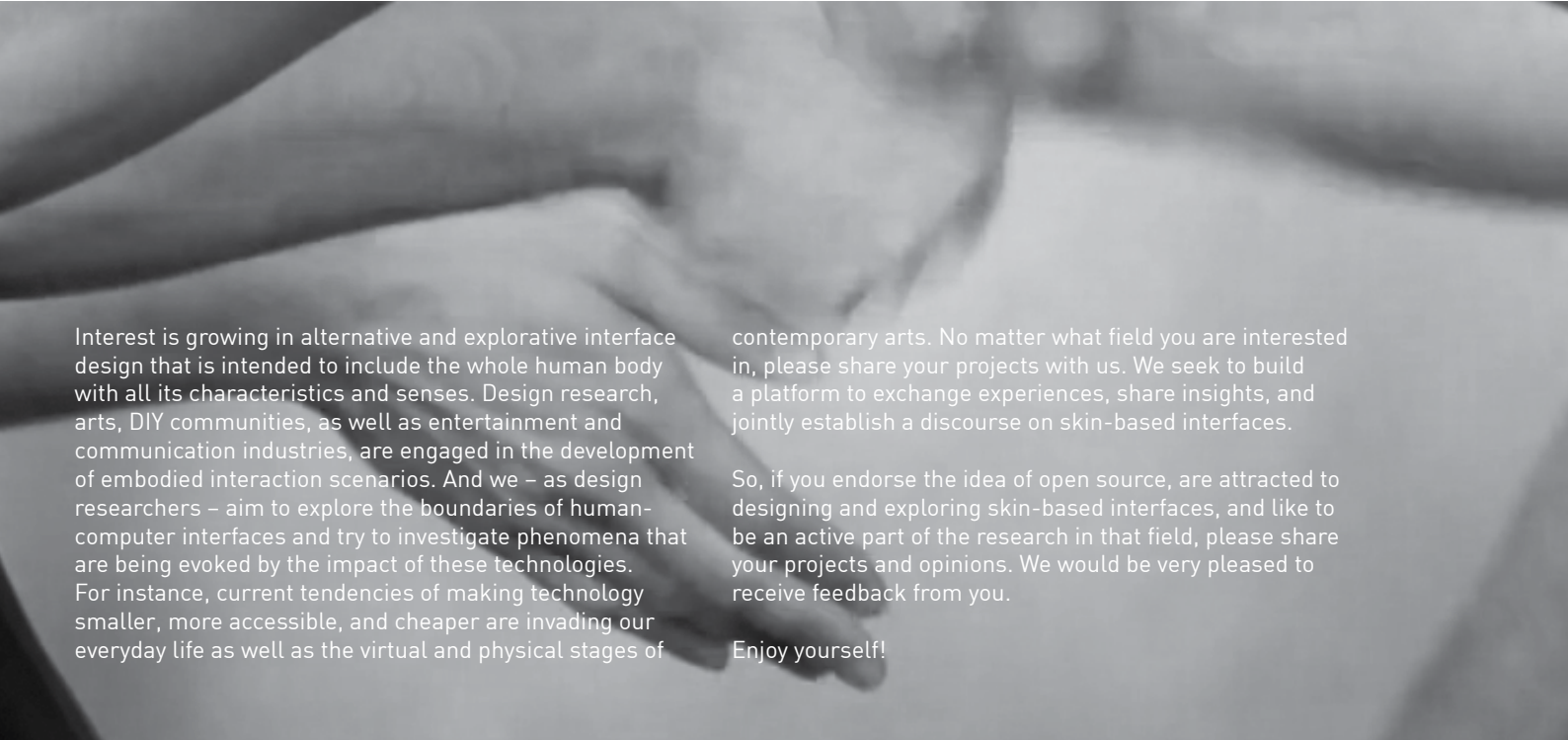# Skintimacy v1.0

instruction manual

Hi,

thank you for acquiring the Skintimacy kit!

Interest is growing in alternative and explorative interface design that is intended to include the whole human body with all its characteristics and senses. Design research, arts, DIY communities, as well as entertainment and communication industries, are engaged in the development of embodied interaction scenarios. And we – as design researchers – aim to explore the boundaries of human-computer interfaces and try to investigate phenomena that are being evoked by the impact of these technologies. For instance, current tendencies of making technology smaller, more accessible, and cheaper are invading our everyday life as well as the virtual and physical stages of contemporary arts. No matter what field you are interested in, please share your projects with us. We seek to build a platform to exchange experiences, share insights, and jointly establish a discourse on skin-based interfaces.

