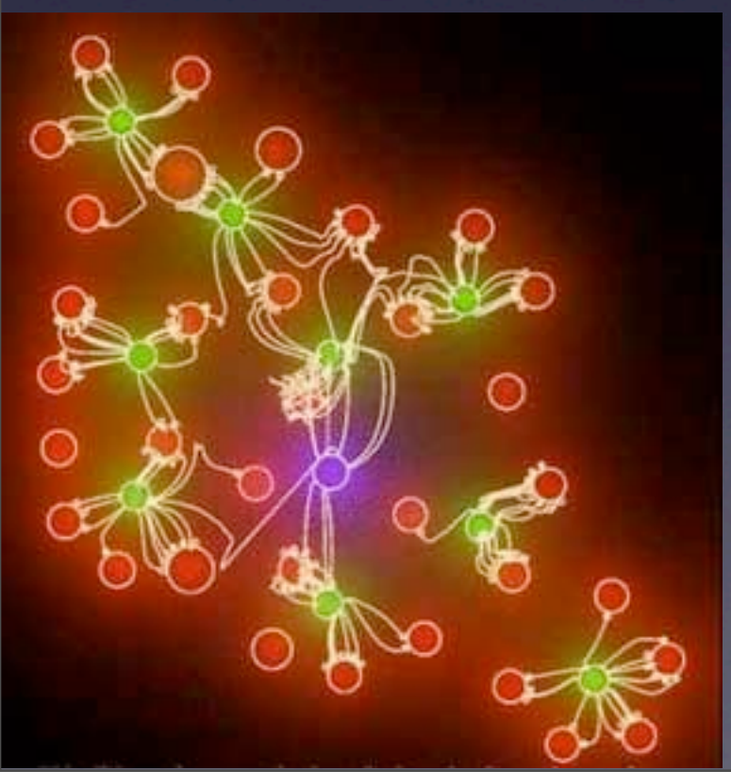
LumiNet: Prototyping Organic Physical Networks

The Workshop



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Media Computing Group
RWTH Aachen University, Germany

Sketching in Hardware
London, July 19, 2009

www.luminet.cc

Get the following:

- 9 LumiNet nodes in 3x3 grid with cables
- 1 vector node (marked) with cable
- 1 battery
- 1 Arduino board (for serial link)
- Arduino LumiNet Edition software
  - from USB stick, DVD, or luminet.cc

