XTEND Digital DAB/DAB+/VBI/DLS
Rack Solution

All-In-1 Modular Racking System Solution
DAB/DAB+/VBI/DLS Coverage Extension
Extendable from 1 up to 6 ensembles
**Voice Break-In / Multizone Service**

Key Features

## EMERGENCY MESSAGE INSERTION / VOICE BREAK-IN

The Voice Break-In (VBI) solution is a highly integrated, hardware based repeater and content replacement system for DAB/DAB+. VBI's are in-tunnel/in-building broadcast systems that in case of emergency play out real-time voice or pre-recorded audio via the DAB/DAB+ radio by replacing the regular program. With our system, seamless switchover to emergency content is enabled by continuous synchronization to the original carrier and completely hardware based demodulation and modulation.

SHORT TUNNELS
RF/RF REPEATERS
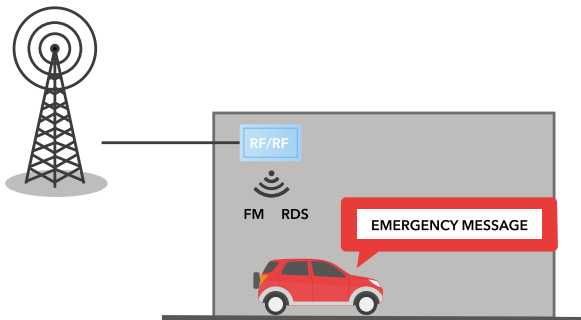

LONG TUNNELS RF/FO
FIBER FED REPEATERS
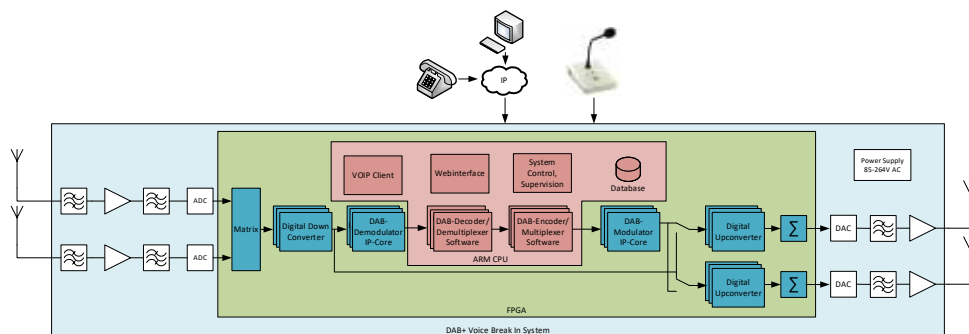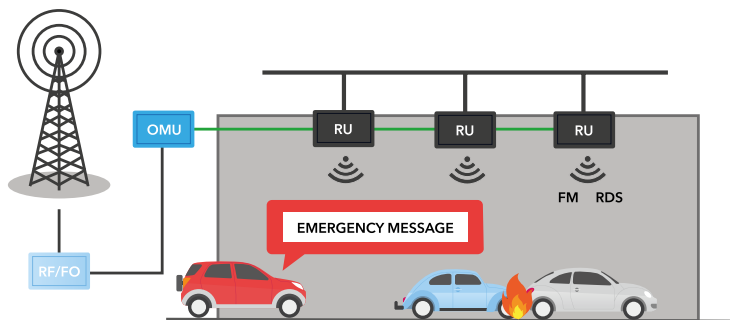
Benefits

☑ Repeater and Voice Break-In mode

☑ Scalable and upgradable up to 6 ensembles on a single unit

☑ No GPS reception needed

☑ Automatic gain control and attenuation and precise RF input level measurement

☑ Dual RF output and individual selection of the mode (voice break-in/repeater) for two tunnel tubes

☑ Automatic reconfiguration on changes in the DAB/DAB+ ensembles

☑ Low power consumption: 23W

☑ Second RF receiver for monitoring of RF signals or a fully redundant setup

☑ Two audio inputs for individual voice break-in on RF output 1 & 2

☑ Future ready: modulator/demodulator fully embedded in hardware, yet programmable (FPGA)