So, if you endorse the idea of open source, are attracted to designing and exploring skin-based interfaces, and like to be an active part of the research in that field, please share your projects and opinions. We would be very pleased to receive feedback from you.

Enjoy yourself!

On Skintimacy

Skintimacy is an interface that allows for the manipulation of electronic-based processes through touch. Depending on whom you touch, the way your bodies make contact influences the control of both analog instruments and digital setups. We developed Skintimacy by implementing an Arduino microcontroller to transfer data to software platforms in order to provide diverse opportunities for a playful control of audio and video. This kit is intended to facilitate the symbiotic relationship between physical computing and the sense of touch. The straightforward design of the device allows for experimentation in many different contexts. Taking into account the dynamic nature of skin conductivity, which varies individually, one has the possibility to create highly responsive installations.

Setup

With Skintimacy, performers can act as a component of a specific electrical circuit. In doing so, each affiliated person assumes a role in the joint play. Through skin contact with a "master", the player's corresponding circuit is closed.
Any person or conductive object can join the performance by touching other players and thus act as a conductive bridge. The gesture of one player touching another influences the outcome by varying the intensity of contact, duration of contact, and movement speed.
Due to the current state of Skintimacy, one player has the central role of "master". Other performers have to make contact with the "master" player in order to generate a signal. The outcome of a performance is not solely dependent on the different gestures but also on individual skin properties.

GETTING STARTED

On the following pages you will find step-by-step
instructions for building the Skintimacy hardware.
With a setup example, we show you how to connect the
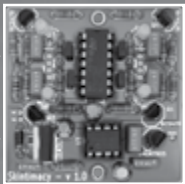Arduino board and the players.
Make sure that the setup you are building is not connected
to a high voltage source! Please, see the safety instructions.

