

RP



Averna

RP-5100 Series

Multi-Channel, 20 MHz Compact RF Recorder

Averna RP-5100 Series is a tool to capture real-world RF signals, with impairments, for Navigation, as well as Broadcast Radio & Video, receiver validation, testing and support.

 **Averna**

➤ *Averna Multi-Channel, 20 MHz Compact RF Recorder*

The need to design, validate, test and support increasingly complex Navigation and Broadcast Radio & Video receivers, in an economical and timely manner, is an ever-growing concern. Averna answers that need with a state-of-the-art multi-channel, 20 MHz compact RF Recorder.

The Averna RP-5110 and RP-5120 (1 and 2 channels) RF Recorder is an advanced tool for both field testing and performance testing. Its compact size and integrated display makes it ideal for easy field operation and its innovative engineering is designed to drive sophisticated applications.

Recording live (impaired) RF signals of interest in the field, without de-modulation or alteration, reduces the need for traditional field-testing of RF receivers. Reproduce complex field conditions accurately and consistently in the lab, and cut-back costly field trips to validate design changes.

Key Features:

- **20MHz recording bandwidth** to capture most signals found in automotive receivers
- **Two channels to capture signals** operating at different frequencies
- **Field-ready** with an integrated touchscreen display, ruggedized chassis and compact size
- **Record all day** with 2 TB of hot-swappable storage
- **Simple field setup** and intuitive user interface and test-case profiles
- **Options available** for synchronized recording of CANbus, video, audio, and GPS positioning data

Build libraries of real-world RF environments. Cover specific reception corner cases, and validate design changes quickly without waiting for time to test in the field.

The Averna RP-5100 Series can be paired with the Averna URT-5000 RF Player and Signal Generator for a complete Record and Playback solution.



➤ *Support for Navigation as well as Broadcast Radio & Video*

With a broad range of frequencies supported from 250 KHz up to 2.5 GHz and 20 MHz of recording bandwidth the Averna RP-5100 is well positioned to support the entire spectrum of Navigation as well as Broadcast Radio & Video protocols. By recording pure RF spectrum, Record & Playback technology is not limited to specific protocols. As a result, an investment in Record & Playback instrumentation will prove to be relevant today with current protocols but future protocol development.

Navigation

All sorts of device makers are including navigation technology in their products and the competition is driving the need for reliable and accurate positioning information. With its ability to capture consumer grade signals as well as supplementary local data through traffic messaging channels, the Averna RP-5100 Series can help developers add another type of receiver to their product.

- GPS L1 C/A signal, Glonass L1
- TMC over RDS, HD Radio® and TPEG over DAB

Broadcast Radio

From analog to the latest breed of digital radio broadcasts, the Averna RP-5100 Series is an essential tool to improve quality, leading to success in the marketplace.

- AM, FM (RDS, IBOC), DAB, DAB+, HD Radio®

Broadcast Video

With the world moving to digital video delivery on cable and over the air, an immense opportunity exists for receiver manufacturers to expand their product offerings to the world. The Averna RP-5100 Series is there to help developers by capturing the complex mix of standards and frequencies covering everything from cable and fixed terrestrial to mobile / hand-held terrestrial.

- **Cable**
 - DVB-C
- **Fixed Terrestrial & Mobile Terrestrial**
 - DVB-T, DVB-T2, DVB-H, T-DMB, ATSC, ATSC-M/H, DMB-T/H, CMMB, ISDB-T, ISDB-Tmm, NTSC, PAL



Navigation



Broadcast Radio



Broadcast Video

> *The Avera difference is in the details*

Bringing a successful product to market requires attention to the finest of details. From a competitive advantage through quality and performance to reducing costs or improving time to market; Avera has the details covered so you can focus on the success of your product.

Complex conditions call for high-performance instruments

Receivers fail at the extremes and weak signals are no exception. Test cases for weak signals are paramount in receiver design to ensure end users have positive experiences with products under typical conditions.

The Avera RP-5100 Series stands out from the crowd with a best in class -172 dBm/Hz noise floor. This performance enables developers to optimize their receivers for weak signal performance gaining a critical competitive advantage over their competition.

Simplify mobile recording

The challenges of mobile recording are a perfect fit for the Avera RP-5100 Series. During a test drive it is inevitable that the power levels will change dramatically as the line-of-sight distance from the transmitter changes; add this to changing power levels of strong adjacent interferers emitting from other transmitters and capturing a quality recording becomes more challenging.

The instrument's pre-amp with AGC (Automatic Gain Control) transparently enables up to 80 dB of instantaneous dynamic range within an overall effective range of up to 140 dB. The AGC adjusts the gain while automatically logging its adjustments, synchronously with the time-stamp of the RF recording. This lets the user simply perform an optimal capture within the instantaneous dynamic range, avoiding avoid clipping.

Upon playback with Avera URT-5000 RF Player and Signal Generator the gain adjustments are accommodated to ensure a synchronous power-accurate output. When even more dynamic range is needed to record strong adjacent interferer scenarios a dual-channel RP-5120 recorder is up to the task.

Focus on the right details

Based on spectrum analyzer architecture for RF acquisition the Avera RP-5100 Series provides excellent selectivity to focus on capturing signals of interest. Maximizing sensitivity and dynamic range for the signals of interest, particularly for the capture of weak signals, requires the rejection of unwanted signals. However, for active antennas this filtering is typically an integrated feature, while for passive antennas additional application specific filtering is recommended.

In order to simplify operation and maximize performance the Avera RP-5100 Series offers an optional selection of high-performance filter-kits to fit most applications. In cases where standard filter kits are not available, Avera is able to provide custom filter kits to ensure that the high level of performance of the Avera RP-5100 Series is not compromised.

Manage data storage

As recording times in the field increase so does the demand on storage. For mobile applications the ability to sustain recording, even on bumpy roads, becomes critical to ensure a successful capture. Providing up to 2 TB of storage, the Avera RP-5100 Series can support more than 5 hours of recording, extending time in the field.

Hot-swappable storage enables full hard disks and completed recording sessions to be quickly removed from the system and shipped back to the office for fast analysis while field trials continue. Mobile 2.5" form factor hard disks in combination with additional shock and vibration dampening protects the hard disks, keeping the instrument running at peak performance even under the toughest conditions, so the data is captured right the first time.



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measure. improve. succeed.



Simple or Advanced operation, the choice is yours



With an intuitive graphical user interface leveraging the signal power level display and automated potential saturation detection, and the ability to save and recall configuration profiles – even the most novice user can successfully capture RF signals correctly on the first trip. Operation of the Averna RP-5100 Series can be done by either the integrated touchscreen or by connecting an EMI shielded laptop remotely to the unit through Ethernet – useful in cases where the instrument is located in a car trunk.

Users can further customize and optimize their experience by utilizing the Averna Remote API (Application Programming Interface). The Averna Remote API enables users to fully customize the interface and script the operation of the instrument to achieve maximum efficiency for the user.

Reducing the cost of change

Modeling new receiver designs in powerful simulation environments such as MATLAB® proves to be a very effective approach in reducing time-to-market. Creating theoretical stimulus for these models works well when all the cases are well understood and can be generated, but corner test cases with unexpected conditions require a different approach.

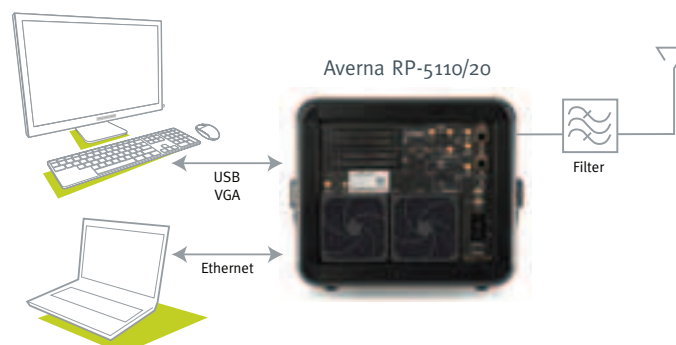
Traditionally these cases are examined during field testing with a fully developed receiver, changes at this stage of the development carry high risk and a high cost. Recordings created from the Averna RP-5100 Series can be imported into tools such as MATLAB® to give the model real-world stimulus including the test cases that would otherwise be impossible to generate. Bring real-world data into the process at an earlier stage, correcting problems sooner in the development cycle, thereby reducing cost, time-to-market and significantly improving the quality of the finished product.

