
Your Personal Phone Security

A Telecom Computer Security Bulletin File

To secure speech transmissions against eavesdroppers, you could scramble the speech information by rearranging its frequency spectrum. This Technique has particular application for radio-link transmissions for example, in land mobile radios, cellular radios, or cordless phones-in which it's relatively easy for third parties to tune in to the transmission frequency.

To My knowledge, the FX204 variable-split-band Frequency-inverter IC performs scrambling or descrambling of speech on one chip. The IC splits voiceband information into High and Low Frequency Bands and then inverts each band around its center frequency. The FX204's switched capacitor filters split the frequency spectrum, and its balanced modulators perform the frequency inversion of each band. All Clocking information for the filters and modulators comes from a single external 1-MHz crystal that you can connect directly across two of the IC's pins.

Five CMOS-Compatible latched programming inputs allow you to program the device's internal clock dividers to produce one of 32 different voiceband-frequency split points between 350Hz and 2800Hz. You can hard-wire these inputs to produce a fixed-code scrambler, or you can Dynamically change them during the transmission to produce a rolling-code scrambler.

The IC's Transmit/Receive control input optimizes the internal operation of the FX204 for scrambling or descrambling. To recombine the upper and lower frequency bands and provide a low-impedance audio output, the IC has on-chip summing amplifier with external gain defining resistors.

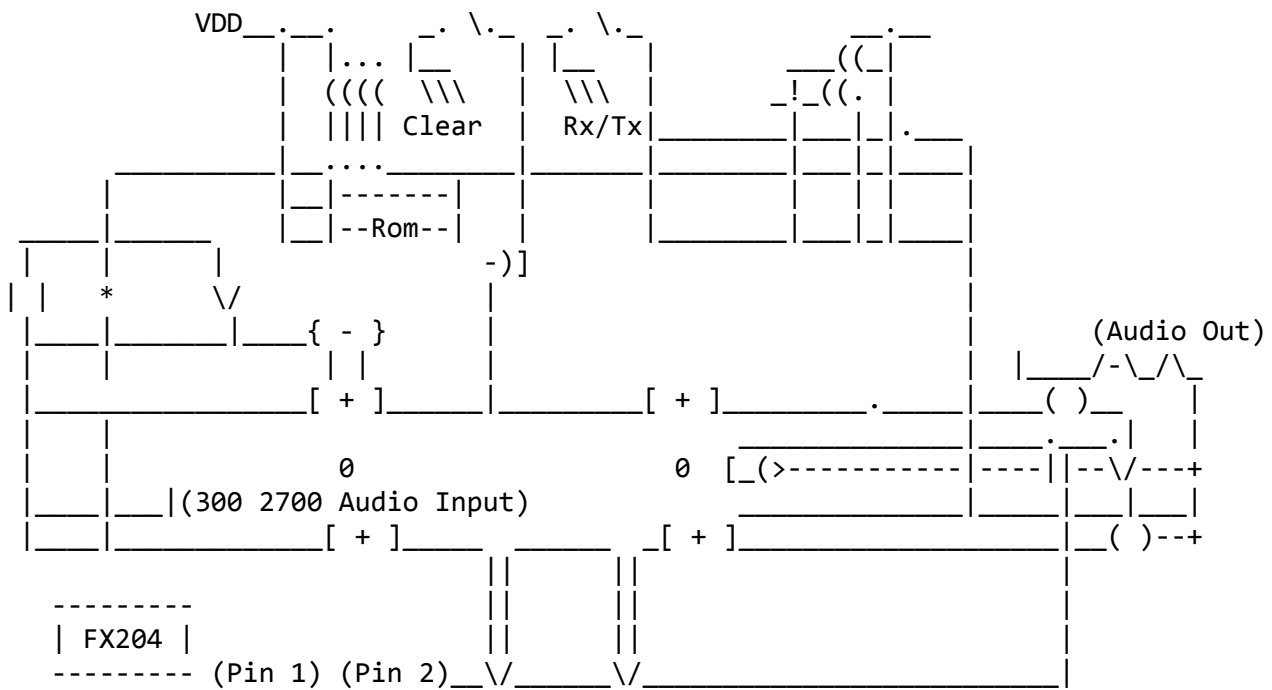
The FX204 requires a transmission-channel bandwidth of 300 to 3400 Hz; However it reduces the Upper bandwidth limit of the transmitted speech frequency to 2700 Hz. The Redirection in effective speech-frequency bandwidth occurs because the fx204 separates the high and low frequency band by 700Hz in order to reduce spurious outputs.

You can operate the device over narrower transmission-channel bandwidths for example, the 3-kHz bandwidth used for mobile radio by reducing your external crystal oscillator's clock frequency. The Audio Input is capable of handling a maximum input signal of at least 340 mV rms; the Dynamic range is 25 dB typ.

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Fabricated in CMOS technology, the FX204 operates from a single 5v supply. It draws 3 mA typ (10 mA max) of supply current so it's suitable for use in battery-powered equipment. Supplied in a 24-pin ceramic DIP or Surface-Mount Flat pack...

Schematics



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