On our website you will find examples and the software you
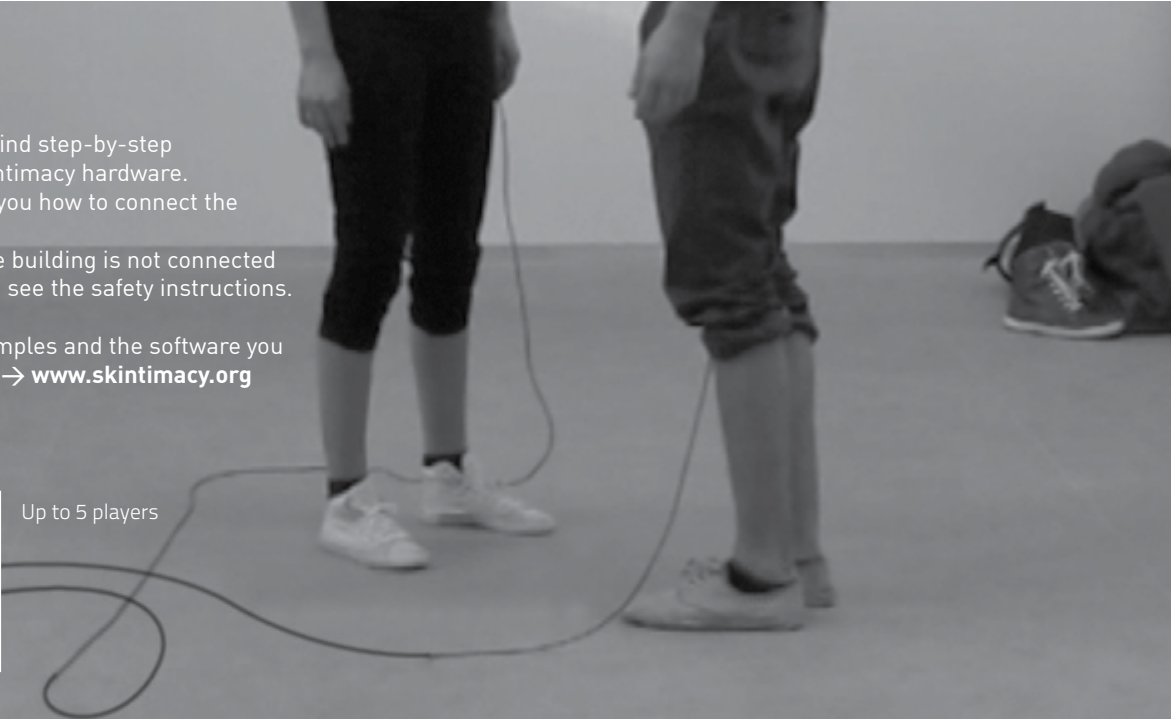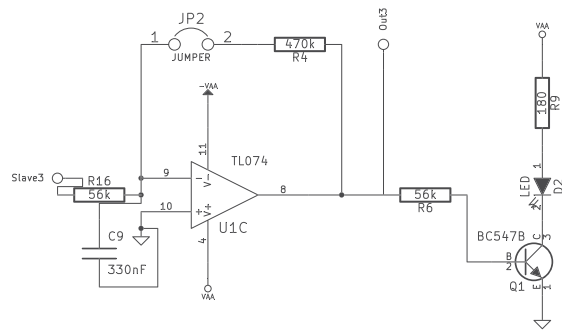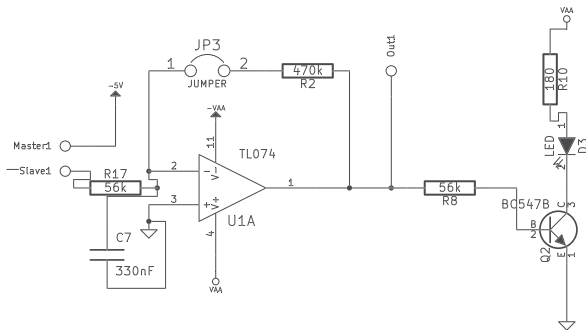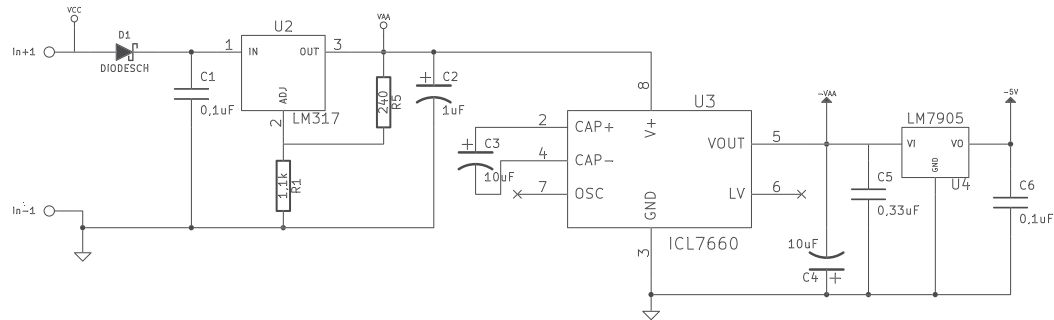need to get Skintimacy running. → **www.skintimacy.org**
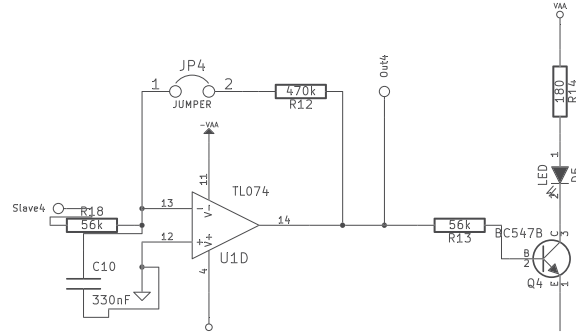
Computer

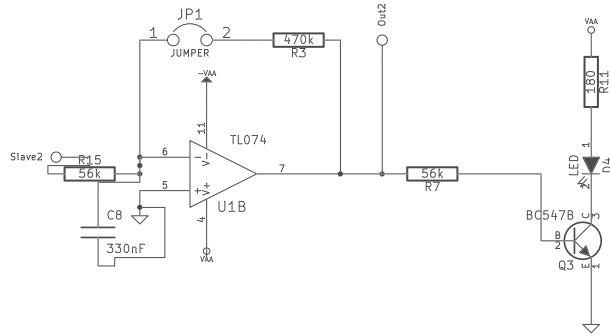Arduino

9V Battery

Up to 5 players

Circuit diagram

Reference designs are provided "as are", with all their faults. We do not acknowledge any warranties, express or implied, regarding products, including, but not limited to, any implied warranties of merchantability or fitness for a particular purpose. We may make changes to specifications and product descriptions at any time, without notice.

