

JBL Radial Operational Description

The JBL Radial is a high performance loudspeaker system that docks Apple iPods. The JBL Radial system amplifies audio signals from an iPod or external line level analog source. The Radial system is one main device with iPod dock, a 6 button remote control (described separately), and a power supply.

The power supply is a "lump in line" type and is of the switching type. It provides 24VDC at steady state currents up to 2.3A.

On the back of Radial are the DC input jack, an analog auxiliary audio input jack, USB jack, and S-Video jack. The USB and S-Video jacks simply pass their respective signals from a docked iPod to the jacks. When an iPod is docked, Radial will also charge the iPod.

There are two volume buttons on the front of the unit that increase and decrease the volume. Pushing both at the same time will mute the unit.

The JBL Radial system has two identical stereo analog signal paths at the input of the system. The paths are mixed in the analog realm, and then converted to digital signals. The converter generates all the audio system clocks from a 12Mhz crystal and sends them to the DSP along with serial data containing the digital audio signal. This is I2S format. The DSP is a 3 channel DSP/digital amp integrated part. The output is a high voltage/current digital signal at 384khz, which gets filtered down with passive components and sent to the transducers that produce Sound. There are a total of 5 transducers in the device.

A micro controller controls the housekeeping operations of the system (button presses, communication, initialization, LED drive, etc). It micro controller runs on its own internal oscillator.

The ground system is a system of planes on the different layers of the 4 layer PCB. Effort has been spent to divide the digital signal, RF, analog signal, and power signal grounds from each other. These should represent different planes and be connected together at a singular point near the power entry header of the system.

The JBL Radial receiver circuit has a PCB antenna that is designed to pick up the 2.4Ghz signal coming from the transmitting remote control. It is approx 2 inches in length, and has a bend in it. The JBL Radial unit transmits a "command acknowledgement" signal back to the remote. The receiver chip runs off a 16Mhz crystal.