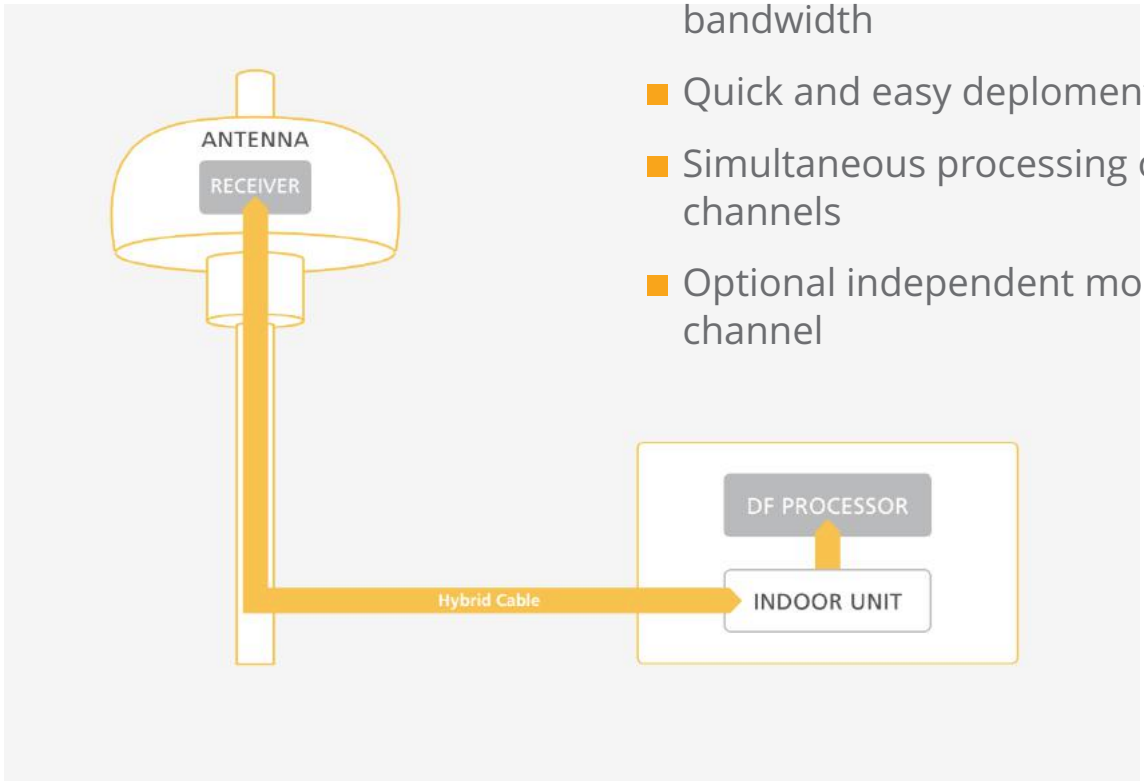
Data Sheet

IZT R5506
Remote Direction Finding Sensor

- Highest signal quality in the frequency range up to 6 GHz
- Digitization close to the antenna
- Up to 60 MHz instantaneous bandwidth
- Quick and easy deployment
- Simultaneous processing of up to six channels
- Optional independent monitoring channel



The IZT R5506 is a compact, high performance radio direction finder for the frequency range of 1 MHz **to** 6000 MHz **with** 60 MHz **instantaneous bandwidth. The RF and digital processing is closely integrated with the antenna system. The receiver is non-switching to maximize sensitivity and minimize detection times. The digitized signals are sent to the DF processor via a hybrid optical cable to increase operational flexibility and avoid loss of performance due to long coaxial cables. The result is an optimal dynamic range, sensitivity and DF accuracy within the capabilities of the antenna array.**

Figure 1: Antenna with IZT R5506 Receiver

KEY FEATURES

Close Integration with the Antenna

The IZT R5506 product is closely integrated with the antenna system. Figure 1 shows the IZT R5506 in combination with the Alaris DF-0095A. This five channel antenna covers the frequency range of 1 MHz to 6000 MHz in four bands. Optionally the antenna can be equipped with an omnidirectional monitoring channel. The antenna is radomized and suitable for fixed or mobile use. The power dissipated by the electronics is conducted to a passive cooler below the radome. The mechanical dimensions are shown in 3 Since only a hybrid cable has to be connected to the antenna system, the IZT R5506 installation is quick and simple.

