

DETS

Voice Break-in System for Digital Radio

DAB/DAB+ Voice Break-in for Road Tunnels



The DETS Voice Break-in System for Digital Radio enables tunnel operators to replace audio programmes with live or pre-recorded announcements, providing information and instructions in the event of an emergency, without any disruption at the receiver.

The system monitors the live Ensemble for all current audio service configurations and automatically manages the replacement of normal programmes with the emergency announcement using the same audio bit-rate. This ensures a seamless transition and avoids receiver reconfigurations, which would otherwise lead to a delay in the reception of announcements.

To prevent the need for receivers to re-tune, the system maintains RF frame synchronisation when switching between live programmes and announcements, thereby avoiding disruption to the digital radio signal.

When an announcement is required, an RF switch is used to replace the conditioned off-air signal with the locally generated emergency broadcast.

DETS inserts emergency audio and text messages in to DAB and DAB+ Ensembles. The system's seamless break-in of announcements and synchronisation of transmission framing ensures that listeners can be made aware of emergency situations with the minimum possible delay.

Highlights

- **Voice announcements and DLS text break-in for DAB and DAB+ networks**
- **Seamless transition between terrestrial and emergency broadcasts**
- **Avoids receiver re-tuning**
- **1 or 2 Ensemble break-in**
- **Selectable live voice or pre-recorded audio files**
- **DLS text replacement**
- **Support for multiple languages**
- **Automatic multiplex reconfiguration**
- **Unattended operation**
- **>100000 hours MTBF**
- **Remote management and monitoring software**
- **Remote monitoring, alarms and break-in message selection via SNMP**
- **Local alarm output**

Overview

In an FM or AM broadcast system, voice break-in is simple to implement; the broadcast transmission is simply replaced with one carrying the announcement.

For multiplexed digital radio, this simple approach will not work, because the receiver has to actively acquire and track the frequency and timing of the broadcast signal.

If the signal is simply replaced without preserving the frequency and timing characteristics of the original, the receiver's tracking is disrupted and it has to then re-acquire the signal.

Receivers vary in their ability to cope with this, but some receivers may take a minute or more to complete the process.

DETS Functional Description

During normal operation, the RF signals from locally received DAB ensembles are amplified and filtered, then passed through the RF switch before being routed to the tunnel via the power amplifier.

Importantly, this provides continuity of transmission to DAB receivers in the tunnel. This is necessary to minimise the possibility of signal loss and, as a result, ensures that receivers do not mute, or switch to FM.

In parallel, the DETS extracts the ensemble's configuration information from the local RF signal and replaces the normal audio services with live or pre-recorded content from the tunnel operator.

To ensure seamless switching between live audio and break-in announcements, the DETS uses an audio sub-channel replacement technique. This avoids transmission delays in programme content that may result from alternative methods, such as re-multiplexing, or multiplex reconfigurations.

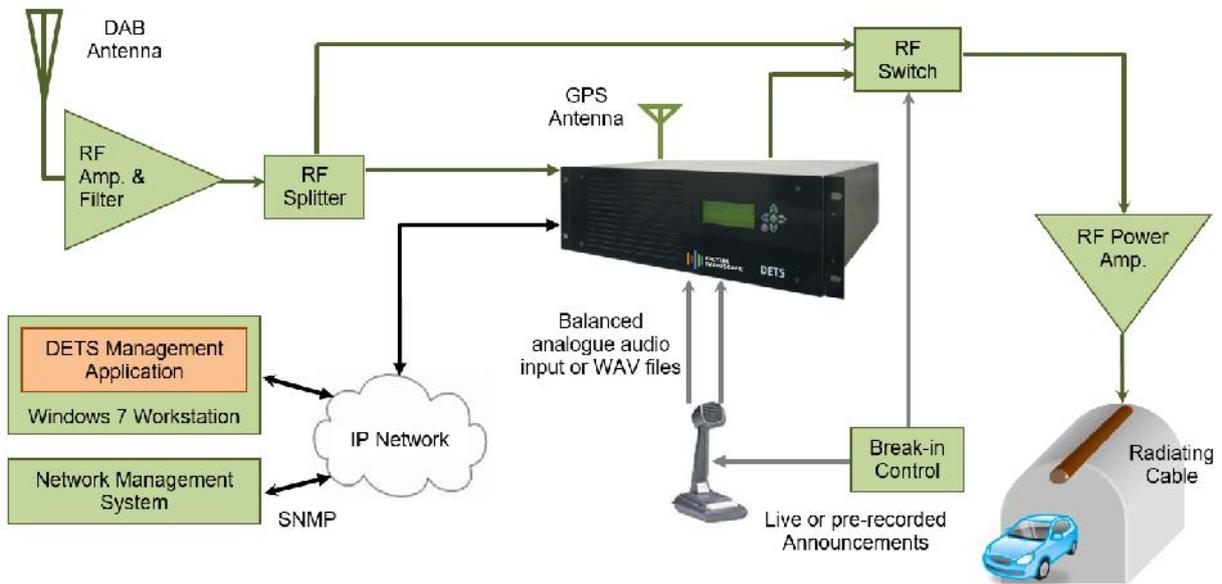
Once the DETS has been configured, the system automatically manages the insertion of the replacement content to match the bit-rates of the original services. This avoids the need for a reconfiguration, with its inherent 6-second delay.

Having configured the DETS, no further operator intervention is needed, as the service replacement is managed automatically. Even if the ensemble is reconfigured by the broadcaster, the DETS manages this reconfiguration automatically.

The only need for operator intervention is when extending the DETS to support an additional break-in language, or to support an additional ensemble.



System Diagram



DETS Management Software



DETS is supplied with remote management software that provides operators with an immediate, overview of the functioning system, as well as detailed views of each step of the signal chain within the DETS.

The software displays real time information about ensemble, sub-channel and DLS text replacement.

Extensive system alarms provide peace of mind about the operating status of the system.

In addition to audio replacement, it is possible to create new DLS text messages.

DETS automatically monitors the on air signal for reconfigurations and adapts accordingly with minimal system reconfiguration time.

Voice break-in is supported for 2 ensembles in a single DETS unit without the need for further RF equipment

Voice break-in messages can be selected and delivered by an SNMP trigger or live audio input.

A Web interface is also available for viewing the status of ensemble, sub-channel and DLS text replacement.

Specifications

RF Input

Connector Type:	SMA female
Input Impedance:	50Ω
Frequency Range:	174MHz – 240MHz (Band-III)
RF Power Level:	minimum -80dBm maximum -10dBm
Maximum number of Ensembles:	2

GPS Input

Connector Type:	SMA female
Input Impedance:	50Ω
Antenna Type:	Standard L1 (1575MHz) active GPS antenna required
Power Output (for Active Antenna):	+5V @ <100mA short-circuit protected

Power Input

Connector Type:	IEC
Input Voltage:	90V – 264V AC
Input Frequency:	47Hz – 63Hz
Power Consumption:	1 ensemble: 65W typical 2 ensembles: 90W typical 96VA (PF ~0.94)

Live Audio Input

Connector Type:	3-pin XLR female
Audio:	Balanced analogue
Input Impedance:	>10kΩ
Maximum input level for full output:	+24dBu
Minimum level for full output:	-16dBu gain adjustable

Audio File Input

Connector Type:	RJ-45
File Upload Protocol:	FTP
Audio File Format:	.wav
Audio File Selection:	Via SNMP

DLS Text Input

Static Text Input:	Via DETS Manager user interface
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RF Output

Connector Type:	SMA female
Input Impedance:	50Ω
Frequency Range:	174MHz – 240MHz (Band-III)
Maximum RF Power Level per Ensemble:	-3dBm
Maximum number of Ensembles:	2
MER:	40dB
Frequency Stability:	<1ppm
Out-of-Band Noise (Shoulder) Suppression:	>50dB
Spurious Output Suppression:	>50dB
Output Return Loss:	>15dB

Monitoring

Remote Control and Alarms:	SNMP V2
Local Alarm:	Relay contact
Status Monitoring:	DETS Manager software, Web interface, SNMP
Event Logs:	Log files and configuration data available for download

Network

Connector Type:	RJ-45
LAN:	1000BASE-T

Chassis

Dimensions:	132mm (h) x 480mm (w) x 403mm (d)
Weight:	Less than 10kg

Environmental

Operating Temperature:	0° - 40°
Humidity:	0% - 90% non-condensing

Specifications subject to change without notice
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