ARDUINO HACKING 101:

IMPORTING THE UNIVERSE

FEDERICO LUCIFREDI

DISCLAIMER

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PROCEED AT YOUR OWN RISK.

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oscon
open source convention

ARDUINO

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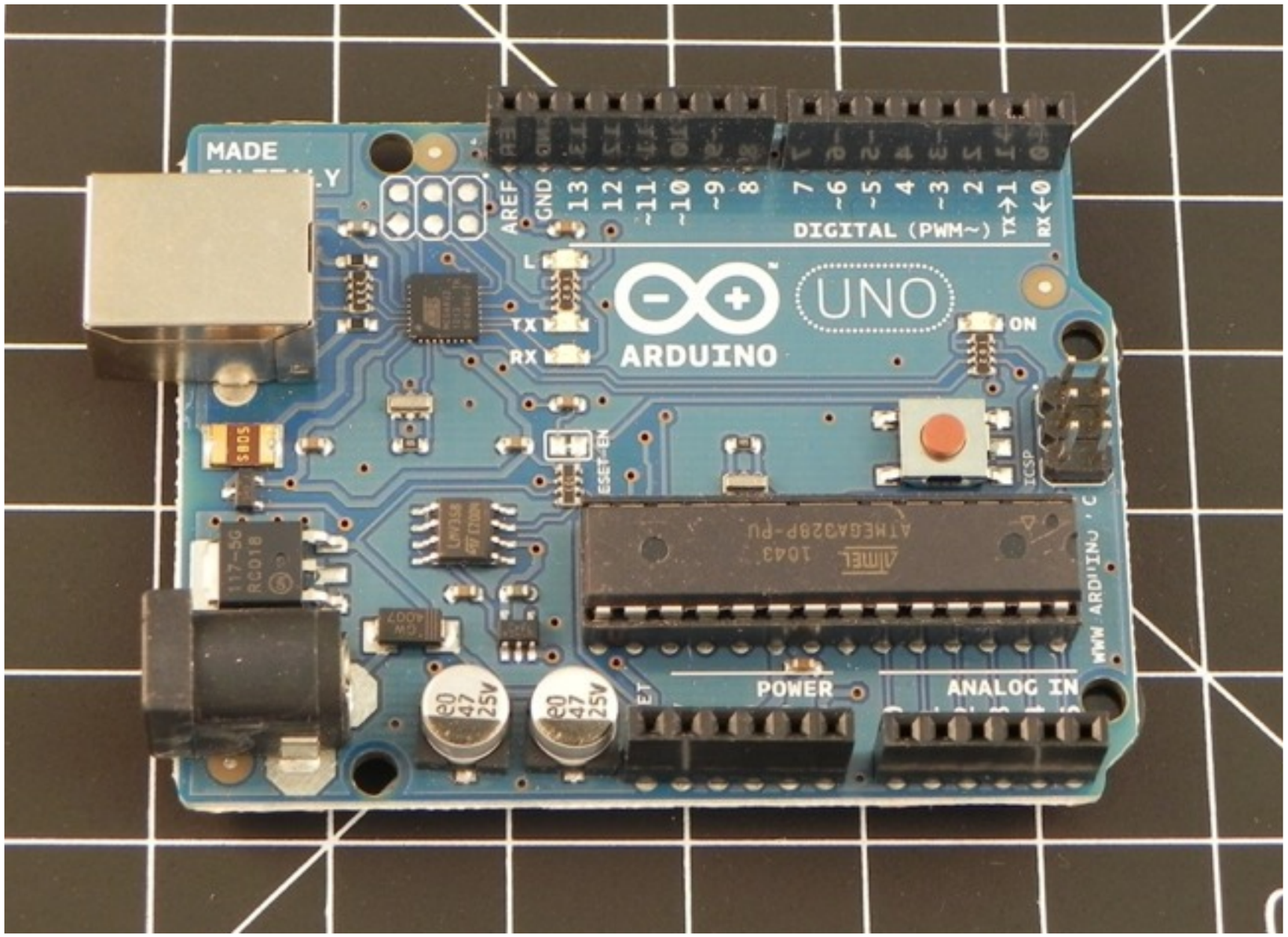

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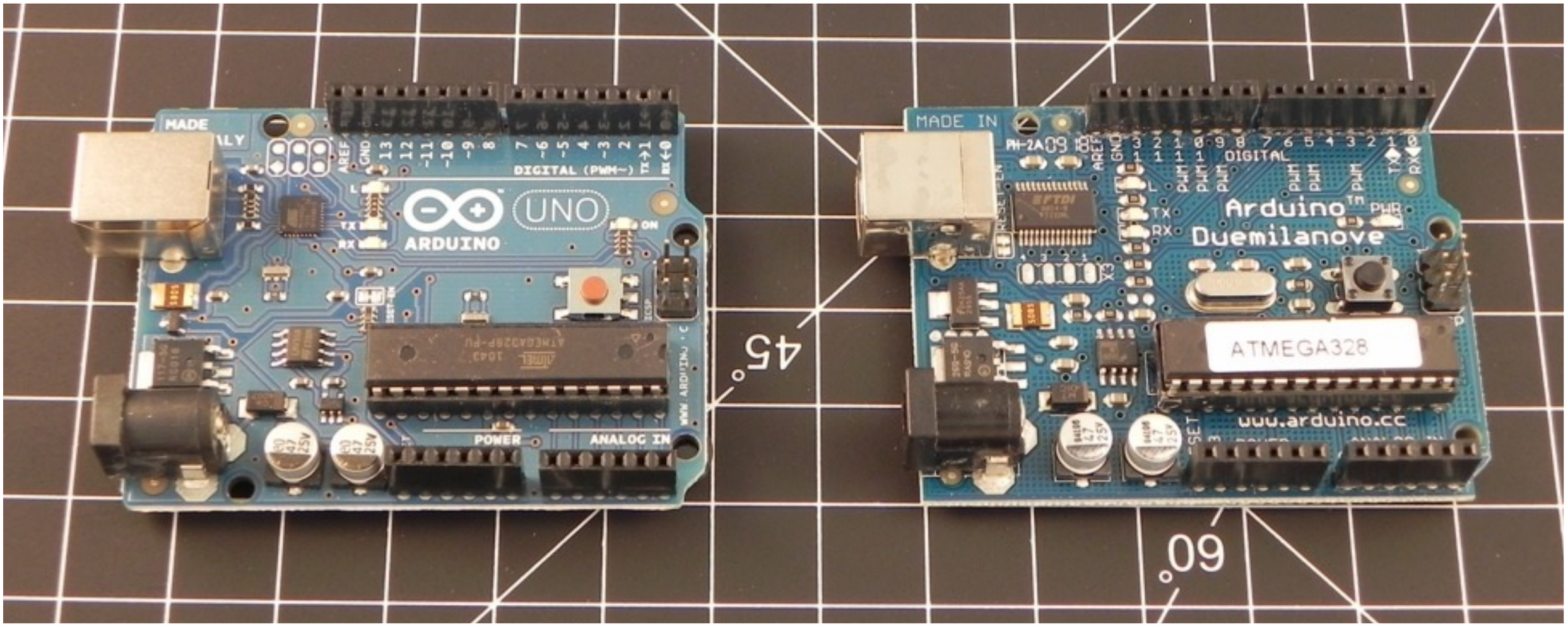

