010-02	ARM A72 Quad-core 1.6 GHz Clk 8 GB DDR4	Y	Y	Y	Y	Y		Y	Y	Y

- 1-year hardware warranty
- 24/7 technical support
- Comprehensive online resources

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