North

LED jumper

VCC 0 1 GND

VCC

/Reset

GND

VCC

West

7

6

GND

VCC

2

3

GND

East

TOP

8 SCK

9

MISO 10

MOSI

VCC 5 4 GND

South

North

LED jumper

VCC 0 1 GND

VCC

/Reset

GND

VCC

West

7

6

GND

VCC

2

3

GND

East

TOP

8 SCK

9

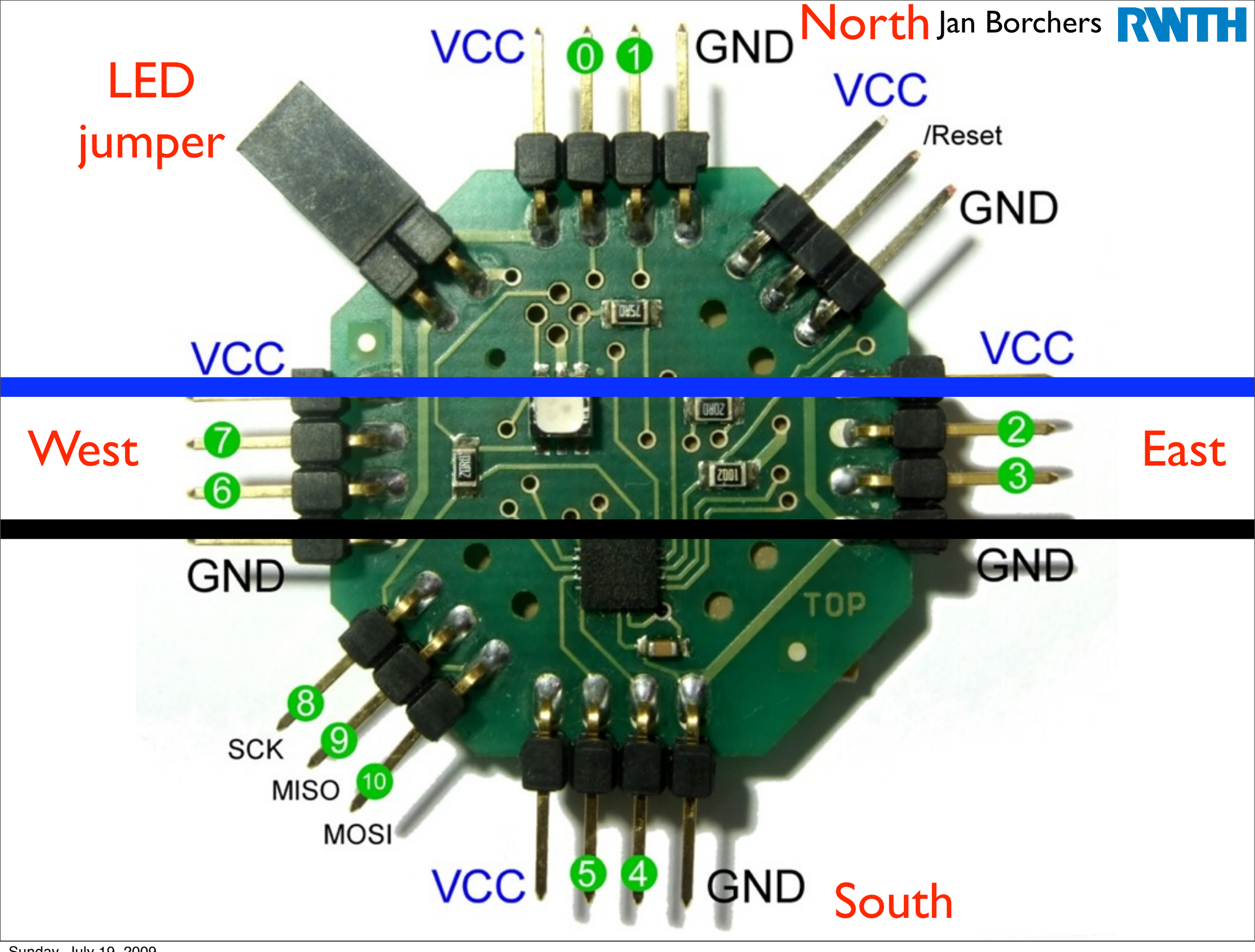
MISO 10

MOSI

VCC 5 4 GND

South

North Jan Borchers RWTH



North Jan Borchers RWTH

LED jumper

VCC

VCC

0 1

GND

VCC

/Reset

GND

VCC

West

7

6

2

