



## Product Line DAB Monitoring Receiver RF-DAB

### RF-DAB monitoring receiver

RF-DAB is a professional DAB monitoring receiver for transmitter, content and field monitoring. Its modular design enables flexible configuration for various specific applications.

### Key Features

Depending on the configuration, the following key features are available:

- Field proven DAB demodulator
- Parallel full Ensemble decoding
- Complete EDI reconstruction from RF
- Full Ensemble EDI output to LAN
- Simultaneous decoding of all audio and data services
- Extensive RF measurements
- Browser-based HTML5 user interface with remote audio and data streaming
- Available for virtual environments without hardware

### Applications

- Transmitter monitoring
- RF measurements and synchronization monitoring
- Content verification and monitoring
- Listen to DAB over IP
- Relay (ball) reception, e.g. for FM
- Off-air EDI reconstruction for DAB retransmission
- Field measurements and verification
- Short-term logging and analysis

### Basic Software Features

#### Common Features

- Stand-alone monitoring receiver for reception analysis and content verification
- NTP synchronization
- Field proven demodulator
- Browser based configuration and services decoding. No installation of software necessary.
- Proven long-term stability
- Firmware update via Web /
- Extendible to work with RFmonitor / RFarchiver network for long-term monitoring and content archiving
- Fully compliant to DAB standards family (ETSI EN 300 401)
- DAB Mode I, II, III & IV

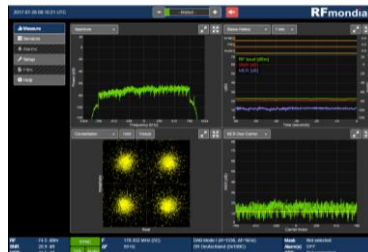
### DAB Decoder

- Decoding status
- Display of all services
- Audio decoding of a single service
- Streaming of audio as WAV
- Decoding of DL/TM(+), Journaline®, Slideshow, Broadcast Website, SPI, TPEG(optional)
- Full ensemble EDI output to Ethernet
- DCP/EDI output via Ethernet (including multicast support)

### Advanced GUI

The advanced graphical user interface (GUI) is designed to provide the full experience of a modern and professional measurement device:

- State-of-the-art HTML5 technology
- No software / plug-in installation necessary
- Same browser based advanced GUI remotely and locally (if available)
- Touchscreen and mouse capability
- Adapts to different screen sizes



### Remote Control

- Full remote control via Ethernet
- Browser-based user interface
- SNMP (Get, Set, Treewalk)
- Control via DCP/UDP

### Hardware

#### RF-Frontend

Parameter	Value
Input frequency range	168-240 MHz 1452-1492 MHz (optional)
Max. input level	0dbm
Max. input level for optimal decoding	-15dBm
Sensitivity	-96dBm
IIP3	-15 dBm typ.
Noise figure	2.2 dB

### Front Panel Signaling

- LCD display with status information and IP address
- LED status

### Interfaces

- Antenna 50 Ohm N
- 2 Ethernet
- USB
- 10 MHz ref. input 3 - 4.5 V TTL, BNC
- Displayport / HDMI (optional)
- Digital/analog audio output (optional)
- Internal GPS (optional)
- External GPS input 10 MHz, 1 pps, NMEA (optional)
- ETI in / out (optional)

### Power Supply AC Input

- Auto-sensing supply, 100 VAC to 240 VAC, 50-60 Hz
- DC input (optional)
- Redundant power supply (optional)
- Power consumption: 35 W typ., 45W. max.

### Mechanical

- Aluminum extrusion front bezel
- Industrial 19" 1RU, rack mountable
- 420 (483) x 250 x 44 mm
- Weight: 5.5 kg
- Operating temperature: 0 – 50°C
- Humidity: 20 – 80% non-condensing

### Options

#### RF Measurements (RFM)

Either four window view or full screen display of diagrams.

Relevant measurement values are available on SNMP.