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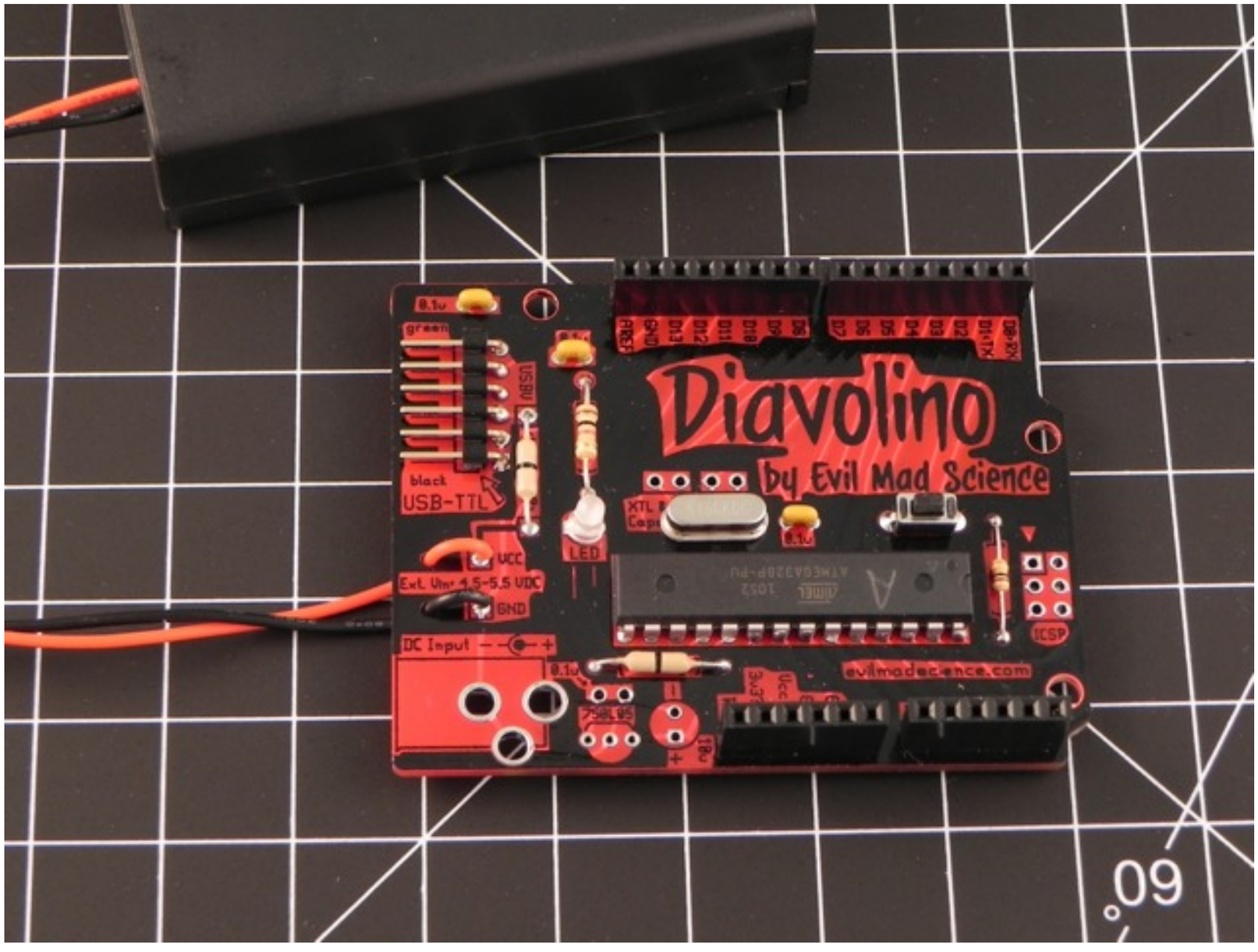