3

East

GND

8

SCK

9

MISO

10

MOSI

VCC

5 4

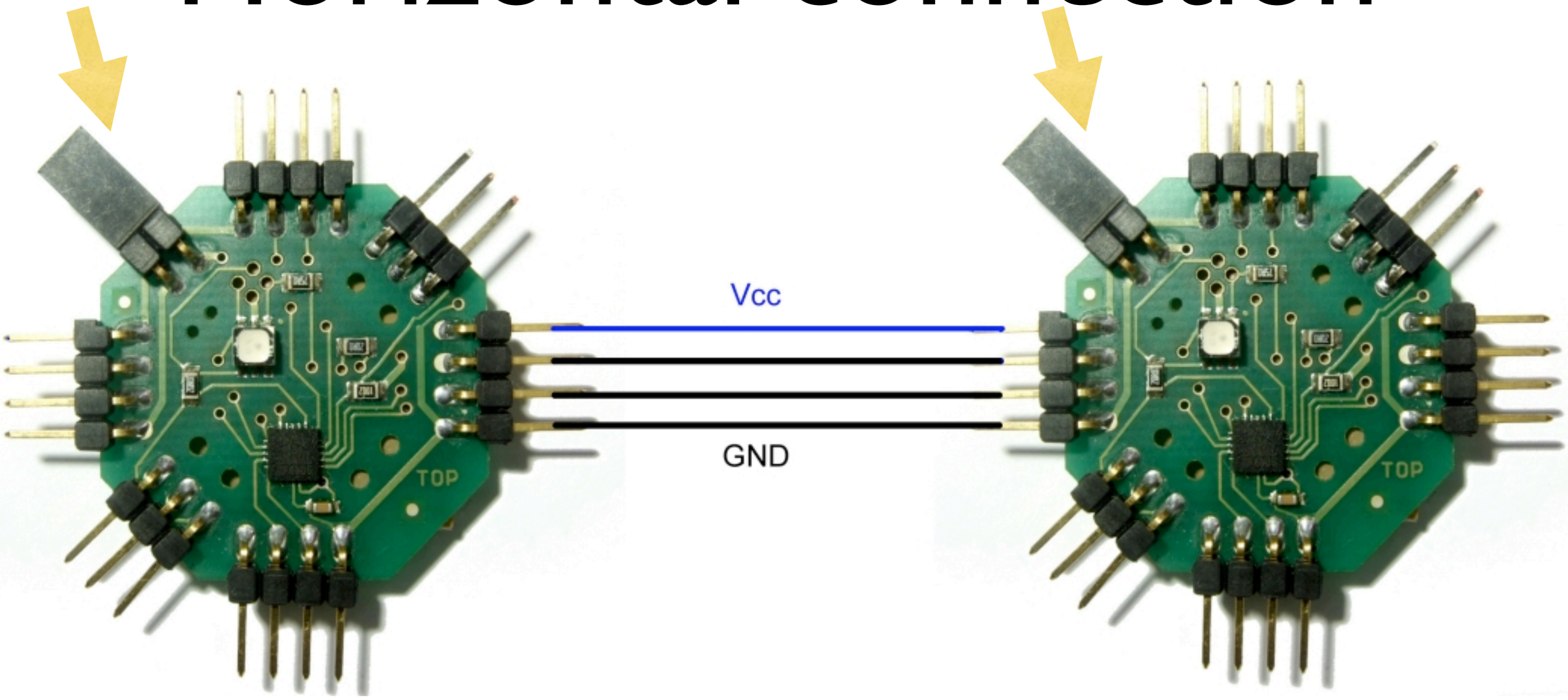
GND

GND

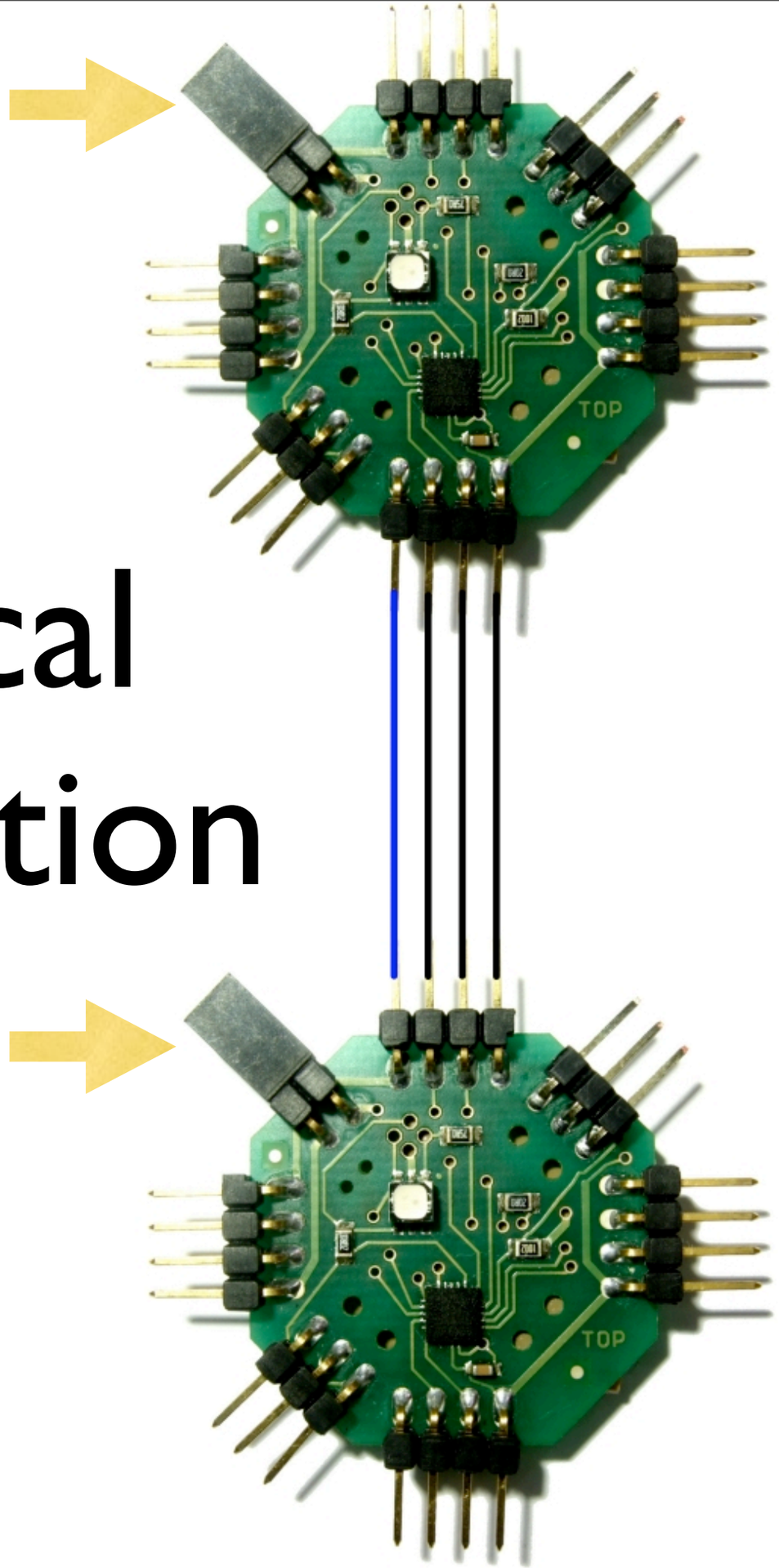
TOP

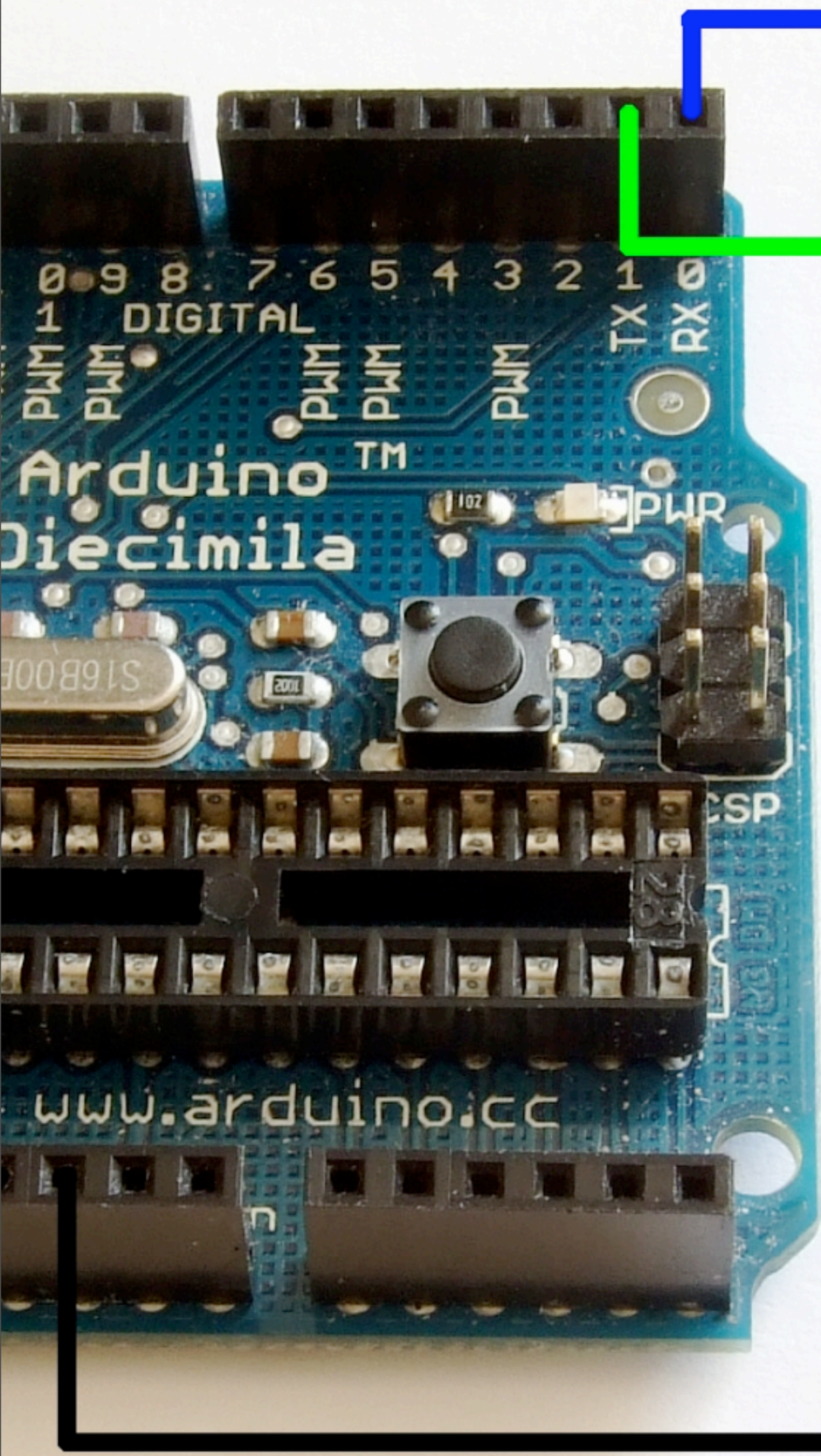
South

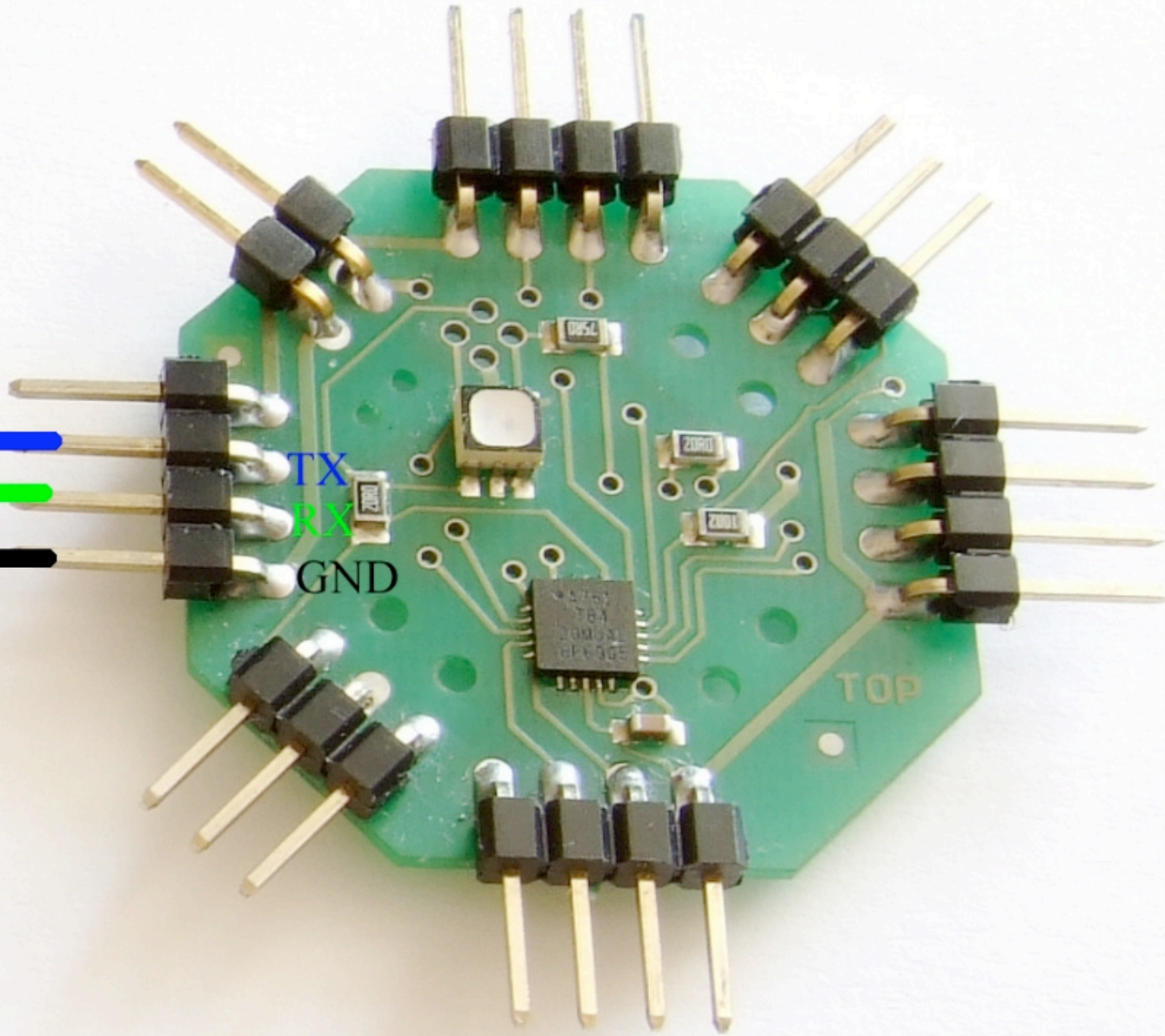