List of parts

STEP	PART	QUANTITY	POSITION
1	small pin	4×2	JP 1,2,3,4
	jumper / 32-pin header, straight	4	JP 1,2,3,4
2	mount for TL074	1	U 1
	mount for ICL7660	1	U 3
	quad low-noise JFET op-amp (TL074)	1	U 1
	switched-capacitor voltage converter (ICL7660)	1	U 3
3	film capacitor, 1nF (MKS2-100N)	2	C 1,6
	film capacitor, 330nF (MKS-2-5 330N)	5	C 5,7,8,9,10
4	metal-oxide resistor, 1.1 kOhm	1	R 1
	metal-oxide resistor, 56 kOhm	8	R 6,7,8,13,15,16,17,18
	metal-oxide resistor, 180 Ohm	4	R 9,10,11,14
	metal-oxide resistor, 240 Ohm	1	R 5
	metal-oxide resistor, 470 kOhm	4	R 2,3,4,12

| **5** | transistor, 45V / 100mA | 4 | Q 1,2,3,4 |
	neg. voltage regulator, range: -4.6V←→-5.4V; 0.1A; (TO-92)	1	U 4
	pos. voltage regulator, range: 1.2V←→37V; 1.5A; (TO-220)	1	U 2
6	electrolytic capacitor, 1uF/100V (RAD 105 1/100)	1	C 2
	electrolytic capacitor, 10uF/63V (RAD 105 10/63)	2	C 3,4
	schottky diode, 40V/1A (1N 5819)	1	D 1
7	LED green, max. current: 20mA	4	D 2,3,4,5

DISCLAIMER AND SAFETY INSTRUCTIONS

Do not use AC power for any setups and projects that have a conductive connection with your body. Please integrate a galvanic isolation for your setup (e.g. by the use of a USB interface isolator or a USB Bridge). We are not liable for injury that may result from the use, proper or improper, of the information contained in this instruction manual.

We do not guarantee that the information contained herein is complete, safe, or accurate, nor should it be considered a substitute for your good judgment and common sense. Disconnect or isolate your setup from the power outlet before you get started. However, after dozens of trials and performances with Skintimacy, we are in the best of health.

You start with the circuit board positioned as in the picture below. The „Skintimacy - v1.0" lettering should be in your lower left corner.

. . . .

0 part group **position** quantity name/prop.
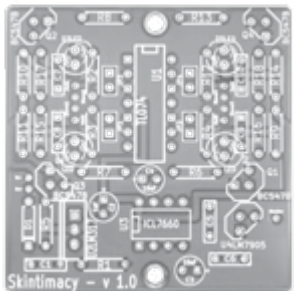
You need four pin pairs. Connect each jumper to the longer side of a pin pair. Carefully use Scotch tape to keep the joined parts in its position and solder.

. . . .
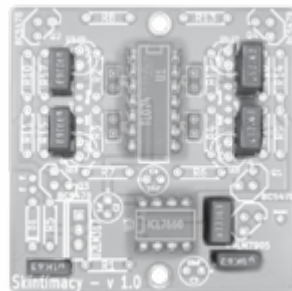
1 small pins **JP1-4** 4x2 pcs

jumpers **JP1-4** 4 pcs
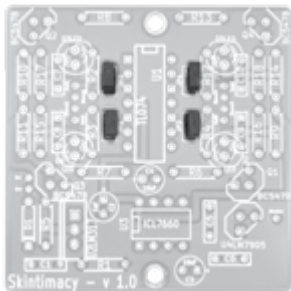
First, solder the mounts, then add the chips (U1 and U3) to the mounts. **Important: Mind the dents on the chips for orientation!**

. . . .

2
U1	long mount
U3	short mount
U1	TL074
U3	ICL7660

dent
↓

dent →
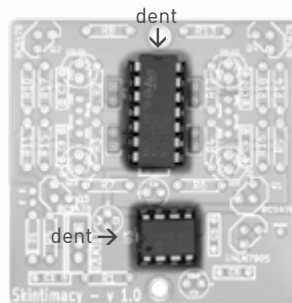
Solder the film capacitors. The two 1uF ones have the lowest position (C1 and C6).

. . . .

3 film capacitors 7 pcs

C1,C6 1uF

C5,C7-10 33uF

There are five different types of resistors. Don't worry about the orientation. It makes sense, though, to have parts of the same group facing the same direction.

4

| R1	1.1 kΩ
R2-4,12	470 kΩ
R5	240 Ω
R6-8,13,15-18	56 kΩ
R9-11,14	180 Ω
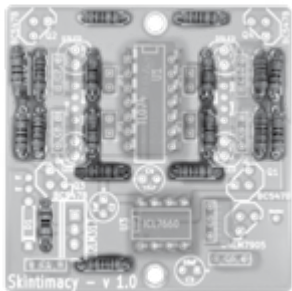
Make sure the four transistors' flat sides face the device's middle.**Don't mix up the U4 regulator with a similar looking transistor!**