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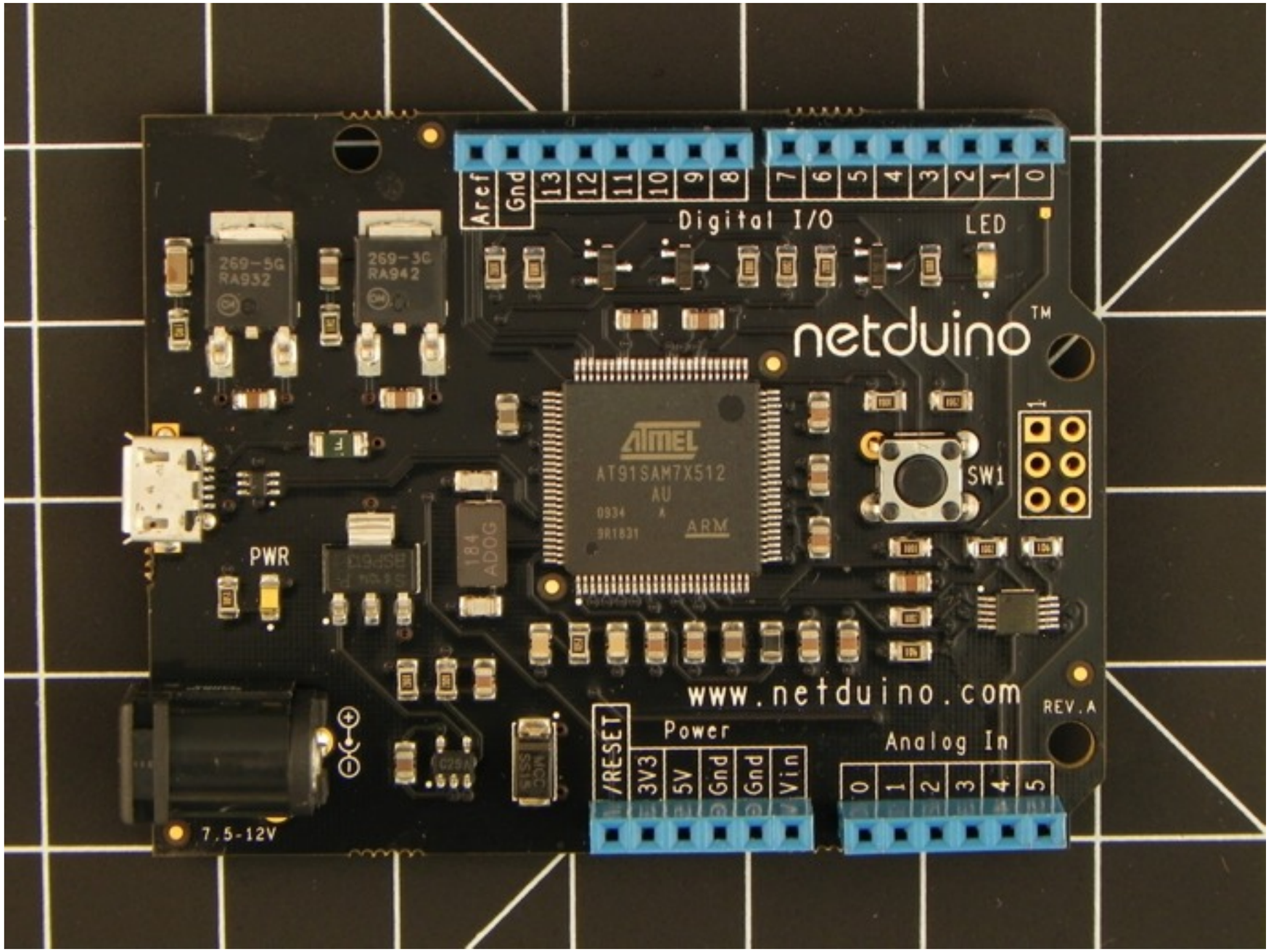