Horizontal connection



Vertical connection

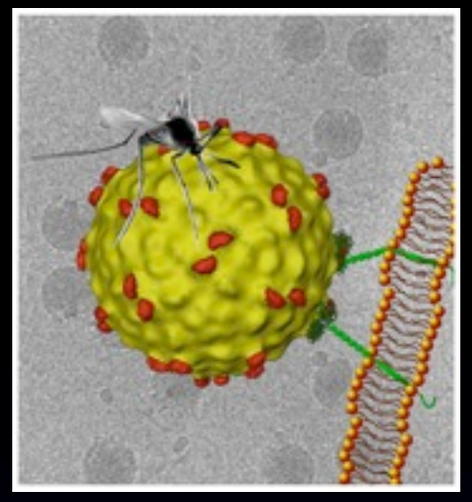



0 9 8 7 6 5 4 3 2 1 0
1 DIGITAL
PWM
TX
RX
Arduino
TM
Diecimila
PWR
www.arduino.cc


TX
RX
GND
TOP

Blink for LumiNet

- Mac: Get Info on Arduino for LumiNet app, check 32bit option
- Launch Arduino for LumiNet
- *Select board: "LumiNet Vector Node"*
- Select your serial port
- Open Sketchbook: Examples: Digital: Blink
- Upload sketch as usual



