Base Unit Description of Operation:

A circuit-board based Inverted F Antenna (IIFA) receives a modulated signal which is passed through an impedance matching network to a Texas Instruments CC8520 RF Transceiver IC.

The Texas Instruments CC8520 RF Transceiver contains an oscillator circuit that stimulates an external 48.000 MHz crystal. An internal clock multiplier circuit then generates the necessary internal clocks for the 2.4xx GHz fundamental tone, modulator circuits, demodulator circuits, and a 12MHz output clock for the external ADC.

A receiver circuit internal to the CC8520 monitors the signal received from the IIFA antenna. The CC8520 then demodulates, decodes, and takes appropriate actions as required. A Digital Audio Data stream is internally buffered, and eventually output to an external Digital to Analog Converter (DAC), synchronized to a 12MHz output clock.

Periodically, at an appropriate timeslot, the CC8520's transmitter output powers up, and transmits a signal. This signal is used as part of a Texas Instruments' proprietary protocol which contains information on channel quality and other useful control information. The control information is framed into a TDM frame, which is then used to perform shaped 8FSK modulation of a fundamental tone in one of 18 channels (4MHz frequency bands with centers ranging from 2.406 GHz for 2.474 GHz). The modulated signal is then amplified to an appropriate power level. The CC8520 contains circuitry for monitoring and controlling the output power. The output of the transceiver is a fully modulated carrier signal at a level of 3.5dBm.

The modulated output of the RF transceiver is passed to the Inverted F Antenna (IIFA), and radiated from the unit.

Once the Digital Audio Data Stream reaches the DAC, it is converted into an analog representation of the original audio signal. The reconstructed audio signal is then passed through a software-controlled switch to a 1/4" output jack, and coupled to an analog gain, filter, and comparator circuit. The output of the gain, filter, and comparator network is then fed to a digital input on a microcontroller. The resulting signal is analyzed by software running in the microcontroller. The frequency of the signal is determined, compared to standard musical pitches, and any delta used to generate a LCD display useful for tuning a musical instrument.

The microcontroller also monitors a footswitch, two human interface buttons, and power supply levels, taking appropriate system actions when required.