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xDUINO

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BLINKENLIGHT

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COMMUNITY

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SENSORS

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ACTUATORS

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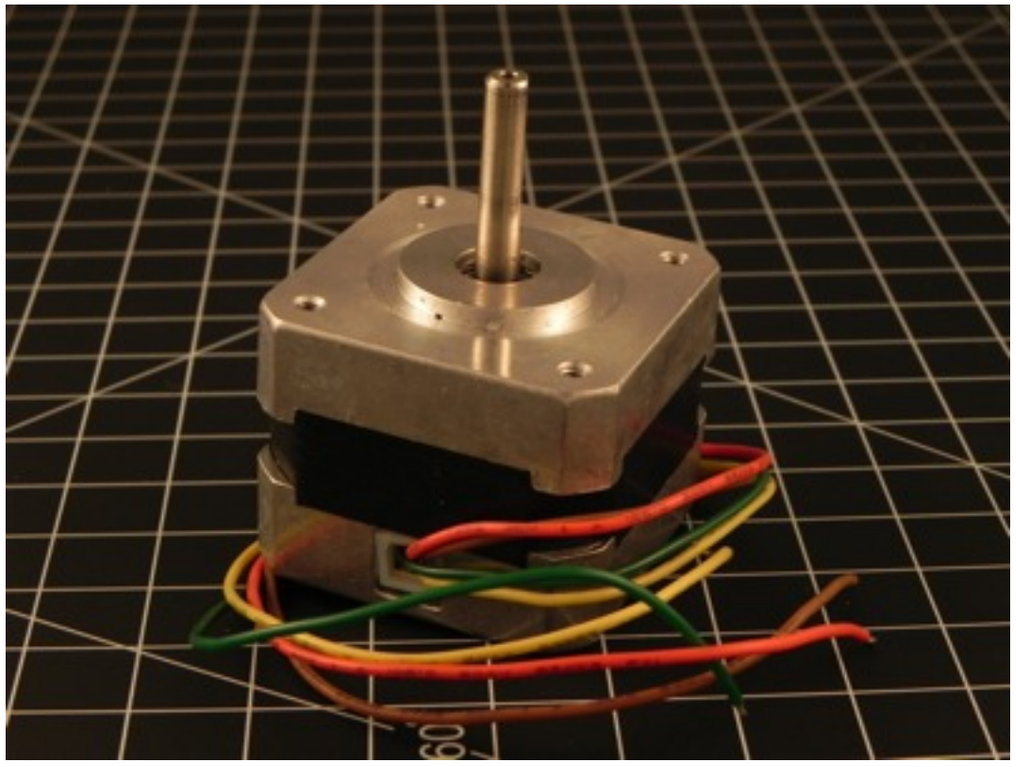
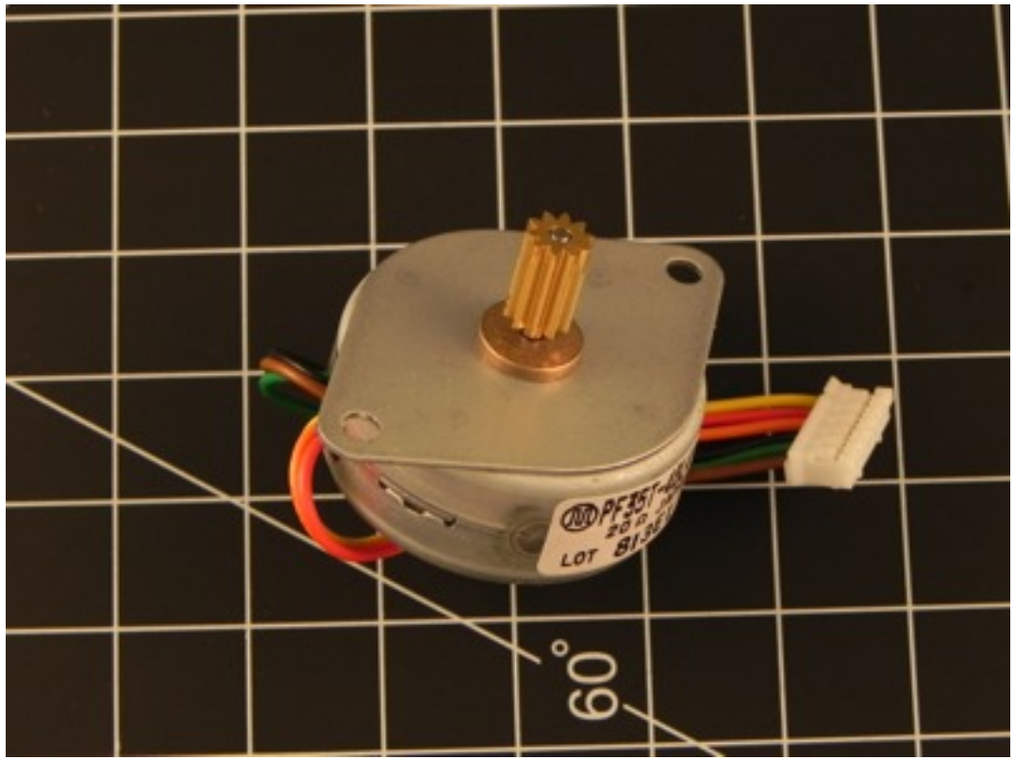
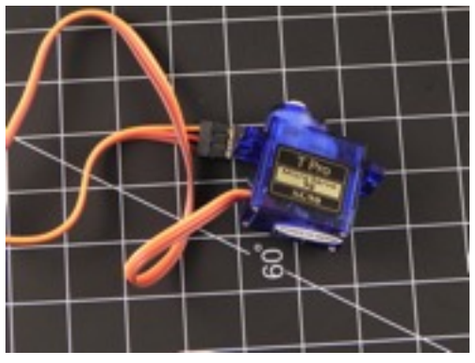
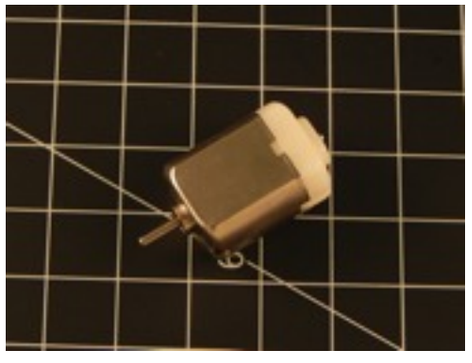
MOTORS









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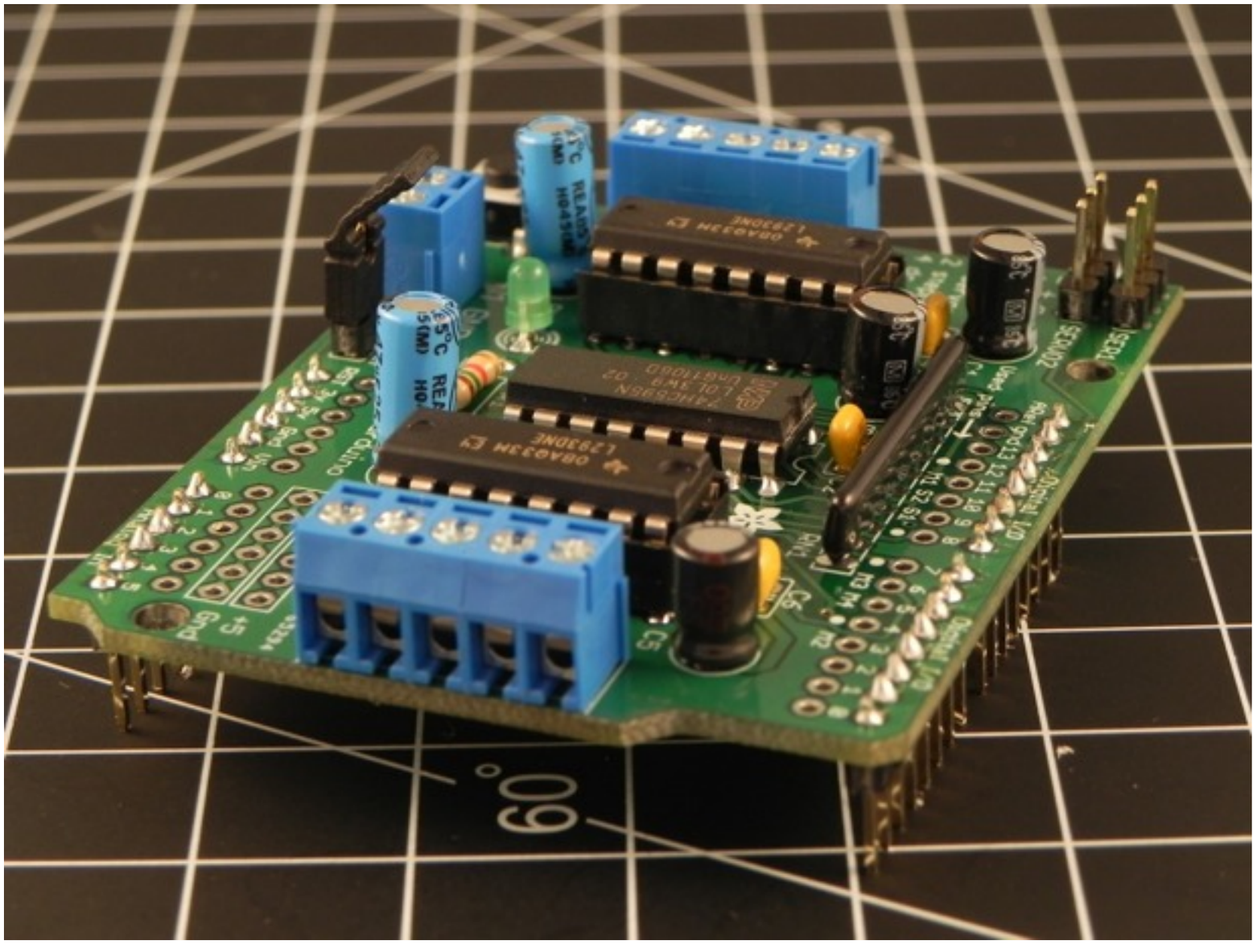
MOTORS