☑ Web management for control and monitoring

☑ Various interfaces, alarm outputs for signal loss or customizable inputs/outputs

☑ High reliability, MTBF

☑ All-in-one 19" rack hardware solution

Specifications

ALL-IN-ONE HARDWARE & SOFTWARE SOLUTION
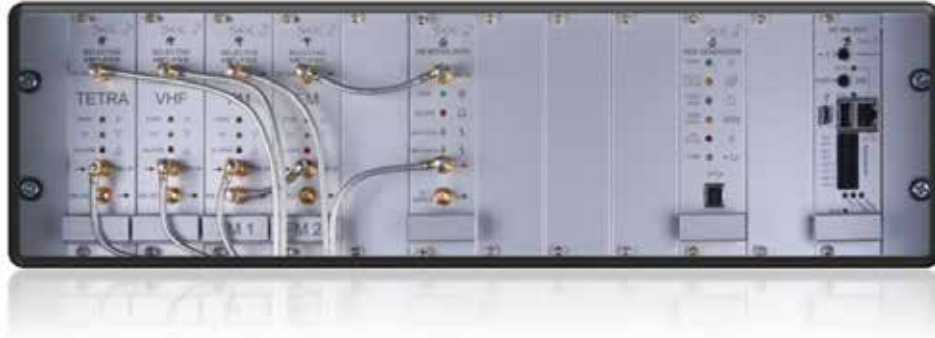
Our compact, fully integrated DAB/DAB+ Voice Break-In module. Multi-ensemble processing, IP connection, low power consumption and a robust, RF safe casing are just some of the features we offer.

GENERAL HARDWARE INFORMATION	
Frequency range (DAB/DAB+)	174-240 MHz
Typical power consumption	23W
Supply voltage (module)	8-15V DC
Supply voltage (rack version)	85-264V AC
Operating temperature	0-50 °C
MTBF	260908 h
Long-term availability	At least until 2030

MECHANICAL: ROBUST HOUSING

CHASSIS	
Size (module, no power supply)	210x155x40mm
Size (rack version)	483x88.1x280 mm (19", 2HU)

OPERATION MODE: VOICE BREAK-IN

Per default, all configured ensembles are repeated with low latency to enable best reception quality and no interference of the user experience. During Voice Break-In mode, all or a selectable number of ensembles are replaced by message insertion via microphone input, pre-recorded messages or audio via IP. Also, radio display messages are replaced and fully customizable, by default showing "Police info".

DAB+ VOICE BREAK-IN	
Supported bit rates	8, 16, …, 192kBit/s (in multiples of 8kBit/s)
Supported sampling rates	32kHz, 48kHz
ETSI Standard	ETSI EN 300 401 compliant
Time Synchronisation Error	<10µs
Frequency Synchronisation Error	<5Hz
Audio Encoder	DAB+, DAB
Simultaneous encoders (1 per bitrate needed)	15
Min. signal input level	-80dBm

OPERATION MODE: REPEATER

Thanks to the hardware embedded modulators, the group delay in the repeater mode can be reduced to under 21µs. The output has automatic gain control and high channel suppression, low noise figure and high linearity.

REPEATER	
Adjacent channel suppression	>80dB
Out of band suppression	>55dB
Group delay	20.3µs
Noise figure	<10dB
Max. gain	75dB

RF SPECIFICATIONS

The RF inputs and outputs both offer two channels and are connected via SMA or customized according to your needs.
Apart from a clock reference input, we offer a high-precision, lowest phase-noise clock reference output to synchronize other devices.

GPS is not needed to operate the device in Voice Break-In or Repeater mode. However, for specific applications an optional GPS module can readily be mounted for improved long-term clock output stability.

