

IZT R5060

Monitoring Receiver

- Frequency range 9 kHz to 6 GHz
- Bandwidth up to 60 MHz
- Two separate sub-bands (DDCs)
- Integrated GNSS module
- Compact form factor
- RF Monitoring & Wideband I/Q recording



IZT R5060 is latest IZT's generation monitoring receiver in a compact form factor. It has a precise frequency range from 9 kHz up to 6 GHz and an instantaneous bandwidth of 60 MHz.

The IZT R5060 is a medium performance monitoring wide-band receiver:

It is designed for cost-efficient applications that require large bandwidths and low power consumption. For example, it is suitable for the detection of unauthorized transmissions or it can build a compact, high-channel-count receiver system.

Overview

IZT R5060 is latest IZT's generation monitoring receiver in a compact form factor. It has a precise frequency and long-term accuracy. It's low power consumption while maintaining excellent quality of reception makes it a practical and unique monitoring receiver.

Combined with a Sensor Controller and the IZT Signal Suite GUI connected via 10 Gigabit Ethernet the IZT R5060 extends the range of inter-compatible IZT receivers.

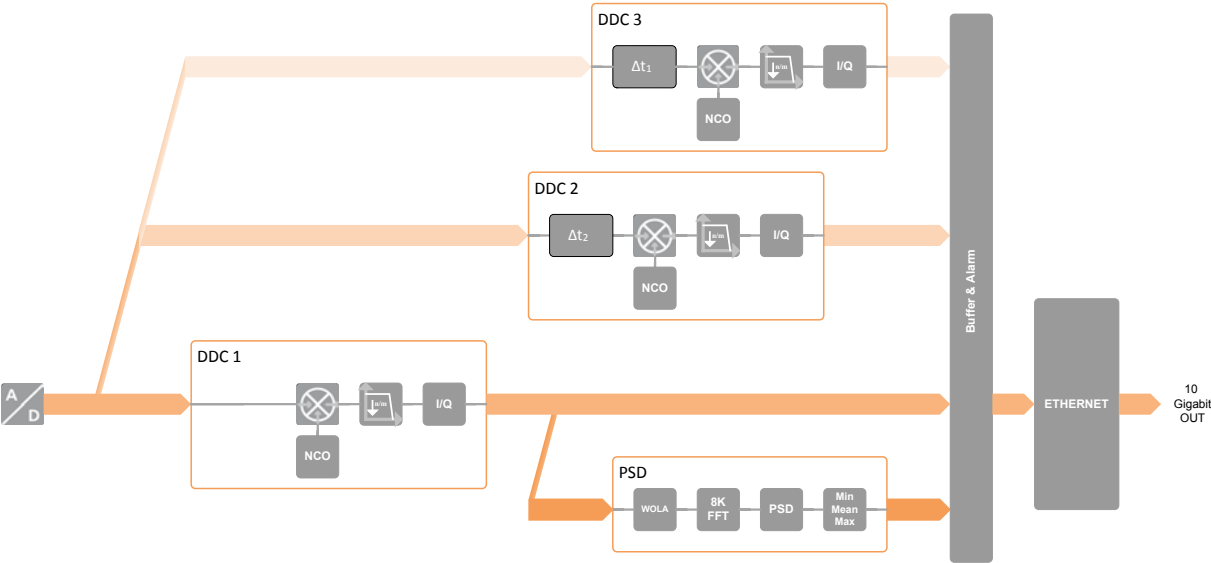


Figure 1: Block diagram of the IZT R5060 digital signal processing

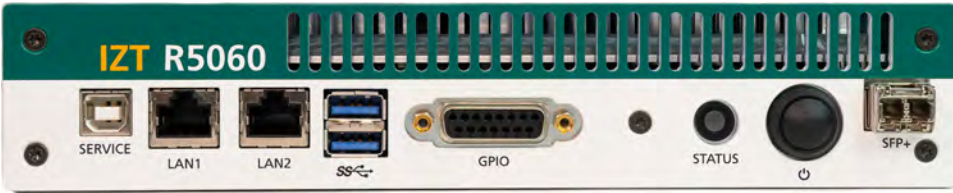


Figure 2: Front panel interfaces



Figure 3: Back panel interfaces

Key Features

- Excellent reception quality
- Frequency range from 9 kHz to 6 GHz
- Real-time bandwidth of 60 MHz
- Two separate sub-bands (2 DDCs)
- High large-signal immunity
- Low power consumption
- GNSS as reference timing source
- Recording capabilities with external PC

HIGH RECEPTION QUALITY

The IZT R5060 uses a power-reduced variant of IZT's latest generation of tuners. The frequency range is from 9 kHz to 6 GHz. The lower end of the frequency range is digitized directly, while higher frequencies are passed through sub-octave preselectors and a dual frequency conversion tuner with a variable 1st IF for maximum robustness against false reception. A low-noise preamplifier can be activated for maximum sensitivity.

The instantaneous bandwidth of the IZT R5060 is 60 MHz. Built-in test equipment allows for end-to-end verification. The receiver can be operated in manual or automatic gain control mode.

HIGH FREQUENCY STABILITY

The IZT R5060 is available with different frequency stability options:

- TCXO (default)
- OCXO

All internal clocks are derived from a single reference oscillator, the built-in high-stability oscillator, which itself can be synchronized to an external source, the built-in GNSS receiver module or slaved to another IZT R5060 receiver via PTP. Once the LAN connection is removed, their internal reference oscillators will maintain highest frequency accuracy to ensure minimum drift of the time bases between multiple receivers.



Figure 4: Two receivers installed in rack mount kit R5060-MNT with 1U form factor

Your Benefits

SIGNAL PROCESSING

The IZT R5060 is connected to a Sensor Controller PC (e.g. IZT P1040) via 10 Gigabit Fiber Ethernet interface and can be used with it in the same way as with other IZT receivers. For two separate sub-bands (2 DDCs) with variable sampling rate, the IZT R5060 can operate within the real-time bandwidth of the receiver. IZT Signal Suite GUI applications running on the PC offer various solutions for signal monitoring, WB recording, signal analysis and post-processing.

COMPACT AND LIGHTWEIGHT

The IZT R5060 combines a limited weight of approx. 4.3 kg and a mobile form factor maintaining an excellent VUHF performance. Additionally, the power consumption of the IZT R5060 stands out: the receiver needs only 36 to 45 watts, depending on hardware options.

WIDE RANGE POWER SUPPLY

The wide range DC power supply from 8 to 30 VDC provides easy connection to electrical systems in the field or in mobile application, for example from the electrical system of a vehicle.

The IZT R5060 can also be used with the included external wide range AC power adapter.

INTEGRATED GNSS MODULE

Based on an integrated GNSS receiver option R5060-REF provides a high quality time reference source. A 1PPS sync pulse derived from the GNSS satellites delivers highly accurate time stamps inside the embedded metadata of the PSD and CBB data streams and also guarantees signal reception with high frequency accuracy.

The GNSS receiver option comes with a builtin NTP server which allows synchronization of external equipment via the 10G interface (e.g. the sensor controller PC). The 10G interface also provides the NMEA data stream with position information via UDP.

Figure 5: GNSS as reference timing source

Figure 6: NMEA via UDP

Your Benefits

COMPATIBLE WITH IZT SIGNAL SUITE APPLICATIONS

The IZT R5060 works perfectly together with IZT Signal Suite software solutions. Various plug-in modules can be added to the basic GUI or the I/Q wideband recording application with continuous I/Q real-time bandwidth of up to 60 MHz (Figure 7), such as Panorama Scan, Persistence Display, Mask Triggered Recording, Long-term Spectrogram Recording, Time Scheduled Recording, Signal Analysis and Modulation Recognition or Demodulation of various modulation schemes.

TRIGGER CONTROLLED SIGNAL CAPTURE

Triggered recording with IZT Signal Suite enables signal capture up to full real-time bandwidth with adjustable pre-recording and follow-up time. The trigger event can be defined by power limits exceeding spectrum masks, captured reference traces with adjustable offset or manually by pressing the recording button or by an external trigger pulse. Captured signal events are automatically stored in subfolders with trigger log, PSD and CBB I/Q files.