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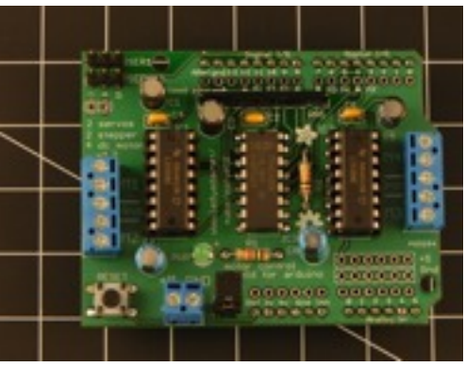
MOTORS



Power Driver Shield
Adafruit Industries 81

2 5V "hobby" servo connections
4 bridges
4.5 V to 36 V, 0.6A each (1.2 A peak)

External power hookup

open hardware

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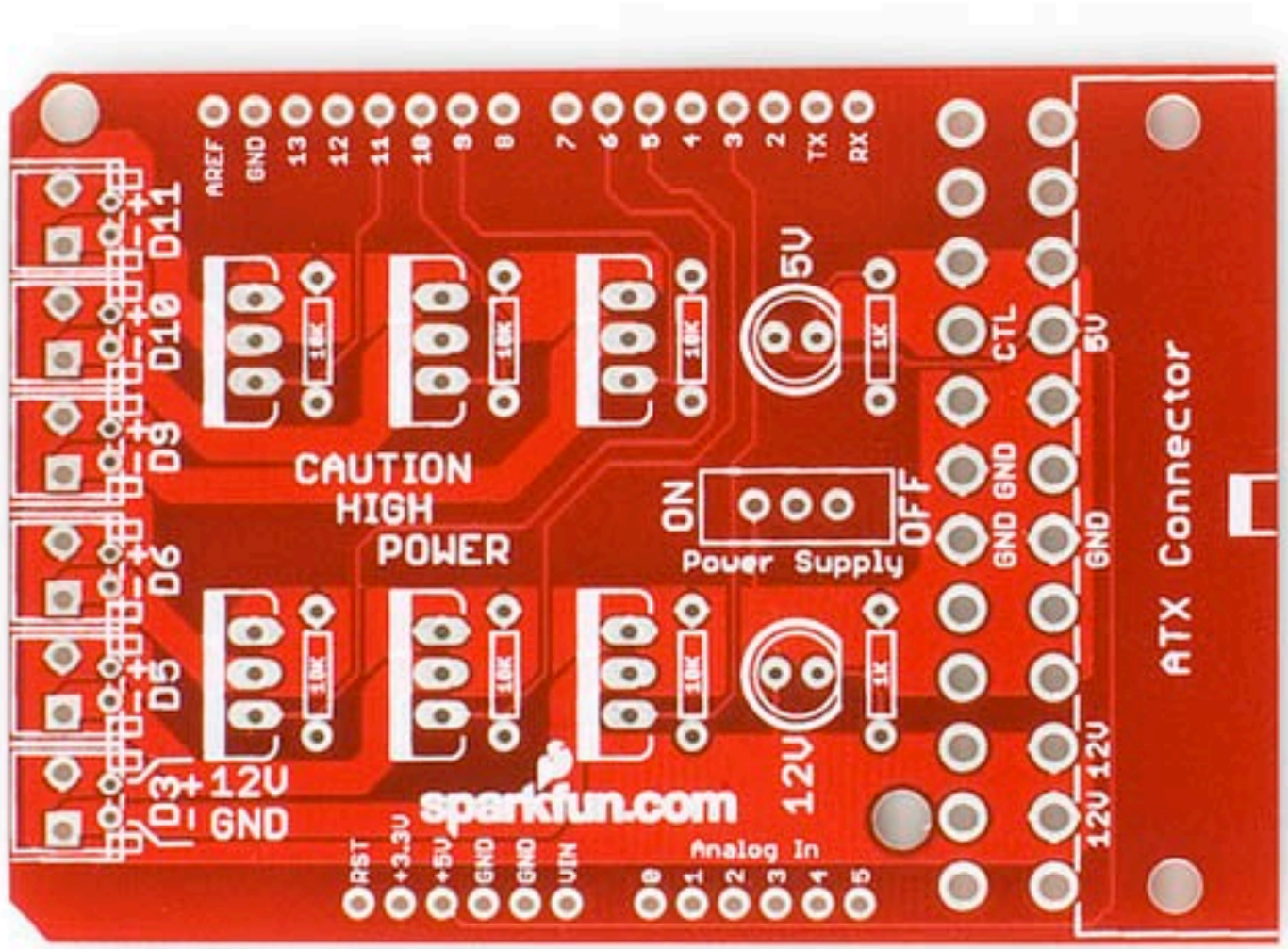
POWER



