Playing chiptunes through a city-wide sensor network

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This is VESNA

(substitute your favorite wireless sensor here)
Let's use sensors for broadcasting audio

Each node should act as an FM transmitter (because science!)
# Quick sanity check

<table>
<thead>
<tr>
<th></th>
<th>packet based</th>
<th>SRD band (868 MHz)</th>
<th>digital FSK</th>
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<tbody>
<tr>
<td>(CC1101)</td>
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<td>bcast. band (&lt;864 MHz)</td>
<td>analog FM</td>
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<td>Legacy transmit mode allows infinite packet length</td>
<td>works reasonably well down to 780 MHz (covers channels used by studio microphones)</td>
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Quick sanity check (CC1101)
Frequency Shift Keying
as received by an analog FM receiver

FSK bit in

spectrum

analog FM receiver out
Exploit high bit rate to gain effective bits with oversampling

(delta-sigma modulation)
Add a wavetable synthesizer
(valid scientific reasons end somewhere around here)
ARM Cortex M3
(72 MHz, 96 kB RAM) can currently do

2 simultaneous MIDI tracks
3 channels per track
25 kHz audio rate
16x delta-sigma oversampling
4 effective bits

Limits

- interrupt load because bit-banging baseband bus
- running out of RAM for audio synthesis buffer
- missing 32 kHz pilot tone for some studio microphone receivers
Plan

1. Reprogram nodes in a sensor network.
2. Studio receivers in the area start playing a chiptune.
3. ???
4. ???(possibly a hefty fine if you didn't talk this through with the right people first)