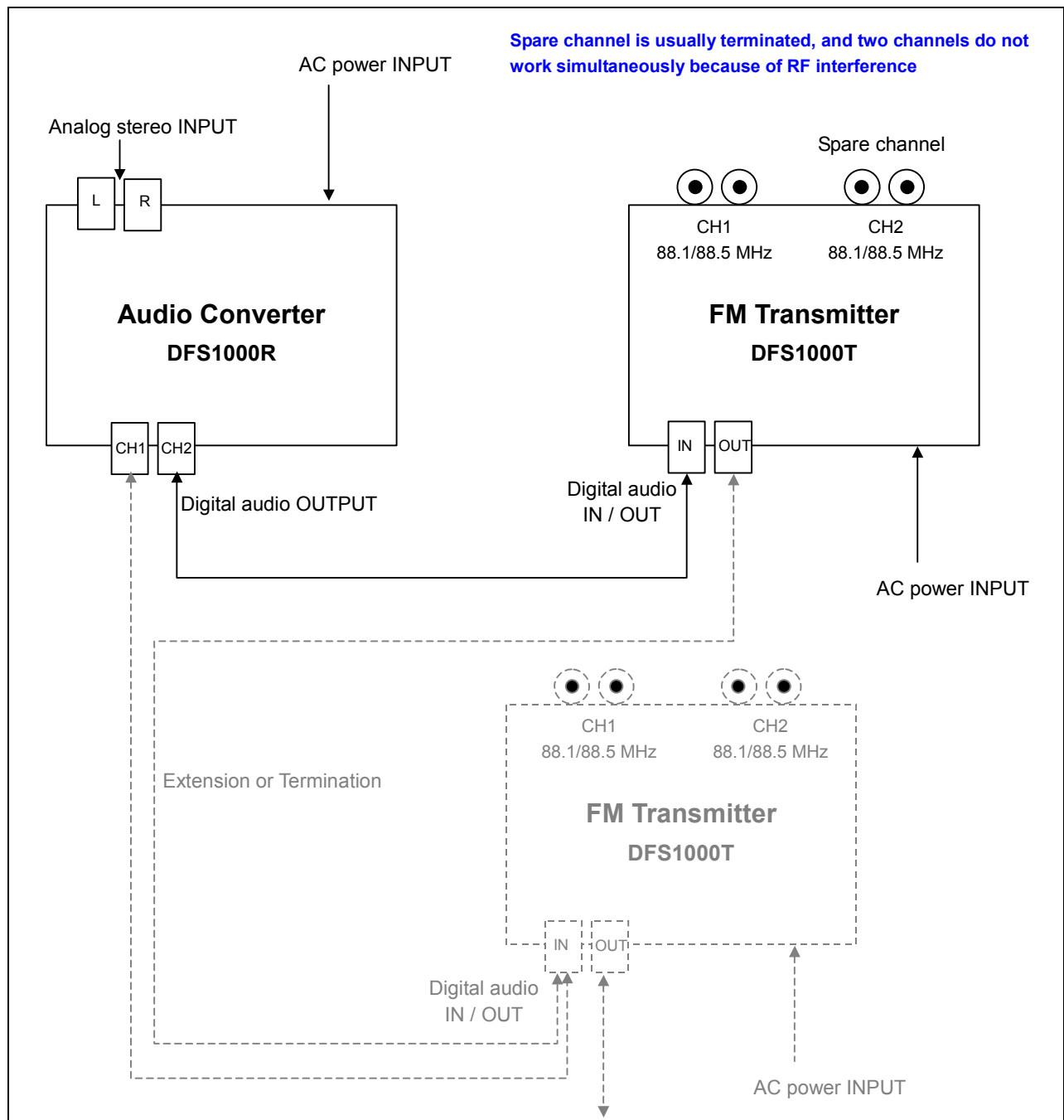


# FMextender<sup>™</sup>

## DIGITAL AUDIO FM TRANSMITTER ADAPTER

### Operational description

The FMextender<sup>™</sup> consists of two parts; Audio converter (DFS1000R) and FM transmitter (DFS1000T). The interface extends the base technology of SPDIF audio and FM radio to provide a specification more useful for audio applications.



The DFS1000R is a complete analog-to-digital converter for digital audio systems. It performs sampling, analog to digital conversion, and anti-alias filtering, generating 24-bit values for both left and right inputs in serial form at sample rates up to 200 kHz per channel. The DFS1000R uses a 5th-order, multi-bit Delta-Sigma modulator followed by digital filtering and decimation, which removes the need for an external anti-alias filter.

The DFS1000T is converter for FM broadcasting. It receives and decodes one of 1 stereo pairs of digital audio data according to the IEC60958, S/PDIF, EIAJ CP1201, or AES3 interface standards. The DFS1000T has serial digital audio input port and comprehensive control ability through a selectable control port in hardware mode. A low-jitter clock recovery mechanism yields a very clean recovered clock from the incoming AES3 stream. Stand-alone operation allows systems with no microcontroller to operate the DFS1000T with dedicated output port for FM broadcasting.

The DFS1000T incorporates four FM transmitter modules and supplies 5 V<sub>DC</sub> to the modules that consists of a stereo modulator for generating stereo composite signals and a FM transmitter for broadcasting a FM signal on the air. The stereo modulator generates a composite signal, which consists of the MAIN, SUB, and pilot signal from a 38kHz oscillator.

Regarding antenna requirements for the intentional radiators, the FM transmitter uses the BNC standard antenna connector. However the system shall be professionally installed and this fact is placed in the instruction manual.

Professional installation justification:

The system cannot simply be purchased and installed by the average (technically inclined) person.

The confirmation from dealers shall be made to supervise all the process of the system installation.

#### Marketing and Application

The system cannot be sold retail to the general public or by mail order. It is sold to dealers and professionally installed in trains for broadcasting advertisements in the FM frequency bands, 88.1 and 88.5 MHz.

#### Installation

Installation of the FM transmitter antenna shall be done by the authorized personal that are trained and qualified.

- Installation must be controlled.
- Installed by licensed professionals (the system sold to dealer who hire installers)
- Installation requires special training (special programming, access to keypad, field strength measurements made)
- The FM transmitter and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter

#### System configuration for professional installation

The system is installed in trains, and transmitter antenna that has approximately 10 m long shall be installed by a professional installer.