High quality measurements on various stages of the reception and decoding chain:

- Spectrum and spectrum waterfall
- QAM constellation
- Channel impulse response
- RF input power (storable offset)
- Frequency offset
- SNR
- MER (> 45 dB)
- MER over carrier
- TII decoding
- BER (MSC, FIC) before Viterbi
- BER (Audio, FIB) after Viterbi

## Advanced Application Decoder (AAD)



Integrated audio and data decoding, licensed from Fraunhofer IIS:

- Parallel full ensemble decoding and access to all audio and data services
- Multi-user, browser-based decoding of all audio and data services
- Display of audio related information, e.g. audio rate, sampling rate, mode
- Streaming of selected audio service
- Parallel streaming of all audio services in AAC/WAV format
- Download of selected audio service in original format and wave
- Service information (Labels, Service country, Program Type)
- Journaline®, MOT Slideshow, Broadcast Website, EPG/SPI
- Optional: TPEG
- Announcements and Emergency Warning Feature (EWF)
- PAD and NPAD, primary and secondary services
- Display of all audio levels, data services and subchannels in parallel
- Statistical information of each service
- Relevant audio values are available on SNMP
- Audio decoding: MPEG-1 Audio Layer 2 (DABclassic), HE AAC v2 (DAB+), each incl. MPEG Surround
- Optional: DMB-Audio



## Local GUI and Audio (LGA)

- Displayport / HDMI touch screen can be attached locally
- Local AES/EBU XLR audio output
- Requires ET2

## Ball Receiver (BAL)

- 2 AES/EBU XLR outputs
- 2 selectable audio services
- Smart conversion of DL/TM or Journaline content for RDS
- Requires AAD option

## Alarm System (ALM)

Flexible, built-in alarm system with the following features:

- Configurable thresholds
- Measurements/content parameters, e.g. MER, input level, BER, audio

level, single stream data rate, announcements, detailed data services parameter

- Alarm and status signaling via SNMP (Traps, Informs)

## SFN monitoring (SFN)

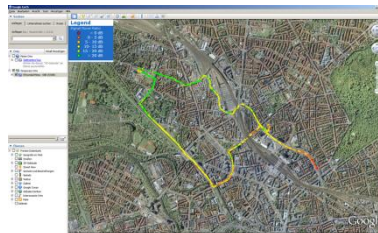
- SFN synchronization monitoring
- Display of echoes, Null symbol and 1 PPS drift
- Alarms on echoes, SFN drift, and TII
- Absolute time offset monitoring using 1 PPS (max. 1 sec. or max. 120sec. depending on multiplexer)
- Alarm and status signaling via SNMP (Traps, Informs)
- Requires RFM and ALM options



## Field Measurements (FIM)

This package provides a comprehensive tool set for mobile field measurements:

- Delivery with USB GPS mouse
- 12VDC input in addition to VAC
- Recording of geo-referenced measurements to file
- Live DCP/UDP output of measurements
- Writing of selected tags (e.g. audio frame error, MER, field strength) in KML and CSV format
- Import to Google Earth possible
- Requires RFM option



## EDI Input (EDI)

- DCP/EDI input via Ethernet
- Full service and data decoding
- Requires AAD option

## ETI (G.703/704) (ETI)

- ETI input hardware interface
- ETI output hardware interface

## Mask Measurement (MAM)

- $\pm 3$  MHz spectrum mask compliance measurement according to ETSI EN 302077/302245
- $\pm 1$  dB power level measurement
- Crest factor measurement
- Requires additional hardware

## Long-term logging / analysis (LOG)

- All RF measurements and content information are logged for to 31 days
- Display of parameter and statistics over time

## ETI Analyzer (EAN)

The ETI Analyzer option parses STI/ETI/EDI content from RF or UDP and displays the following information:

- Service structure (services, service components, signaling)
- MSC layout (position within MSC, protection level)
- Announcement information (when was which announcement signaled)
- Service linking information
- Dynamic PTY information
- List of all FIGs
- MNSC information
- Checking for correct and consistent FIC signaling. Various protocol levels.
- Conversion of EDI/ETI
- Requires AAD option

## Virtualization (VIR)

Especially targeted for content monitoring and verification of DCP streams, the device is available for virtualization environments:

- Delivered as virtual machine image, without hardware
- Software protection via USB dongle

## Ordering Information

RF-DAB:

Basic DAB receiver

Option VIR:

Virtual machine w/o hardware

Option RFM:

RF Measurements

Option RPS:

Redundant power supply

Option AAD:

Advanced Application Decoder

Option LGA:

Local GUI and Audio Output

Option ALM:

Alarm System and SNMP Informs

Option FIM:

Field Measurements

Option MAM:

Mask Measurement

Option BAL:

Ball Receiver

Option ET2:

Second Network Interface

Option LOG:

Long-term logging & analysis

Option RBC:

Rebroadcasting

Option BAL:

Ball-receiver

Option EDI:

EDI Input

Option ETI:

ETI Input and Output

Option MAM:

Mask Measurement

Option SFN:

SFN monitoring

Option LOG:

Long-term logging and analysis

Option EAN:

ETI Analyzer

Option DMB:

Decoding DMB-audio