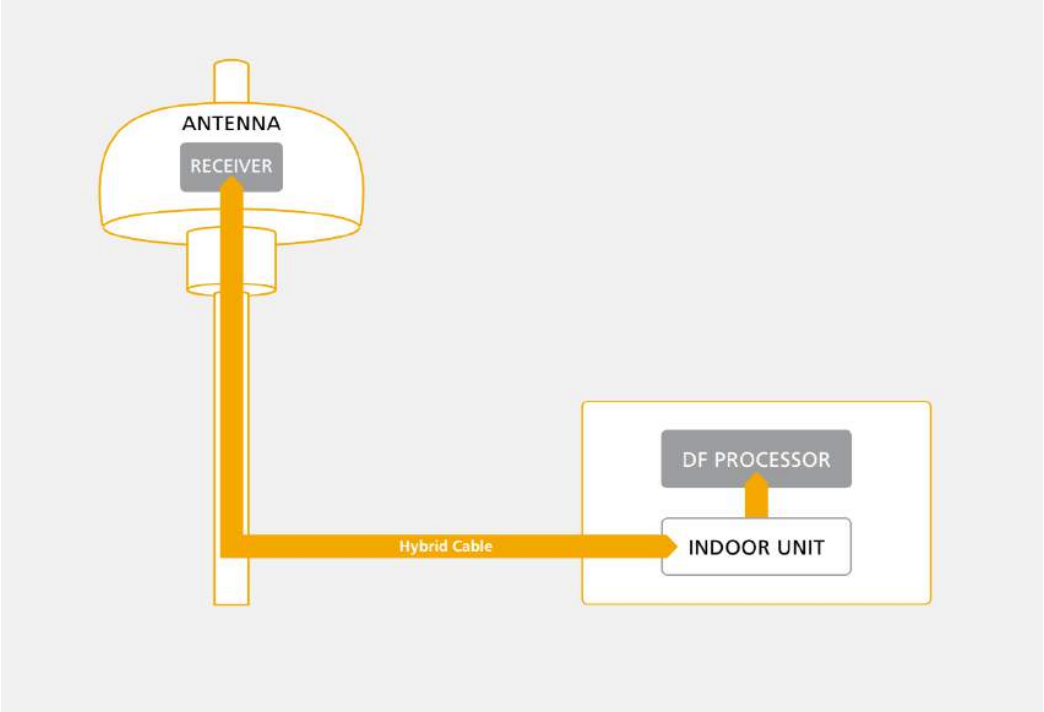


Figure 2: Block Diagram of IZT R5506 with Antenna, Indoor Unit and DF Processor

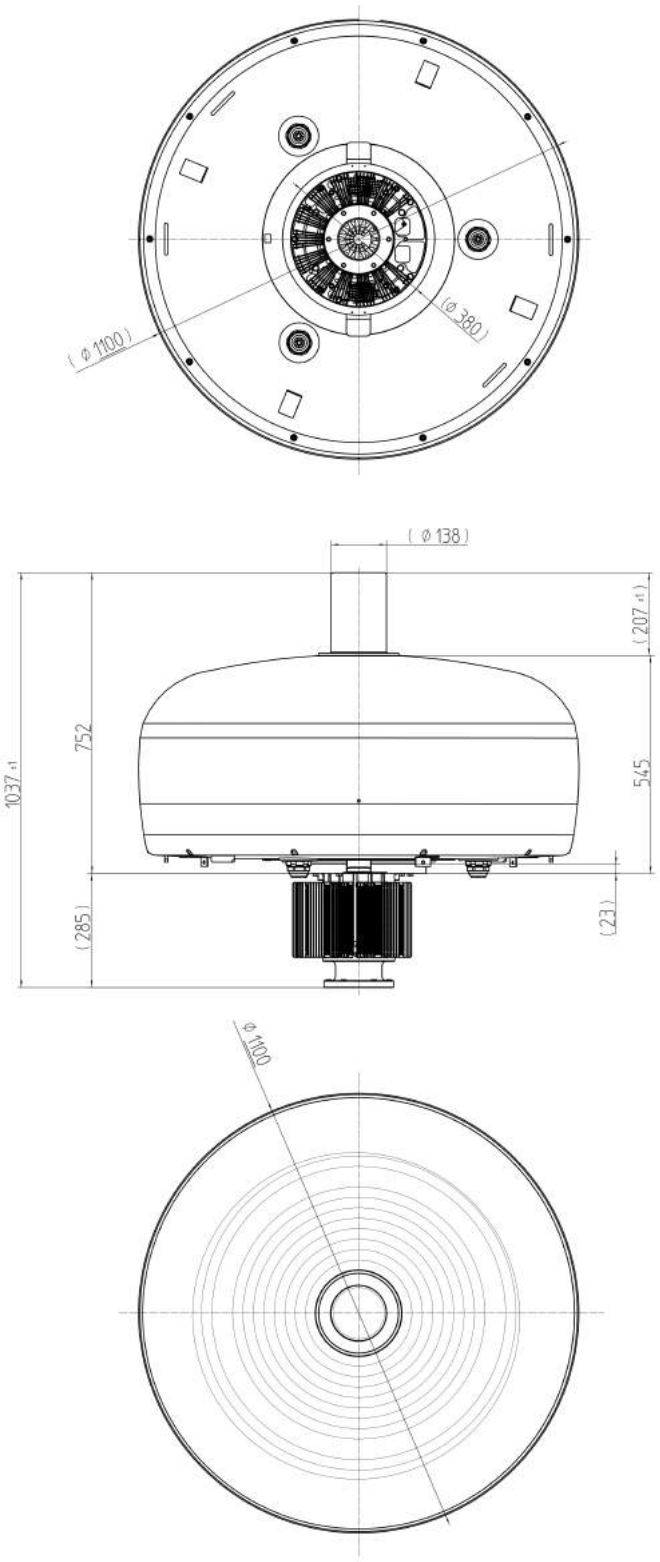


Figure 3: Dimensions

The actual electronics is shown in figures 4 and 5.

Figure 4: IZT R5506 electronics

Figure 5: IZT R5506 electronics with hybrid cable

Quick and Easy Deployment

A key feature of the IZT R5506 is the single connection between the DF processor, usually a PC or similar hardware. This cable brings power to the IZT R5506 in the antenna and transports the digitized data from the receiver to the DF processor. This enables quick deployment in the field. Two persons are adequate to mount the antenna system on a transportable mast. Figure 6 shows the IZT R5506 depoyed in a measurement campaign. The optional magnetic compass allows for a quick, initial alignment with magnetic north.

Figure 6: IZT R5506 Receiver in a measurement campaign

High Reception Quality

The IZT R5506 contains up to six high-performance receivers up to 6 GHz with sub-octave preselector filters. For each antenna element, a dedicated RF input is provided. All up to 24 antenna inputs are protected against excessive input power by fast limiters.

An internal calibration source ensures optimum phase and amplitude matching between the channels. One of the six channels can be factory configured with a separate local oscillator (LO) to work as an independent monitoring channel. The IZT R5506 features a high stability internal reference clock and an integrated Global Positioning System (GPS) receiver for synchronization.

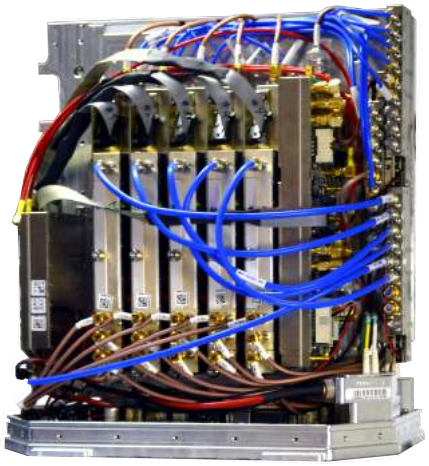


Figure 7: IZT R5506 without housing

Flexible Scan Schemes