Sometimes RF capture is not enough

• Situational Recorder

The ability to record RF in the field is a powerful tool, but sometimes making sense of the recording requires more context to understand the nature of the RF environment at the time of the recording. The Situational Recorder helps the user understand a complete view of the mobile recording by synchronously logging:

- PoE cameras – record the road and a vehicle's dash board
- GPS NMEA (position, heading, velocity)
- Audio – record voice annotations or the output of a radio
- Temperature/Humidity
- Annotations



> RP-5100 Series Specifications

RF Output Specifications

Frequency	
Input Frequency	250 kHz to 2.5 GHz
Resolution	0.1 Hz
Phase Noise (1 GHz @ 10 kHz offset)	<-90 dBc/Hz
Internal Reference	10 MHz +/- 50 ppb (max) initial accuracy +/- 100 ppb/year aging
Temperature Stability	20 ppb (max)
Amplitude	
Noise floor	-172 dBm/Hz (w/LNA Pre-Amp) 2 dB noise figure (nominal)
Input Signal	-140 dBm to +10 dBm
Adjustable Pre Amp gain range	> 55 dB 0.5 dB steps
Level Accuracy	+/- 1 dB (typ.)
Baseband	
Real-time Bandwidth	1 MHz to 20 MHz
Sample Rate	25 MS/s
Dynamic Range	80 dB SFDR
Output Resolution	14-bit

Connectivity

RF Connectors (50Ω)	
IN (Pre-Amp)	1 x SMA Female per channel AC coupled
DC+RF (Bias-T)	1 x SMA Female per channel DC coupled, 2 - 10 V
RF (Bias-T)	1 x SMA Female per channel AC coupled
GPS antenna	1 x SMA Female DC coupled, antenna bias
10 MHz Reference	
10 MHz REF Input (50Ω)	1 x SMA Female Freq 10 MHz Level 0/+10 dBm, Max: +15 dBm
Output (50Ω)	1 x SMA Female Freq 10 MHz Level +2 dBm, Max: +10 dBm
Trigger/Sync Input(s) & Output(s)	
Input (50Ω)	1 x SMA Female Level: TTL 5 V TOL, Max: -0.5/5.5 V
Output (50Ω)	1 x SMA Female Level: TTL 5 V TOL, Max: -0.5/5.5 V
Ethernet	
1 x 10/100/1000 Mbps RJ-45 LAN Port	
Keyboard, Mouse & Service Port	
2 x USB 2.0/1.1 Type A connector ports	
External Display	
1 x DBHD-15F VGA port	

Environmental

Warm Up Time	
30 min (typ.)	
Weight	
20.5 kg (45 lbs)	
Size (H x W x D)	
273 mm (10.75 in) x 311 mm (12.25 in) x 533 mm (21 in)	
597 mm (23.5 in) x 419 mm (16.5 in) x 686 mm (27 in)	
w/lightweight reusable shipping container (13.5 lbs)	
Temperature	
Operating	+ 0°C (32°F) to 50°C (122°F)
Storage	-20°C (-4°F) to 70°C (158°F)
Relative Humidity	
10% to 90% (non-condensing)	
Power	
DC Input	11-15 Volts 165 Watts (typ.) – RP-5110 190 Watts (typ.) – RP-5120 DB 7W2 Terminal Connector SAE j563 12-Volt Size A to DB 7 W2, 5.5 m (18 ft) North American power cord included SAE j563 12-Volt Size B to DB 7 W2, 5.5 m (18 ft) European power cord included Battery clips to DB 7 W2, 5.5 m (18 ft) power cord included
AC input	90-264 Volts 50/60 Hz 200 Watts (typ.) – RP-5110 230 Watts (typ.) – RP-5120 IEC 60320-C14 power connector inlet IEC 60320-C13 to NEMA 5-15P, 3 m (9.8 ft) North American power cord included IEC 60320-C13 to CEE 7/7, 3 m (9.8 ft) European power cord included
Compliance	
UL/CSA pending	
CE Class A pending	
FCC 47 part 15 Class A pending	
European Directive 98/336/EEC Class A (Emissions) pending	
European Directive 2002/95/EC (WEEE) pending	
Integrated Display	
1024 x 768 pixel, 10.5 in integrated touch-ready display	
Calibration	
1 year	
Storage	
4 x 2.5 in hot-swappable drive bays	
Up to 4 x 2.5 in 500 GB (2 TB total)	
SATA 2.0 hard drives	

