Ruggedized and Weatherproof SDR Platforms

RX310

KEY FEATURES

- Ruggedized version of National Instruments (Ettus Research brand) X310 Series Software Defined Radio
- Conduction-cooled construction optionally designed to meet MIL 810 for shock/ vibration and MIL 461 for EMI
- IP67 weatherproof sealed unit (except air cooled version)
- Other similar National Instruments (NI) small form factor SDR versions are available upon request
- Customizable I/O options
- Anti-vandal pushbutton on/off switch
- Pole-mount and other mounting options available
- Contact Pixus for ruggedization options for other NI SDRs

The Pixus Technologies RX310 is a ruggedized version of National Instruments (Ettus Research brand) X310 Software Defined Radio. Working with NI, Pixus redesigned the commercial version of the product to create a hardened, sealed, conduction-cooled unit to meet IP67 specifications. There are options to further ruggedize the unit to MIL 810 for shock/vibration and MIL 461 for EMI.

The NI hardware architecture combines two extended bandwidth daughterboard slots covering DC – 6 GHz with up to 120 MHz of baseband bandwidth, multiple high-speed interface options (PCIe, Dual 1/10 GigE), and a large user-programmable Kintex-7 FPGA. The RX310 series can be used in various types of airborne, shipboard, ground vehicle, or outdoor designs. Example applications include SIG-INT, passive RADAR, Drone Deterrence/ Spoofing and prototyping systems for advanced wireless (WiFi/Cell/ MIMO).

Contact Pixus for ruggedization inquiries for other SDRs from NI. Visit www.ettusresearch.com for SDR specifications.

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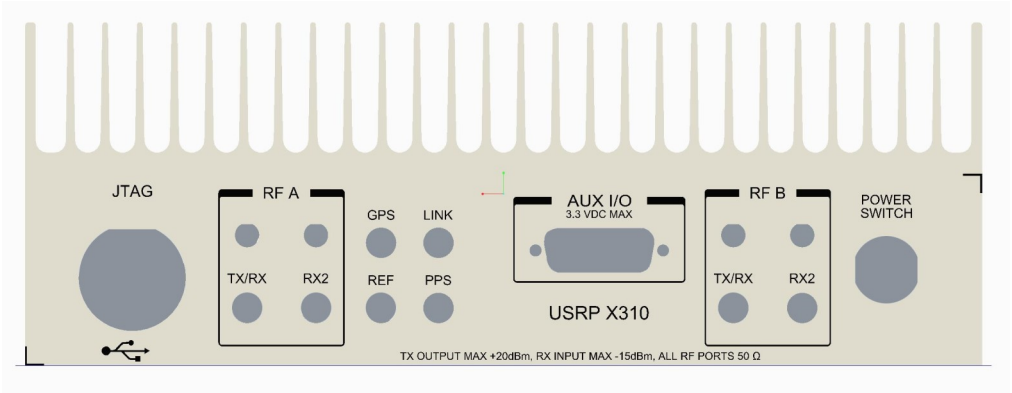
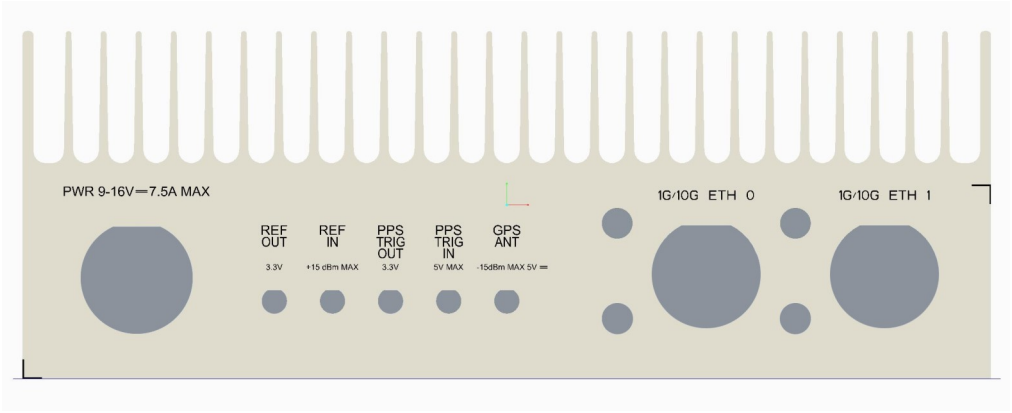
I/O Configurations & Power

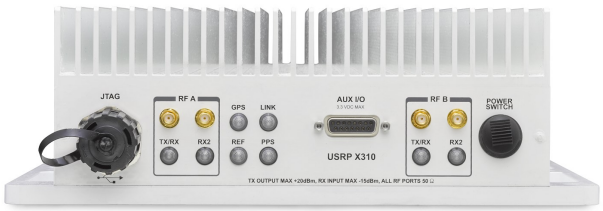
Pixus offers a standard I/O configuration for the IP67 RX310 (see below) and other SDRs. The modular front and rear faceplates are also customizable. Consult Pixus to discuss your specific requirement. The RX310 comes with a loose connector that can be terminated by the user to the application's power source (via crimp or solder). For powering the unit in a lab/test environment, see P/N SPS0006 in the Accessories section. Please note that the MIL rugged version requires modification to the I/O details below. The unit standardly runs on 12V power. For versions that require an internal heater for low-temp applications, the power will utilize 24V.