Via a flexible job control scheme, the user can define complex scan jobs that will be automatically and synchronously executed by the receiver. All data is tagged with accurate time stamps to support also hybrid (AOA/TDOA) location finding schemes. The data rate generated by the IZT R5506 can be controlled over a wide range. This is realized by introducing gaps and adjusting the bandwidths to adapt to the processing speed of the DF Processor software.

Signal Processing

IZT R5506 uses latest FPGA technology for signal processing. Up to six channels with 60 MHz instantaneous bandwidth are continuously sampled, filtered and decimated. Together with meta data and highly accurate time stamps the data is sent to the DF processor server via optical LAN with a maximum capacity of 20 Gigabit per second. A flexible job control allows the user to define complex scan scenarios to be executed by the receiver. Different data formats are available.

IQ Data Direction Finder IQ Data from the DF channels are available with variable sample rate and an instantaneous bandwidth of up to 60 MHz.

Power Spectrum Direction Finder The data from the DF channels can be added with weighting coefficients and converted into a power spectrum (PSD) with 4096 frequency bins, which will be sent to the DF processor.

IQ Data Monitoring If fitted with the optional monitoring channel, the IQ data is available with a variable sample rate and bandwith up to 60 MHz.

PSD Data Monitoring The signals received by the monitoring channel are also available as PSD with 4096 points.

Complex FFT Data As an option, the IZT R5506 can convert up to six DF channels into an overlapping WOLA-3 16384-point complex FFT. The sample rate going into the FFT is continuously settable by the user, for example to cover integer channel spacings. In this configuration, the capability for processing the PSD is not available, but the overall system performance will be greatly enhanced by reducing the processing power requirements in the DF processor.