➤ Ordering Information:

Part number	Description
RP-HW-5110	Averna Record and Playback RP-5110 portable and compact one channel 250 kHz to 2.5 GHz, 20 MHz recorder for Navigation, Radio and Video applications Includes lightweight and reusable shipping container
RP-HW-5120	Averna Record and Playback RP-5120 portable and compact two channel 250 kHz to 2.5 GHz, 20 MHz recorder for Navigation, Radio and Video applications Includes lightweight and reusable shipping container
Storage Options	
URT-HW-STR-6X500MHDD	Additional 6-pack of pre-qualified high-throughput 500 GB HDDs
URT-HW-2T-25	Averna pre-qualified 4 x 500 GB 2.5" hot-swappable hard disks and external e-SATA carrier for URT™ Averna sig-gen and playback platforms
Low-EMI Laptop Option	
URT-ACC-SBX-LAPT	Ruggedized low-EMI (Electromagnetic interference) laptop option for remote system control. 1.2 GHz Intel® Core®2 Duo, 2GB RAM, 160 GB HDD, 10.4" Display. Recommended for use with AM/FM/DAB recording
Filter Options	
URT-ACC-FIL-AM-FM1	AM/FM Filter kit includes FM band pass filter for 76-90 MHz (Japan) and AM 1.8 MHz low pass filter
URT-ACC-FIL-AM-FM2	AM/FM Filter kit includes FM band pass filter for 88-108 MHz and AM 1.8 MHz low pass filter
URT-ACC-FIL-DAB-III	DAB filter kit includes band pass filter for 174-240 MHz (Band III)
URT-ACC-FIL-DAB-L	DAB filter kit includes band pass filter for 1467-1492 MHz (L-Band)
Custom Filters	Contact your local Averna sales representative for details
Options	
RP-5100-MM1	Averna Situational Recorder includes hardware and software
Shipping Container	
RP-ACC-5100-FRT1	Averna RP-5100 Series replacement lightweight and reusable shipping container
Maintenance and Support	
RP-SER-SUP-5100	RP-5100 Series- Additional 1 Year Technical Support/Software Subscription
RP-SER-CAL-5100	Calibration service requires instrument to be shipped to Averna, or an Averna certified calibration house. Includes Averna calibration certificate
RF Playback Options	
URT-HW-5000, URT-SW-PLAY-RF	Averna URT-5000 20MHz, 140kHz to 2.5GHz RF Signal Generator and RF Player
URT-HW-1100 or URT-HW-1101 URT-SW-PLAY-RF	Averna URT-1100 Series 20MHz, 250kHz to 2.7GHz PXI-based RF Signal Generator and RF Player




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Put the Averno Experience to the Test

Averno is a global test engineering, software, solutions and services company whose mission is to accelerate electronic product development and improve quality standards for innovative high-tech manufacturers. OEMs, ODMs and CMs rely on Averno to establish and support a global test strategy, to standardize and streamline their test activities, and to deliver leading-edge test systems in parallel with their own R&D efforts. They leverage Averno off-the-shelf software, instrumentation and communication solutions as well as on-demand engineering services to maximize the impact of test on product success, from design to manufacturing.

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