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POWER

Power Driver Shield
Sparkfun DEV-10305

6 PWM outputs (screw terminals)
Powered by ATX PSU

12 V 8 A

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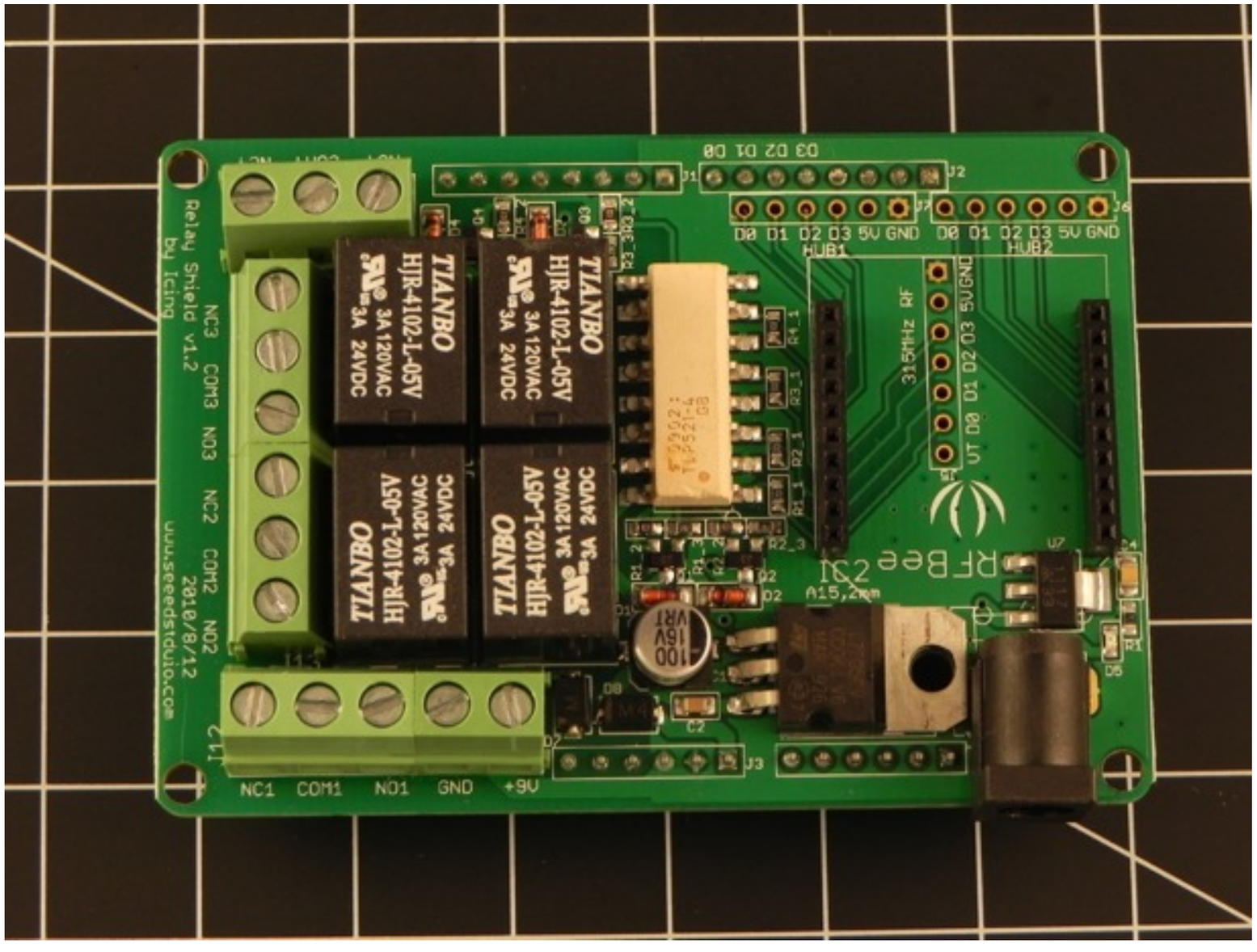
REAL POWER