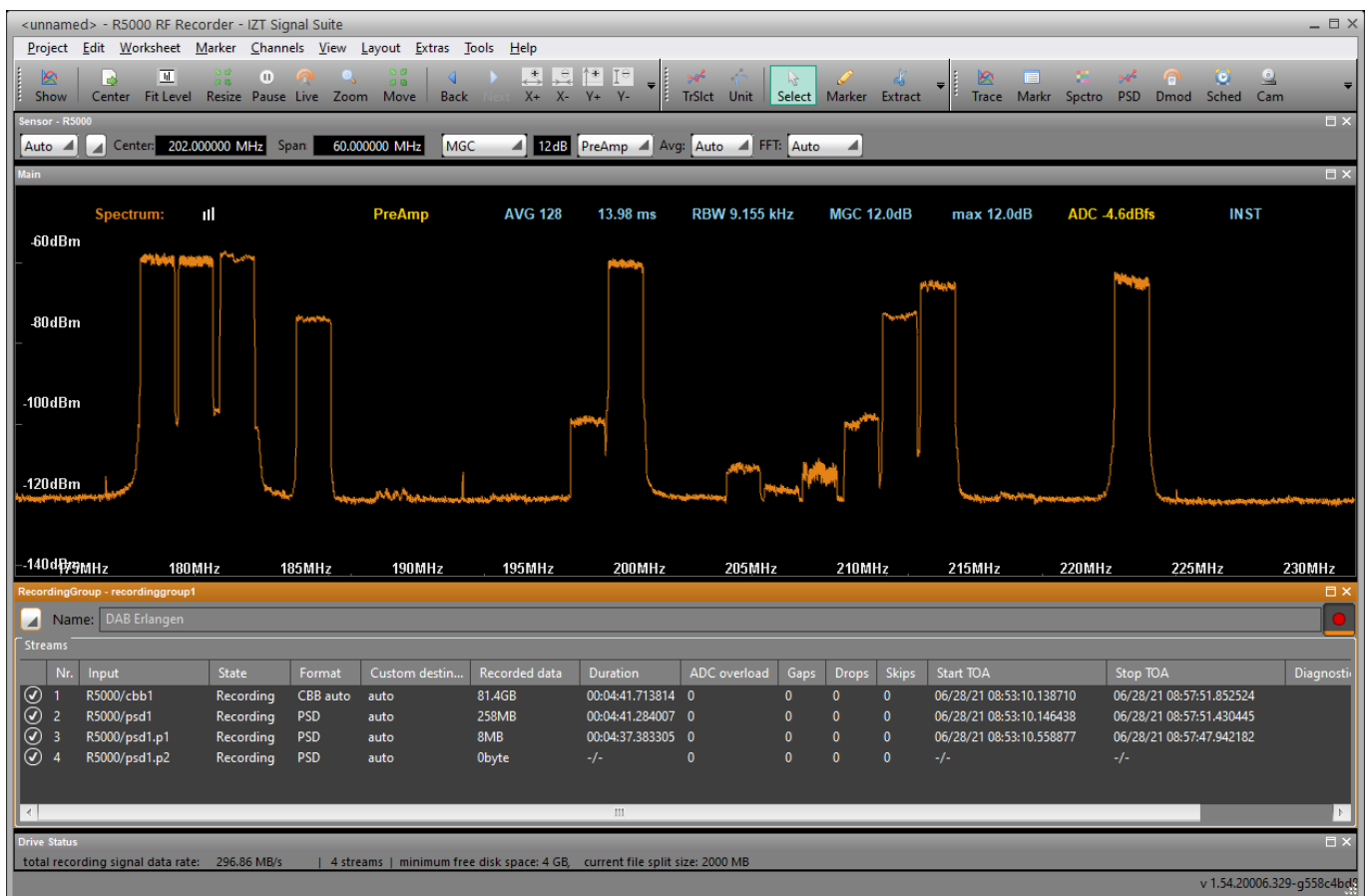


Figure 7: IZT Signal Suite IQ wideband recording with 60 MHz

Specifications

RF Input	
Frequency range	9 kHz to 6000 MHz
Receiver bands	HF: 9 kHz to 65 MHz VUHF: 20 MHz to 6000 MHz
Instantaneous bandwidth	60 MHz
Number of antenna inputs	RF1: HF, RF2: VUHF 1, RF3: VUHF 2

Signal Processing	
ADC	16 bit
PSD	8192-point FFT, WOLA-3 window Averaging by 1 to 32768 Min/Mean/Max/Percentile trace
PSD preview	Long-term spectrogram generated during recording
I/Q	IZT R5000 CBB data format with embedded metadata
SCD	Proprietary IZT SCD data format reducing data amount Compliant to IZT Signal Suite for signal extraction
Sweep time	2 ms typ. plus time for gathering data
Scanning speed	Up to 20 GHz/s Up to 300 GHz/s within 60 MHz bandwidth
Sampling rate	Variable from 6.25 kSPS (5 kHz) to 75 MSPS (60 MHz)

HF Performance	
Frequency range	9 kHz ¹ to 65 MHz
Maximum input power	+20 dBm
Return loss	VSWR 1:2
IP2	+25 dBm, typical, minimum attenuation
IP3	+13 dBm, typical, minimum attenuation
Noise figure	5 dB, typical
Sensitivity	-124 dBm @ 3 kHz bandwidth, S/N = 10 dB -115 dBm @ 25 kHz bandwidth, S/N = 10 dB
Gain	19 dB, minimum attenuation
Attenuation	0 dB to 31 dB
Tuning speed	direct sampling
Tuning resolution	1 Hz
Tuning accuracy	< 0.2 Hz
Phase noise	< -140 dBc/Hz @ 1 kHz, typical < -150 dBc/Hz @ 10 kHz, typical
Spurious level	< -75 dBFS

¹Degraded performance: 9 kHz to 500 kHz

VUHF Performance	
Frequency range	20 MHz to 6000 MHz
Maximum input power	+15 dBm, preamp on +20 dBm, preamp off
Return loss	VSWR 1:2
IP3	+8 dBm, minimum attenuation in normal mode, typical -7 dBm, minimum attenuation in low noise mode, typical
Noise figure	15 dB in normal mode, typical 8 dB in low noise mode, typical
Sensitivity	-114 dBm @ 3 kHz BW, S/N = 10 dB -105 dBm @ 25 kHz BW, S/N = 10 dB
Gain	25 dB, preamp off, minimum attenuation in normal mode 40 dB, preamp on, minimum attenuation in low noise mode
Attenuation	0 dB to 30 dB
Tuning speed	2 ms, typical
Tuning resolution	1 Hz
Tuning accuracy	< 0.2 Hz
Phase noise	-100 dBc/Hz @ 1 kHz, typical -108 dBc/Hz @ 10 kHz, typical
Frequency conversion	Dual conversion with variable 1st IF
LO1 leakage	< -100 dBm
LO2 leakage	< -120 dBm
IF1 rejection	80 dB, typical
IF2 rejection	> 100 dB
IF1 subharmonic blocking	> 100 dB
Image rejection IF1	> 120 dB
Image rejection IF2	> 100 dB

Specifications

VUHF Performance	
Preselector Filter	14 bands, electronic switching
	20 MHz to 80 MHz
	80 MHz to 120 MHz
	110 MHz to 170 MHz
	160 MHz to 260 MHz
	240 MHz to 390 MHz
	350 MHz to 570 MHz
	530 MHz to 860 MHz
	800 MHz to 1260 MHz
	1200 MHz to 1960 MHz
	1900 MHz to 2960 MHz
	2900 MHz to 3560 MHz
	3500 MHz to 3960 MHz
	3900 MHz to 4860 MHz
	4800 MHz to 6060 MHz

Interfaces	
Antenna inputs	RF1, RF2, RF3: N (f), 50 Ω
Data, monitor and control	SFP+
PTP synchronization	2x RJ45
10 MHz reference	REF, I/O, SMA (f)
Trigger input	TRIG I, SMA (f)
Trigger output	TRIG O, SMA (f)
GNSS antenna	GPS, SMA (f)
USB	2x USB 3.0
Status LED	Power-on & health-status
Service GPIOs	LVC MOS outputs (8x)
DC connector	4-pin connector (Lutronic 2420 04 T18CB100)

Environmental Parameters	
Power supply input	8 to 30 V DC External AC/DC adapter (100 to 240 V AC, 50 to 60 Hz) included
Power consumption	36 W typ. (45 W max.)
Dimensions (WxHxD)	324 mm x 43.5 mm x 335 mm
Weight	Approx. 4.3 kg (4.7 kg with AC adapter)
Temperature range	Operation: 0 to 50°C Storage: -40 to 70°C
Humidity	Max. 90% r.H., non-condensing

Certificates	
EMI / EMC	EN 61010-1:2002 CISPR 25 class 5
Conformity	CE marking

Ordering Guide

Option	Description
IZT R5060-CHS	Base Unit, 60 MHz bandwidth, 3 DDCs incl. TCXO & wide range DC input
IZT R5060-HF	HF input, 9 kHz to 30 MHz
IZT R5060-RF3	RF input, 20 MHz to 3 GHz
IZT R5060-RF6	RF input, 20 MHz to 6 GHz
IZT R5060-OCX	Oven stabilized reference oscillator (replaces TCXO)
IZT R5060-PSD	8k WOLA-3 PSD
IZT R5060-REF	Built-in GNSS receiver (incl. GNSS Sync & NTP)
IZT R5060-PTP	PTP synchronisation capability
IZT R5060-MNT	Rack mounting kit for one or two receiver units

IZT R5060

Monitoring Receiver

About IZT The Innovationszentrum fuer Telekommunikationstechnik GmbH IZT specializes in the most advanced digital signal processing and field programmable gate array (FPGA) designs in combination with high frequency and microwave technology.

The product portfolio includes equipment for signal generation, receivers for signal monitoring and recording, transmitters for digital broadcast, digital radio systems, and channel simulators. IZT offers powerful platforms and customized solutions for high signal bandwidth and real-time signal processing applications. The product and project business is managed from the principal office located in Erlangen/Germany. IZT distributes its products worldwide together with its international strategic partners. The IZT quality management system is ISO 9001:2015 certified.

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