Programming by Infection

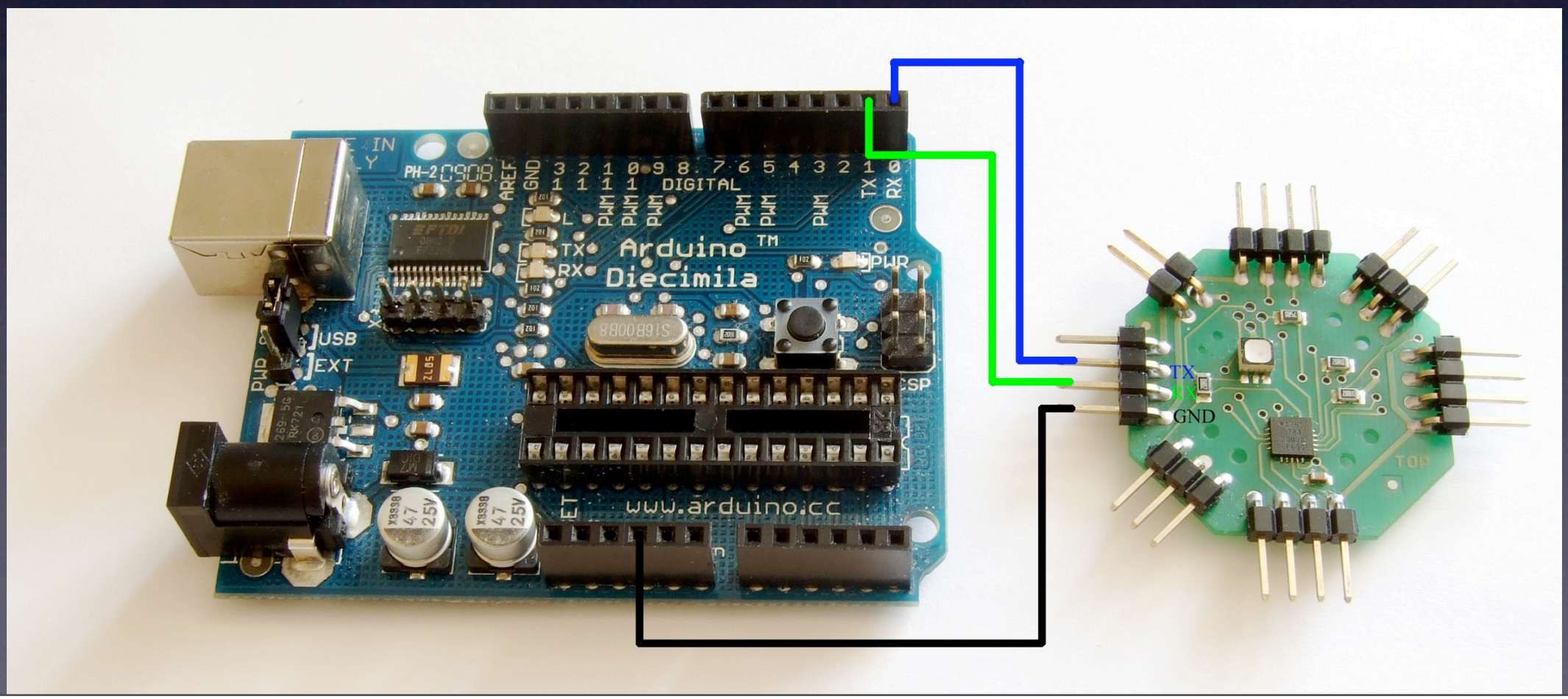
- Disconnect vector from Arduino
- Remove jumper cable from vector
- Connect vector to LumiNet network
- Connect battery to any Vcc+GND pins
- Power up LumiNet
- Watch infection spread (~ 1 minute)
- When all nodes are blue or green, power off

Run LumiNet Blink

- Remove vector
- Power on
- All nodes should blink
- Congratulations!

Experiment #2: LightRing

- Power net off and remove vector
- Put vector jumper cable back
- Connect vector to Arduino again



Install LightRing code on LumiNet

- Load LightRing code from file (came with IDE)
- Upload to vector
- Remove jumper cable from vector
- Move vector from Arduino back to net
- Power up net to infect it (takes a while)
- Power down net, remove vector, power up