5

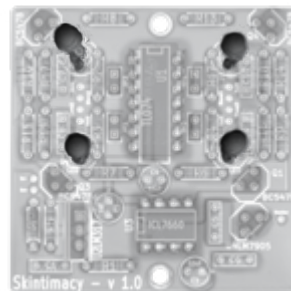| transistors	4 pcs
Q1-4	BC 547B
regulators	2 pcs
U2	LM317
U4	LM7905
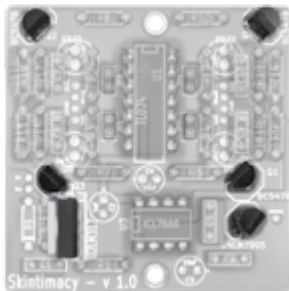
The long leg of each of the three capacitors must go into the hole marked with "+" next to it. The diode's long leg goes into the square framed hole.

6

electrolytic cap.	3 pcs
C2	1uF
C3,C4	10uF
schottky diode	1 pcs
D1	40V/1A
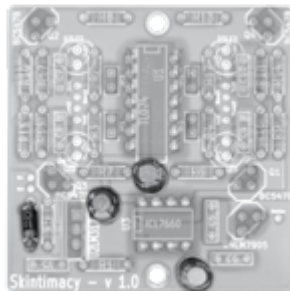
The short leg of each LED should be on the flat side of the circular mark.

7

LEDs	4 pcs
D2-5	green

Wiring

Arduino A0 — Out1
Player 2 — Slave1
Player 3 — Slave2
Arduino A1 — Out2

Arduino A2 — Out3
Player 4 — Slave3
Player 5 — Slave4
Arduino A3 — Out4

Arduino GND and 9V Battery - — In-
9V Battery + — In+

Master — Player 1
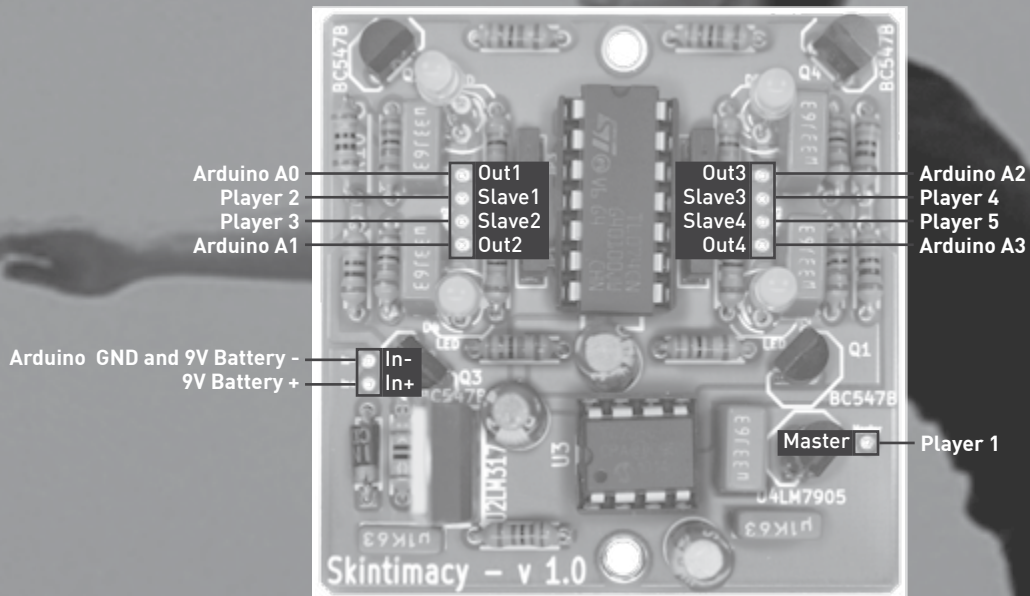
Skintimacy – v 1.0

www.skintimacy.org

On our website, you will find more information on the project, software patches for Max and Processing as an introduction, and a selection of experiments and projects. You are invited to present and share your projects and (re)designs using Skintimacy. We are seeking to build a community with an interest in dealing with the subject of touch-based interfaces and alternative interaction scenarios.

LICENSE

Please feel free to redesign and remix Skintimacy in a safe, health-conscious and peaceful manner. All content of this instruction manual including the circuit diagram are licensed under a Creative Commons Attribution-NonCommercial 3.0 Unported License.

Skintimacy is a research project carried out by the Design Research Lab, in particular by interaction designer and design researcher Alexander Müller-Rakow, with the assistance of Michael Pogorzhelskiy.

Many thanks for their contribution and inspiration to Jochen Fuchs, Konrad Röpke, Lisa Weiss and Matthew Rios.

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Design
Research
Lab

Universität der Künste Berlin

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