DF PROCESSOR SOFTWARE

The IZT R5506 requires a DF processing software which usually runs on a server, that receives data from the outdoor unit via the hybrid cable. For customers who wish to adapt or design their own DF processor software, IZT will provide interface control documents and technical support from IZT's engineering team. IZT can also offer its own DF processor software or direct customers to other available software solutions. Please contact IZT for details.

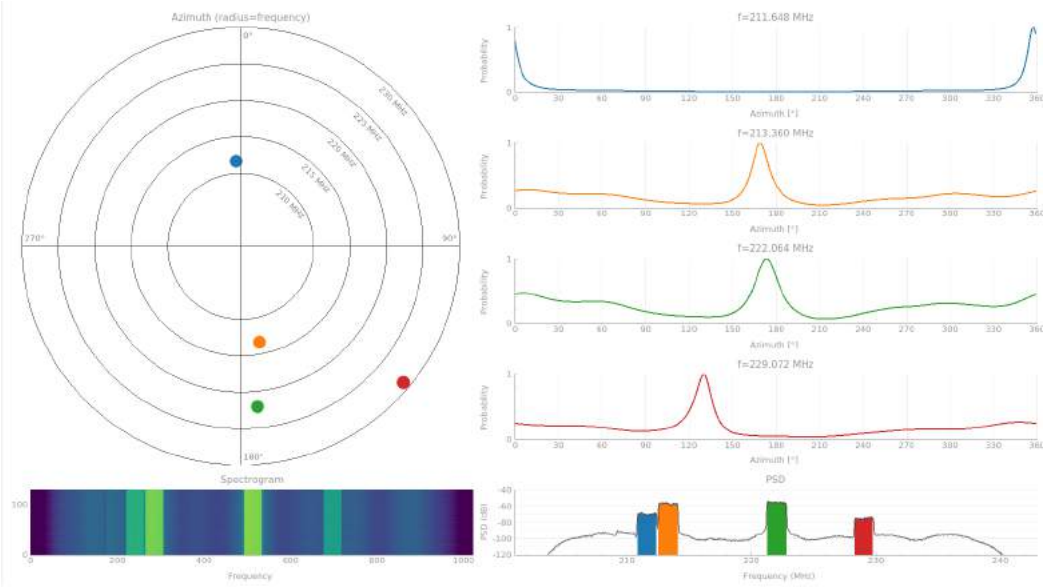


Figure 8: Super resolution DF of a DAB transmitter signal

YOUR BENEFITS

Non-switching Design

The IZT R5506 samples signals synchronously from all antenna elements in a specific frequency band eliminating the need for additional radio frequency (RF) switches. If supported by the DF Processor Software, this feature allows short detection times, beamforming and maximum sensitivity.

Hybrid Cable

Optical fiber replaces long RF cables from the antenna tower to the shelter or vehicle. This makes the installation much simpler and completely eliminates problems with losses or parameter variations in the antenna cables of traditional DF systems. The same hybrid cable also supplies a galvanically isolated DC voltage to the IZT R5506 electronics. The IZT R5506 Indoor Unit contains the power supply, surge protection and access to the data for the DF processor server. All the sensor's functions are remote controlled via the optical interface.

SPECIFICATIONS

Specification	IZT R5506
Number of DF channels	Up to six [1] [2]
Frequency range	1 MHz to 6000 MHz
Frequency bands for DF	Four
Number of RF inputs	24
Preselector	14 bands, electronic switching
Conversion scheme	Dual conversion with variable 1st IF
Instantaneous bandwidth	60 MHz
Number of monitoring channels	Up to one [3]
I/Q sample rate	Up to 78 megasamples per second
PSD	4096 points
Monitor & Control	From DF processor software via optical link
Power consumption[4]	Approx. 200 W to 250 W

Table 1: IZT R5506 specifications

ORDERING GUIDE

Option	Description
IZT R5506-DSP	DSP Unit and framework
IZT R5506-DC6	Analog Tuner Channel up to 6000 MHz
IZT R5506-MON6	Monitoring Channel independently tuneable up to 6000 MHz
IZT R5506-IDU	Indoor Unit
IZT R5506-MNT1	Mechanical Adapter and cooler for DF-0095A
IZT R5506-MNT2	Mechanical Adapter and cooler for DF-0095A, heavy load
IZT R5506 DF0095	5 Element Wideband Portable DF-Antenna 1 MHz to 6000 MHz
IZT R5506-DF0095 OMNI	OMNI Channel for DF0095
IZT R5506-CMP	Built-in Magnetic Compass
IZT R5506-100	I/Q Data
IZT R5506-200	PSD Data
IZT R5506-300	Complex FFT Data

Table 2: IZT R5506 Ordering Guide

[1] simultaneous sampling
[2] up to five if equipped with monitoring channel
[3] optional
[4] depends on number of channels and options

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.