Using LightRing

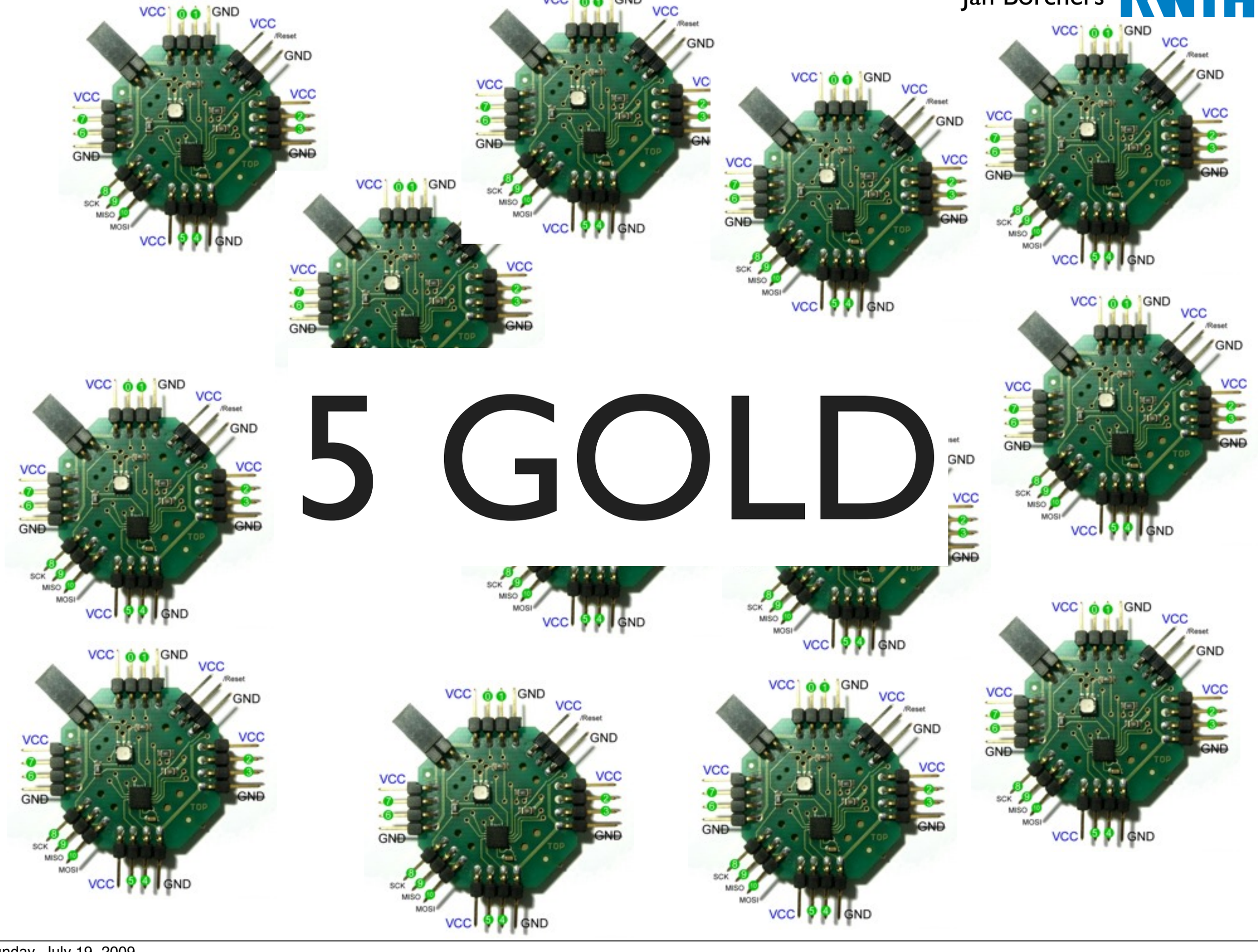
- Ground any RX pin (e.g., pin 7) with a jumper cable for light ripple effects
- How does LightRing work?

- Buffers incoming signal on all 4 sides, passes it on after 100ms to opposite side and immediately to the other 2 sides
- *Simple code, emergent behavior*

Experiment #3: Social LightRing

- Connect IR sender/receiver node to any node
- Remember to connect only
  - WEST to EAST or
  - NORTH to SOUTH!
  - To orient boards correctly, let jumper point to upper left corner
- Pass light ripples from net to net or jacket!

Jan Borchers



5 GOLD

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