

## Operational Description

*Equipment Tested (Company, Model)*

**Digital Innovations**

*FCC ID:*

**PL7-11774**

The Neuros Digital Audio computer is a next generation MP3 player. It plays standard MP3 files that are transferred from a computer using the Neuros Synchronization Manager software via a USB 1.1 interface. The unit has a digitally enhanced FM radio and the unit can record to MP3 format from an internal microphone, from FM radio, or from a line-in jack. The unit also has an FM transmitter that can broadcast MP3 audio files over a limited FM band of 90.1 – 104.9 MHz.

The unit is an intentional radiator over a limited FM band of 90.1 – 104.9MHz at 200 kHz intervals. The unit uses FM modulation. The FM modulator will be prevented from working when the headphones or line input cable is inserted. The FM modulator will also be prevented from operating during USB communications. The FM modulator works when DC power is applied or when it is running standalone in battery mode.

The standard Neuros is made up of three boards, which are enclosed in two separate housings. The Main player housing contains the main PCB board and the keyboard PCB. These PCBs contain the CPU, the FM tuner, the FM transmitter, and storage memory. The standard backpack housing contains the power regulators and the batteries

The main player has a TI TMS320DA150 DSP as the core-processing unit of Neuros. This is intricately linked to a CPLD that contains proprietary code to assist the DSP in processing. The DSP has program flash, SRAM, and an EEPROM to store permanent information. The unit also has 128Mb of NAND Flash for audio storage and a 128x128 bit grayscale LCD Display. The clocks for all circuitry are generated off a 12MHz oscillator that primarily runs to both the CPLD and the DSP and then distributed on from there. The audio codec enables much of the functionality of our player. For MP3 files, the music is decoded in the DSP and then is formatted by the codec for output onto the headphones. The codec is also connected to line-in and the internal microphone for audio recording. The FM radio audio signal is also routed to the codec for transmission over the headphones or for audio recording. The FM receiver with digital tuner is on the separate keyboard PCB inside the main player housing.

When there is nothing plugged into the USB, headphone, or line-in jacks, the audio codec then routes the audio out to the RF transmission circuitry. Using the frequency tuned by the FM receiver, the RF Block transmits the signal over the user-selected frequency from 90.1 - 104.9 MHz. This signal is then routed to an internal antenna in the housing. This antenna is a rectangular piece of tin-plated copper tape mounted on Poron double-sided foam tape. The dimensions are 38.20 mm by 11.43 mm and it is attached to a mounting hole on the main PCB by a 28 AWG wire. There is also a USB peripheral controller that handles the interface between the PC and the Neuros using USB 1.1.

The standard backpack housing contains two rechargeable NiMH batteries to power the Neuros. The power regulators to provide the main power rails to the main player are also in the backpack, as well as the real time clock to provide accurate date and time function to the unit. The backpack also has a DC power jack that provides power to the battery charger circuitry that charges the batteries.