

FM Radio Re-Broadcast & Break-In Solution



Why do you need a FM Re-broadcast and Break-in (FM RBBI) System?

The FM radio Re-broadcast and Break-in System (FM RBBI) is a highly effective tool for both entertainment and emergency management in road tunnels, in-building and large underground stations. The system repeats normal FM broadcast with RDS data but in an emergency, can replace the content with real-time voice or prerecorded audio announcements to notify the public of emergency events like fire, accident or the need to evacuate the incident area.

The system is a highly integrated, hardware based repeater and content replacement system for commercial FM broadcast. The operating principle for the break-in is to substitute each re-broadcasted FM channel in the tunnel with real-time voice, RDS data or up to 100 prerecorded emergency advisory messages in different languages.

For robustness and high system availability, the RBBI system can be designed with

- Geographical redundancy, with main and hot back-up systems in different Control Centers
- N+1 redundancy for each language group of FM radio channels
- Duplicated work stations at both Main and Alternate Control Centers for source selection, break-in voice announcements and playback of up to 100 prerecorded messages
- Fail-safe RF switch for source selection with manual by-pass
- Monitoring of off-air RF signals and audio announcements
- Interface to external management system for system monitoring and control

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For long tunnels and large underground complexes where auxiliary RF distribution system such as leaky coaxial cables LCX and indoor antennas are installed to improve RF coverage and overcome blind spots, the RBBI signals can be distributed through outdoor rated (both IP65 and IP66 versions are available) RF to fiber optic converters and amplifiers located at strategic locations to boost and inject the signals, ensuring seamless coverage throughout the service area.



KEY FEATURES

- Channel selective repeater for 87.5 to 108 MHz FM Band
- High selectivity and high dynamic range
- PLL operation
- Voice break-in capability by RDS FM transmitter
- Up to 100 prerecorded audio messages
- Front panel LED for status monitoring
- High availability design, supports geographical and N+1 redundancy
- Fail-safe RF switch for source selection with manual by-pass
- Interface to external management system for monitoring and control
- Outdoor rated (IP65 or 66) FO distribution and amplification for harsh environments

Transporting FM RBBI with Radio Systems for Traffic Management & Public Safety Communications

The KMD FM RBBI system is a complete solution for both entertainment and incident management with emergency break-in announcements via microphone or prerecorded messages. For long tunnels and large underground complexes, it is integrated with outdoor rated (IP 65 or IP66) optical repeaters, which are fan free and natural air cooled, to distribute the RBBI signals to all areas covered by the RF distribution system. The optical system offers a wide bandwidth of 30 MHz to 3 GHz with a range of up to 25 km. Hence, where required, other radio systems such as Tetra, P25 or LTE for traffic management, public safety and security communications can be combined to transport over the optical system, maximizing the use of existing RF infrastructure to provide reliable communications inside the tunnels and underground complexes.

KMD specializes in the design, manufacture, supply, installation, test and commissioning of RBBI system, off-air cell enhancers, boosters and optical repeater systems for the transport and distribution of commercial FM broadcast, bi-directional analogue and digital radio systems in road and rail tunnels, in-building and large underground complexes. Our products are field proven, with installations in a number of tunnels and underground stations in Singapore. We are also the official distributor of BHE Bonn Hungary Electronics and Sinclair products covering a wide range of RF accessories and antennas, critical communication solutions, satcom subsystems, telemetry transceivers and microwave defence solutions. Contact us for your RF communication needs today!

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BRRF 14 & BRRD14

CHANNEL SELECTIVE FM REPEATER & DAB REPEATER MODULES

- **HIGH SELECTIVITY**
- **HIGH DYNAMIC RANGE**
- **3U HIGH MODULES**
- **FIT INTO 19" RACK**

BRRF14 and BRRD14 are the channel units of BHE's FM and DAB solution. They are connected to the respective amplifier unit (BRRF15 / BRRD15) to amplify the selected channel within the band. **Placed in a modern rackmount box, these units can be combined with BHE rackmount TETRA repeaters fulfilling the various communications need of special places like tunnels or underground stations.**

Electrical characteristics:

Specification	BRRF14 FM Broadcast repeater	BRRD14 DAB repeater
Input characteristics		
Frequency (Programmable, Channel selective)	87.5 – 108MHz	174 – 240MHz
Frequency step	50kHz	25kHz
Input power range – Repeater mode	-80... -30dBm	
Input return loss	<-10dB	
Noise figure @ max. gain	4.5dB typ., 6dB max.	8dB typ., 10dB max max.
Selectivity (typically)	-3dB @centre freq +/-100kHz --- -50dB@centre freq +/-300kHz	-3dB @ centre freq. +/-0.77MHz - -45dB @ centre freq. +/-0.97MHz -80dB @ centre freq. +/-1.25MHz
Output characteristics		
Frequency (Same as the received frequency)	87.5 – 108MHz	174 – 240MHz
Max. output power	+16dBm min.@ Repeater mode at max. gain +14dBm min. @ Break in mode	
Max. Gain	98dB typ.	
Programmable attenuation	0 - 94.5dB-	
Gain step	0.5dB	
Output 1dB compression	min. +18dBm	
Output IP3	+28dBm min.	
Harmonics	-60dBc typ., -50dBc max.	
Spurious	-60dBc typ. -55dBc max.	
Output return loss	<-15dB	
Local leakage@max. gain	<-100dBm	<-80dBm
FM deviation at Break-in mode	programmable, +/-75kHz max.	-

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Specification	BRRF14 FM Broadcast repeater	BRRD14 DAB repeater
Other parameters		
Control and monitoring	via LAN, Web server	
Connector	DIN41612 type, 60 pins+4 coax. 2 coaxial connectors built-in	DIN41612 type, 60 pins+4 coax. 3 coaxial connectors built-in
Break in mode	RDS message and/or audio transmitting in the selected FM channel by operator	External DAB RF signal switched to RF output
Inputs	RDS data, Audio, Mute, Break in, +2 digital data in (optional)	Mute, Break in, +2 digital data in (optional)
Digital Outputs	Alarm + 2 data out (optional)	
External Audio level	100-600mVeff	-
Double Colour Status LED on front panel	RED at Alarm, GREEN in normal operation	
Monitoring	Input/Output level, Lock status, Internal DC voltages	
Supply current	500mA typical @ +12V	550mA typical @ +12V
Operating temperature	-20°C ... +60°C	
Dimension	188 x 100 x 19mm (without front cover) 5TE wide module, mountable in 3U high, 19" rack	

Installation	FM broadcast	DAB
BRRF11 3U high, 19" rack	16 pcs BRRF14 FM repeaters	16 pcs BRRD14 DAB repeaters
BRRF12 3U high, 19" rack	4 pcs BRRF15 FM amplifiers	4pcs BRRD15 DAB amplifiers
BRRF13 3U high, 19" rack	8pcs BRRF14 FM repeaters and 2pcs BRRF15 FM amplifiers	8pcs BRRD14 DAB repeaters and 2pcs BRRD15 DAB amplifiers

Note:

BRRF14 and BRRD14 modules can be combined without restriction in the racks