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REAL POWER

Relay Shield

Seed Studio Bazaar POW113B1P

4 mechanical relays

Max switching power 90 V DC, 360 V AC

RFBee Socket

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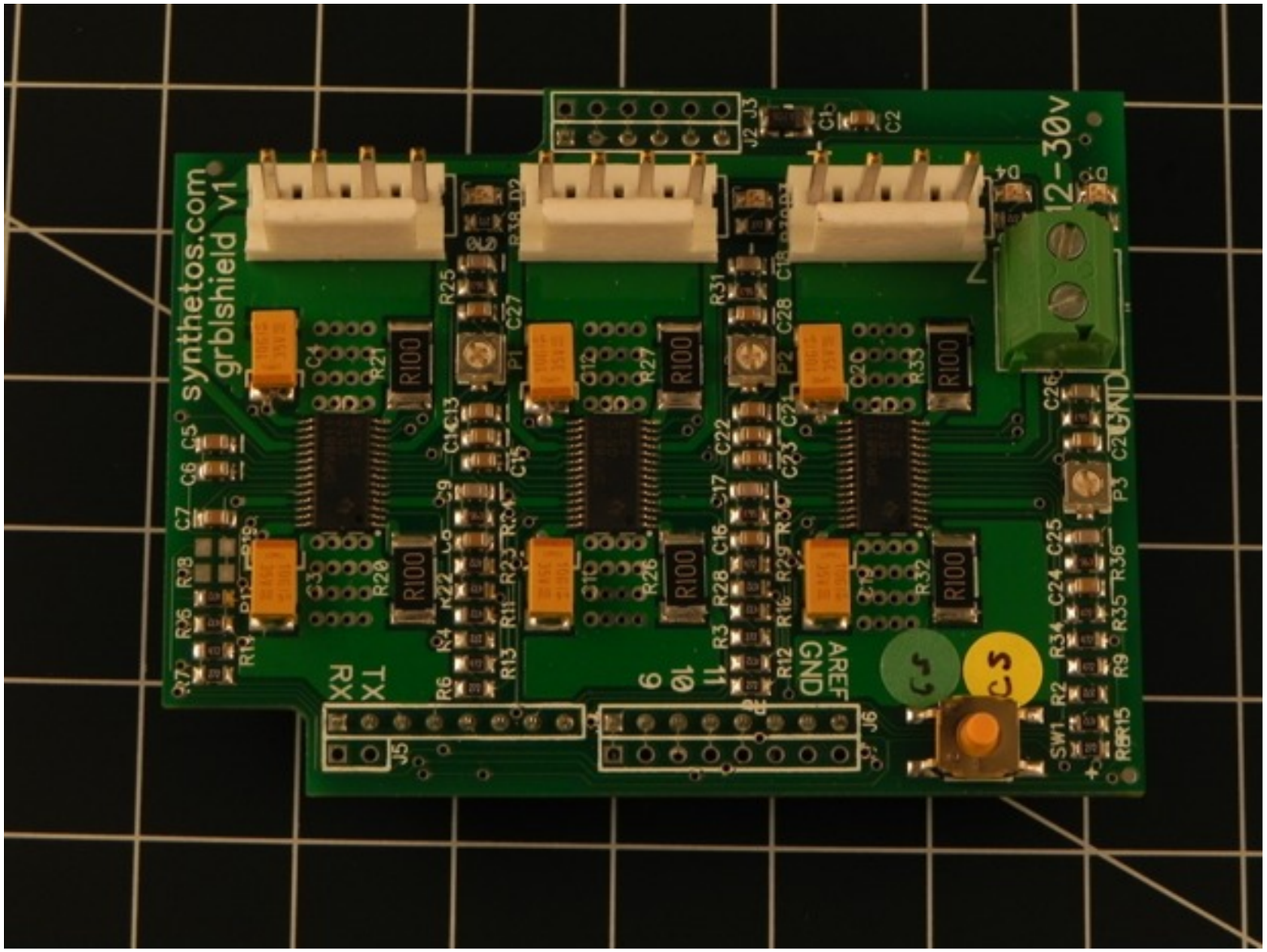
GCODE



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GCODE

Grbl Shield
Synthetos

3 stepper drivers,
2.5 Amps each, 12V-30V motor voltage
Subset of rs274/ngc standard gcode

Grbl 0.6 compatible
Makerbot and RepRap compatibility

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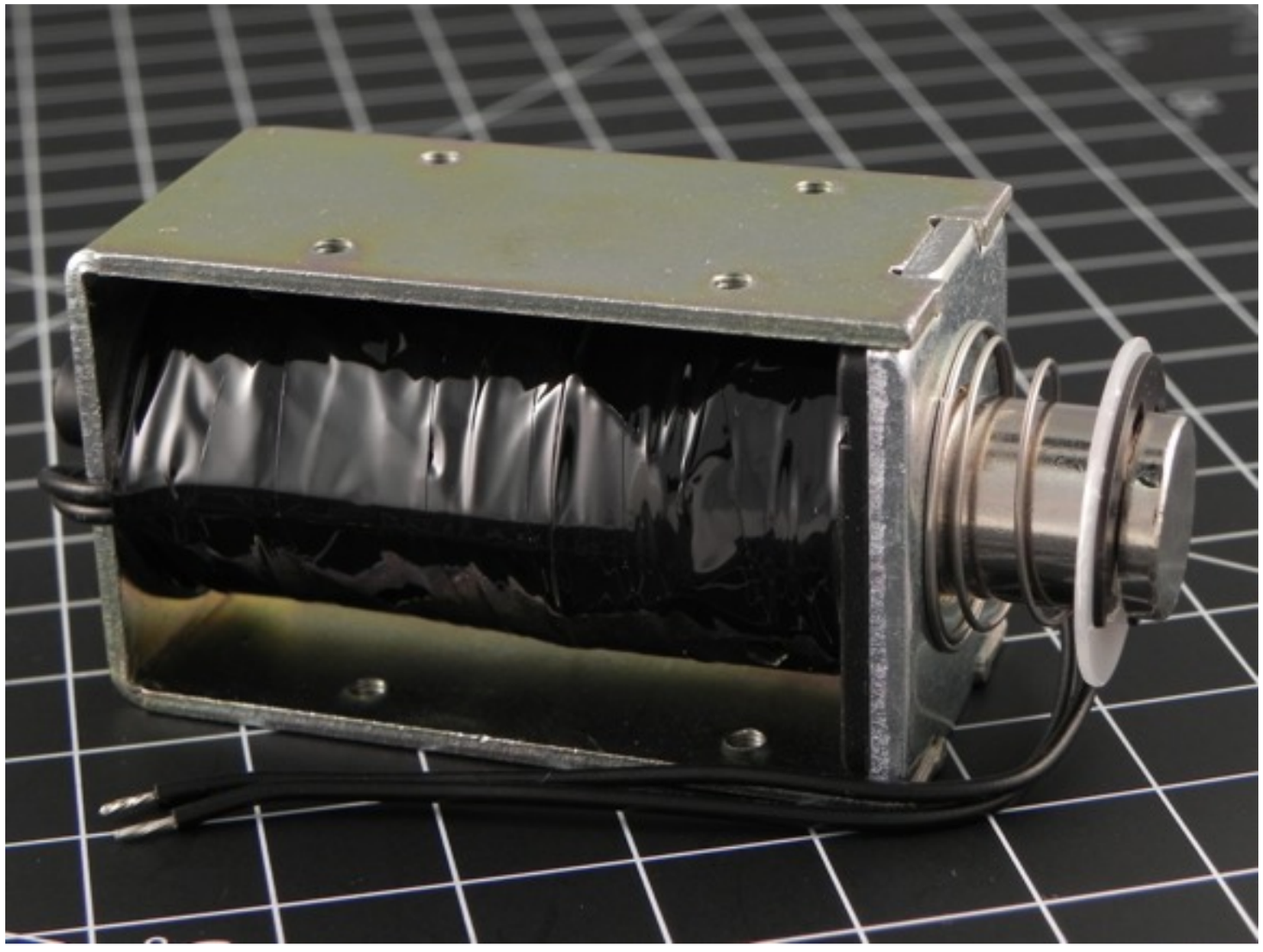
SOLENOID



