

Tobias Schultze (518773)
Markus Konrad (517910)

Project Report: “Loopuino”

Description

“Loopuino” is loop-station with a wired controller for recording audio-signals (e.g. from a guitar or microphone), a wireless (radio-frequency based) controller for modifying these signals and a software that handles the messages received from the controllers to record the audio-signals, play them back as layered loops and modify them.

A loop-station itself is a device or application that allows the user to record a sound (e.g. a chord progression on a guitar), play it back in an infinite loop and then record further sounds (e.g. a guitar solo) on top of it, that are played along with the loop.

With this project we wanted to show how easy one can create interactive audio controllers with simple hard- and software by using available programmable micro-controllers and software libraries.

Basic design

The controllers

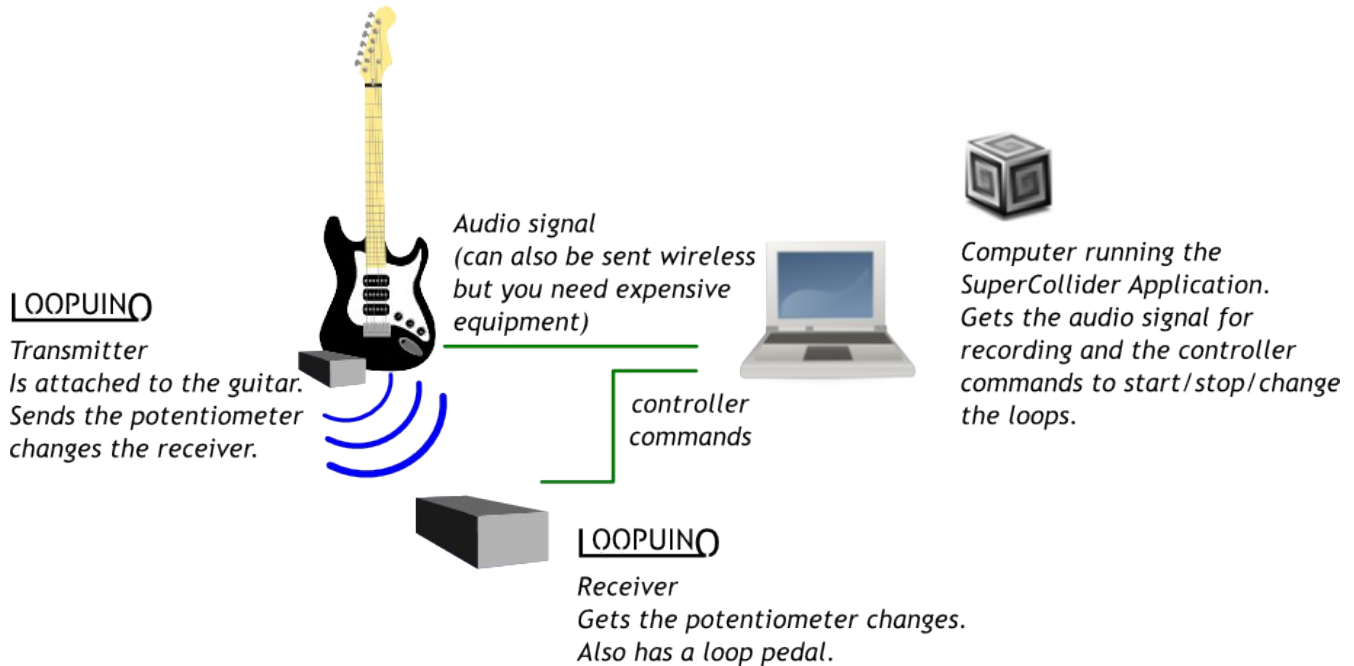
The controller-software is implemented on two Arduino boards: One has a potentiometer and a transmitter. It is powered by a 9V-battery. The potentiometer values are sent to the second Arduino board via radio frequency when they change. This Arduino has a receiver and the “loop pedal” which is a simple button. It is connected to a computer via USB. It can receive the potentiometer values from the first Arduino and then send it via USB to the host application. It also reports to the host application when we step on the loop pedal. The Receiver-Arduino also has a row of LEDs. They shall indicate the current bar that is played. To achieve this, it listens for commands from the host application that says “turn on LED x” via USB serial port.

The host application

The host application is a program written in SuperCollider. It shall respond to messages received from the Receiver-Arduino on the serial port and execute the appropriate functions. These functions basically manage the playback and the recording of the loops as well as reacting to changes of the potentiometer and applying them to the recorded loops (e.g. increasing the playback speed). Additionally it periodically sends commands to the Receiver-Arduino to turn on the LEDs according to the currently played bar.