Front I/O



Rear I/O



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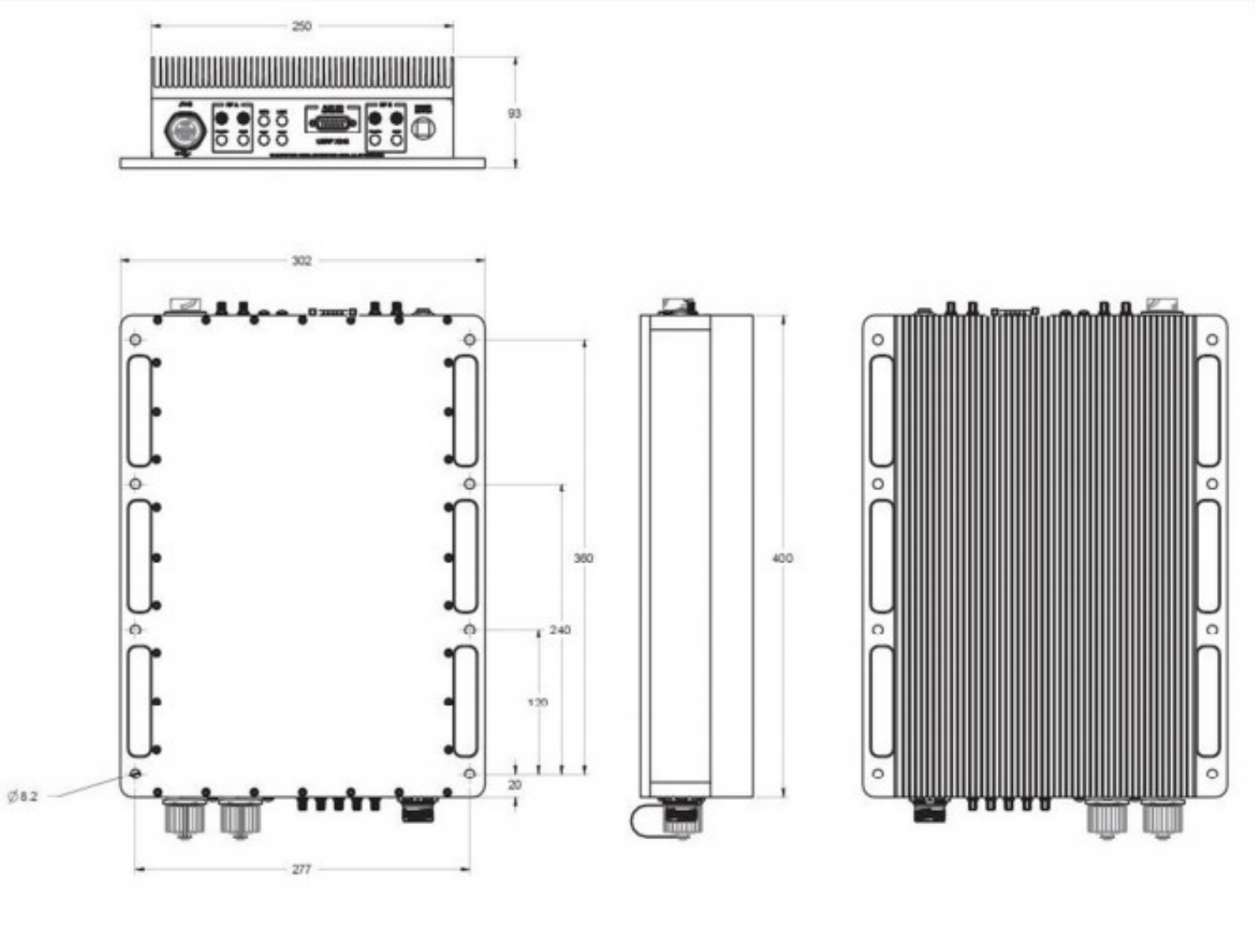
Drawings—IP67 Version



The drawings above are for the IP67 version. The MIL-spec version is slightly larger (contact factory for details).

MIL version—Front

MIL version—Rear

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Air Cooled Version

The air cooled version is designed for Transport grade ruggedization. They may be installed in shock isolated transit cases or shock isolated equipment racks hosted in mobile equipment shelters. During operation, the racks should be climate controlled . When transported, the SDRs are typically installed in the transit cases or equipment racks and transported via military aircraft, over improved roads, or via ship. While in transit, the units do not typically need to be in climate-controlled spaces, but the transit cases or shelters should be closed and latched/locked. The air cooled version is designed to meet the specifications below:

Operational Environmental limits		
Operating Altitude	0 - 7500 ft	
Operating low temp	+35 °F	
Operating high temp	+80 °F	
Operating humidity range	20 % - 90%	
Shipboard Vibration	Yes	Vibration as specified in MIL-STD-167-1, Type 1, over a ship blade rate induced frequency range up to 33 Hz.
Vertical Lift Survive	Yes	2.0 g acceleration vertically with a simultaneous acceleration of 0.2 g in any perpendicular direction when lifted from the top or bottom. MIL-HDBK-810.
Operating pitch or roll	+/- 45 degrees	
Transportation Environmental limits		
Low temp	+14°F	
High temp	+122°F	Direct solar radiation of 1120 W/m2, for a period of 3 hours, per MIL-STD-810
Survive (transport) level altitude	up to 13,000 ft	
Road Transport Vibration	Yes	1.04 Grms (Vertical), 0.20 Grms (Transverse) and 0.74 Grms (Longitudinal) vibration levels in accordance with transportation via truck over US highways per MIL-STD-810G, Method 514.7, Procedure I, Category 4.
Air Transport Vibration	Yes	4.02 Grms of vibration in accordance with general exposure of jet aircraft cargo per MIL-STD-810G, Method 514.7, Procedure I, Category 7.
Road Shock	Yes	7.6G (peak), 11ms shock event in accordance with on road transportation per MIL-STD-810G, Method 516.7, Procedure II.
Transit Drop Survive	Yes	6 inches, per MIL-HDBK-810, Procedure IV

Ruggedized and Weatherproof SDR Platforms

The air cooled version features a more rugged design that the standard Ettus/NI enclosures and superior airflow. The RX310 has a standard 7.2 CFM fan with other options available. It is designed for the +70C to -20C operating temperature range.

Air cooled version—Front

Air cooled version—Rear

Ruggedized and Weatherproof SDR Platforms

Ruggedization Levels

The RX310 was initially designed to meet IP67 waterproof specifications in a rugged, conduction-cooled design. The unit standardly meets –20C to 50C temperature ranges with the powerful Kintex FPGA installed. There are options to extend the temp range to +70C with an external fan or with customization. Alternatively, if a lower-power FPGA is selected, the higher ambient temperature range can also be met.

To meet MIL specifications for shock/vibration, there are modifications required to utilize 38999 connectors and internal bracing. Pixus also offers a light-rugged solution providing –20C to +70C temperature range and transport grade shock/vibration levels in an air-cooled configuration.

The RX310 is a chassis platform for the end customer/integrator to incorporate their software, interface, and mounting options. As such, it is up to the integrator to provide end application testing to the applications' requirements. Pixus will guarantee that we will meet agreed upon ruggedization levels. Contact Pixus for more details or to discuss co-testing options.

	Air cooled	Conduction cooled	Shock/vibration	IP 67	Environmental/EMI
Light-rugged	Temp: - 20C to 70C	N/A	Transport grade	N/A	Not sealed. Various EMI level options.
Rugged, not MIL-grade	Optional External IP67 fan Temp: - 40C to 70C	Temp: - 40C to 50C	~ 15G shock, above Transport grade	Yes	Fully sealed, MIL461 EMI
MIL Spec Rugged	Custom only Temp: - 40C to 70C	Temp: - 40C to 70C with external MIL fan, otherwise - 40C to 50C	~ 20-25G shock, meet various MIL810 specs	IP66/ IP67 optional	Fully sealed, MIL461 EMI

Specification Notes

Dimensions of the IP version are 302mm wide x 400mm long x 98mm tall. The weight is ~20 lbs.
Dimensions of MIL-rugged RX310 are 302mm wide x 400mm long x108mm tall. The weight is ~30 lbs.
Dimensions of the Air Cooled RX310 are 240mm wide x 305.6mm long (including mounting tabs, 265.8mm without tabs) x45mm tall. The weight is ~8.5 lbs.

Interface Connectors

Pixus provides the mating connectors to the external I/O interfaces except for the fiber connector. Contact Pixus to discuss what mating fiber connector options are available by 3rd parties.

Ruggedized and Weatherproof SDR Platforms

ORDERING OPTIONS

RX310-ABC-DEF-XX

A = Type

0 = UBX
2 = TwinRX
4 = Other
1 = TwinRX with GPSDO oscillator
3 = UBX with GPSDO oscillator

B = I/O Configuration

0 = Standard IP67 version as shown page 2
1 = Other

C = Ruggedization Level

0 = IP67, Rugged (standard)
2 = Reserved
4 = Other
1 = Semi-Rugged, air cooled w/filter
3 = MIL 810/410 Rugged, IP67

D = Light Indicator Setting

0 (or blank) = Light indicators connected, lit
1 = Light indicators not connected, dark

E = Ethernet Type

C (or blank) = Copper
F = Fiber

F = Heater Installation

0 (or blank) = no heater installed, 5V power
1 = Heater installed for low-temp apps, 24V power

2 digit customization code

Blank = standard, no customization

ACCESSORIES

Power Supply Kit P/N: SPS0006

The SPS0006 comes with a C13 IEC inlet for AC input and an RX310 compatible connector for the DC output. The part number for the air cooled version is SPS0009. https://www.ettus.com/all-products/12v-pwr/ Note that versions with an internal heater will utilize 24V power.

Pole Mount Kit P/N: SPS0007