RF INPUT (2X)	
Impedance	50Ω
Connector type	SMA
Max. input level sum	-10dBm
IIP3 (0dB)	-7dBm
IIP3 (15dB)	7dBm
Input ESD protection	
S11	<-10dB
Input attenuator	0..31.5dB (0.5dB steps)
Max. level meas. error	±0.2dBm

RF OUTPUT (2X)	
Impedance	50Ω
Connector type	SMA
Max. output level sum	6dBm
S22	<-9dB
OIP3	>30dBm
Max level set error	±0.2dBm
Modulation error vector	>30dB @ 4 ensembles,each 0dBm

REF. CLK IN	
Impedance	50Ω
Max. input power	10dBm (2Vpp)

CLOCK OUTPUT	
Impedance	50Ω
Output frequency	Programmable (0.22 - 2370MHz)
Total Jitter [rms]	120fs typ.

INTERFACES DATA

The system per default is set to indicate and output signal alarms in case reception of one, multiple or all channels is below a defined threshold or too weak. The audio input is stereo fully differential and the stereo differential output allows you to listen to any audio stream in real-time.

Besides the Gigabit Ethernet connection, we offer both isolated RS485 with CAN support as well as isolated I2C and customizable GPIOs. You decide: Voice Break-In mode can be entered by buttons, switches, relays or even via Ethernet interface.

AUDIO INPUT	
Impedance	10Ω
Max input voltage	10 Vpp
Format	Analog, differential, stereo

AUDIO OUTPUT	
Audio Output	5 Vpp, Stereo, differential

OTHER INTERFACES	
Ethernet	RJ45, 1 GBit/s
GPIO	8 channels open collector or digital IO
RS485	CAN support
Fan connectors	2x at Vcc, 300mA max.
USB	1x Host, 1x UART

CONFIGURATION AND CONTROL

Full control over the hardware configuration as well as the mode control and Voice Break-In functionality is provided via a Web-Interface. For secure systems where no Ethernet access is desired, the hardware can easily be set up via USB-UART and new firmware is simply loaded by replacing an SD card or by a USB-stick and the push of a button. SNMP is available.

SYSTEM CONTROL AND OPERATION	
Web interface	Configuration and control
Firmware Update	SD-card, USB, Ethernet
SNMP	Break-in control, status and alarms

FLEXIBLE PLAYOUT SOURCES

Beside the standard 2-channel analog line inputs, audio can be routed from SIP (VoIP) sources or uploaded via Web UI and stored on the device (max 2h).

INDUSTRIAL 19" ENCLOSURE

We supply a 19" 2HU enclosure (depth 343mm) with integrated power supply and fully isolated I/Os available from stock.

FULLY REDUNDANT SETUP POSSIBLE

Thanks to the optional second RF receiver a full redundant setup with two independent DAB-VBIs is possible. In normal condition the RF signal from the master device output will be selected with a relay. The slave device monitors that signal and in case of fault switches over the relay.

Software options

Software options can be unlocked by entering a keycode in the webinterface.

PRODUCT CODE	DESCRIPTION
DAB-VBI-REP	Option DAB repeater channel (for one ensemble) Maximum 6 without ultrascale option Maximum 12 with ultrascale option
DAB-VBI-BI	Option Voice Break-in per Ensemble Maximum 6 without ultrascale option Maximum 12 with ultrascale option Option Voice Break-in per Ensemble(requires Option Repeater per Ensemble)
DAB-VBI-2TX	Option Dual RF Output Option Dual RF Output (simultaneous Repeater/VBI)
DAB-VBI-2RX	Option Second RF Input Option Second RF Input
DAB-VBI-SIP	Option Audio from SIP VoIP Break-in audio signal can be picked up from analog audio output for external usage including DAB latency compensation.
DAB-VBI-PLAYOUT	Option Audio Playout from Files Break-in playout from audio files stored on the DAB-VBI. Break-in messages can be uploaded over the web user interface and triggered there, by isolated inputs or by SNMP. Break-in audio signal can be picked up from analog audio output for external usage including DAB latency compensation.

For more information: **www.see-critical.com**