The application also provides a simple GUI with which you can also control the recording and playback without having the Arduino connected to the computer. When Arduino is connected it reflects the changes made with the Arduino-controllers directly on the GUI.

Overall interface schema



Hardware layout

Components used

Receiver:

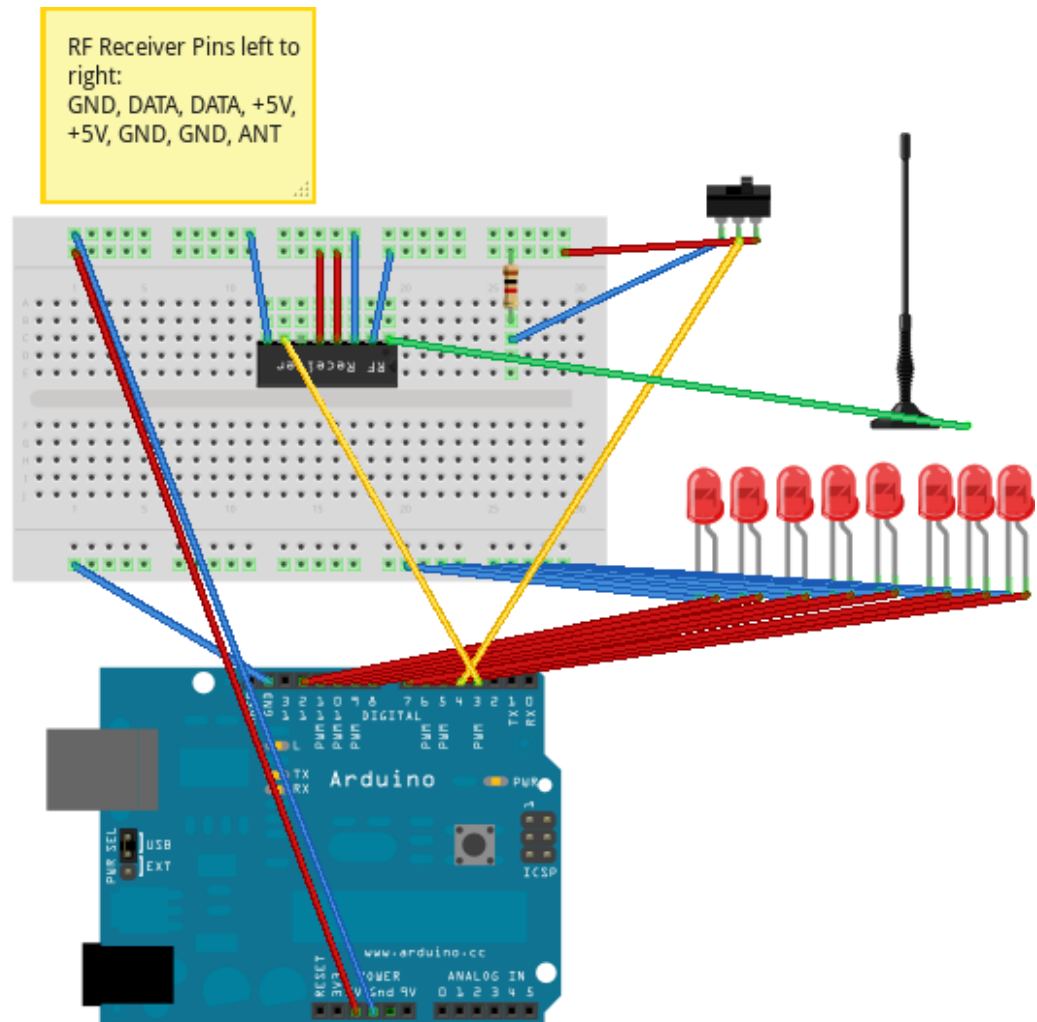
- 1 Arduino ATMEGA 328 boards
- 1 USB cable
- 1 button as loop pedal
- 8 LEDs
- 1 resistor 1 kOhm
- 1 RF-Receiver (RF Link 2400bps)
- 1 resistor 420 Ohm

Transmitter:

- 1 Arduino ATMEGA 328 boards
- 1 potentiometer
- 1 resistor 1 kOhm
- 1 RF-Transmitter (RF Link 2400bps)
- 1 9V battery

Hardware schema

Receiver:



Transmitter:

