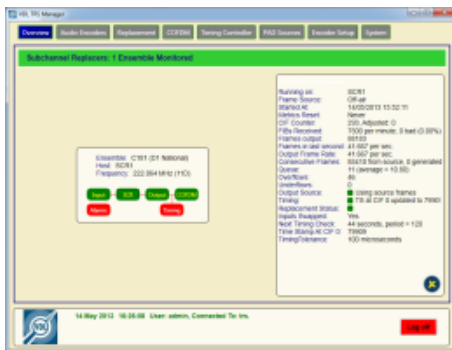


DAB and DAB+ Tunnel Rebroadcasting System with Audio break-in for emergency messages



VDL's Digital Radio Rebroadcast System for Tunnels enables tunnel operators to replace audio programmes with live or pre-recorded announcements, providing information and instructions in the event of an emergency.

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.

Systems can be configured for multiple languages and for separate announcements in each tunnel bore.

The scalable design ensures that additional ensembles, audio channels and languages can be supported when new services are introduced into the transmission area.

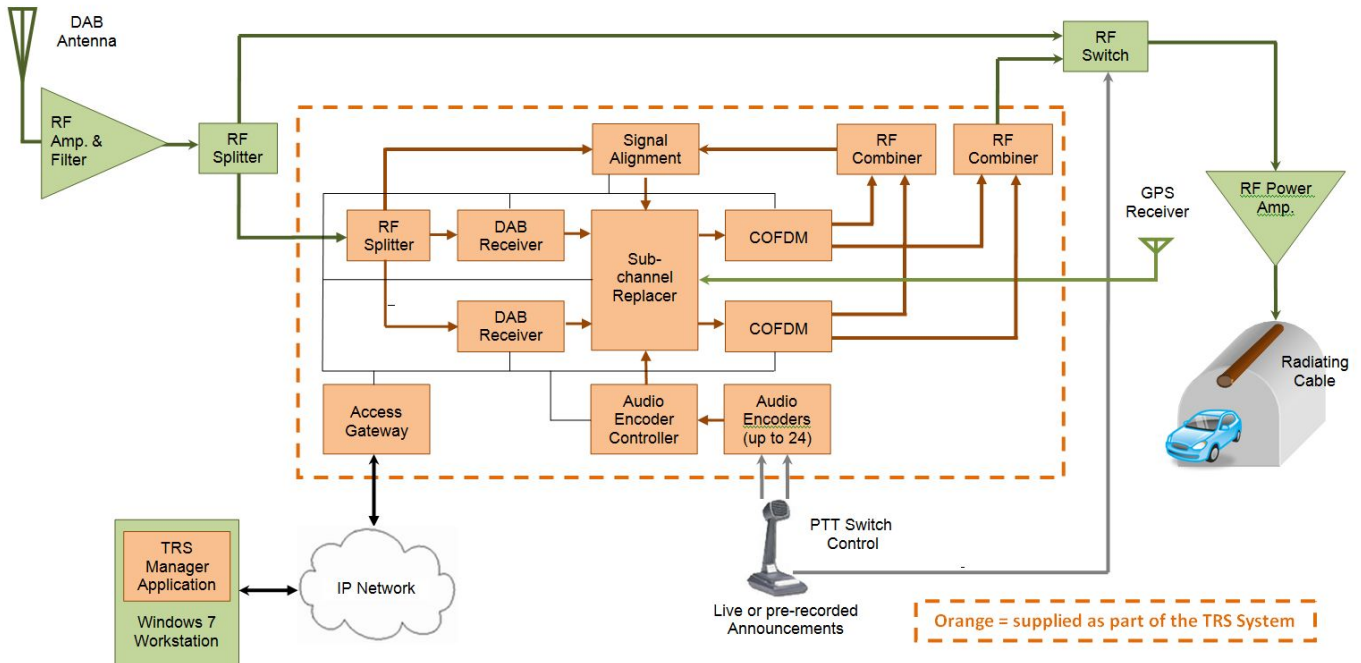
The system is equally suited to new installations, or updating existing AM/FM tunnel announcement systems.

VDL's Digital Radio Rebroadcast System is capable of meeting the requirements to rebroadcast DAB/DAB+ Ensembles and insert emergency messages. 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

- Supports DAB and DAB+
- Seamless transition between terrestrial and emergency broadcasts
- Same bit-rate replacement for audio services - avoids delays caused by receiver reconfigurations
- RF transmission frame synchronisation - avoids delays caused by receiver re-tuning
- One or two Ensembles replication
- Simple setup
- Support for one or two languages
- DAB Band-III (optional L-Band)
- Automatic multiplex reconfiguration
- Unattended operation
- SNMP

Functional Diagram



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

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



Specifications

RF Input

Connector Type	SMA female
Input Impedance	50 Ω
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	50 Ω
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	90W (typical for a 2 Ensemble system) 96VA (PF ~0.94)

Live Audio Input

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

Audio File Input

Connector Type	RJ-45
Protocol	To be confirmed
Audio File Format	.wav

DLS Text Input

Static Text Input	Via TRS Manager user interface
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RF Output

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

Monitoring

Alarm Signalling	SNMP V2
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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 are subject to change without notice

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