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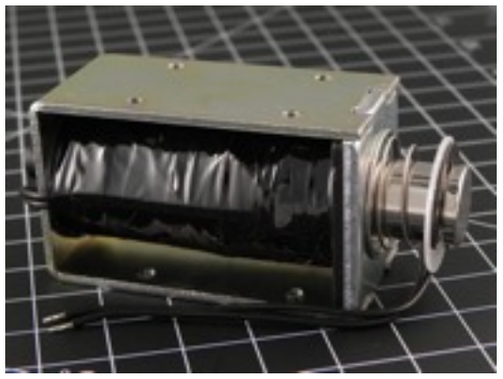
SOLENOID



36V Solenoid
Sparkfun ROB-10456

Really heavy duty body mounting holes

throw: 10 mm
36V

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INTERTUBES

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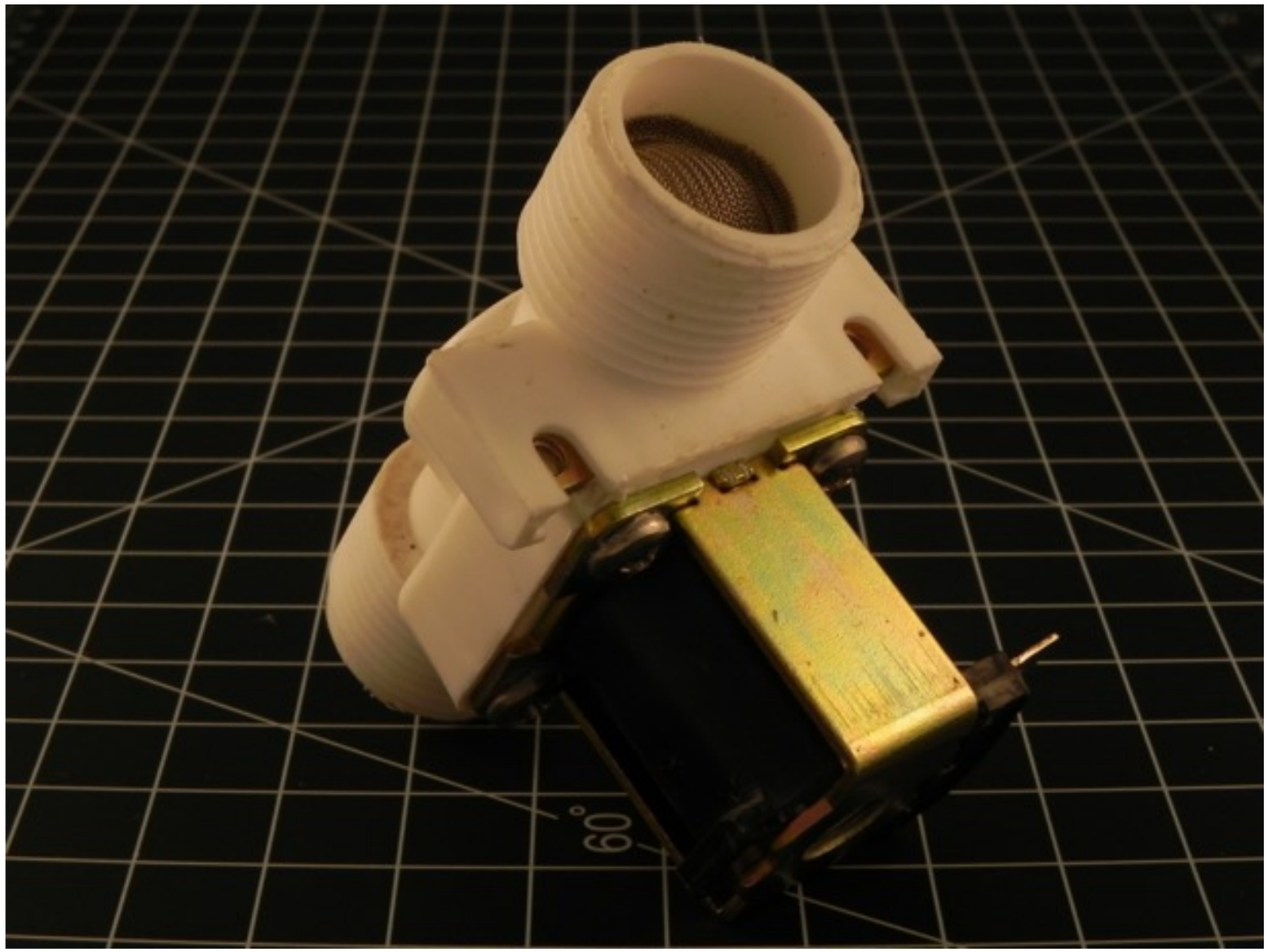
SOLENOID VALVE



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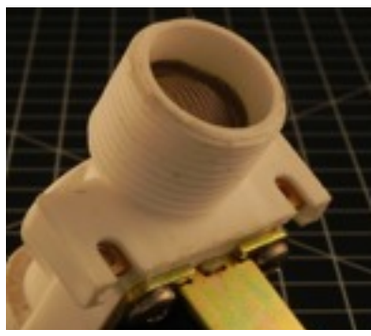
SOLENOID VALVE

Solenoid Valve
Sparkfun ROB-10456

3/4″ threaded inlet and outlet
Default closed
12V 300 mA

3 PSI minimum pressure required
Pilot-assisted (not bidirectional)



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WATER PUMP

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WATER PUMP

Liquid Pump
Sparkfun ROB-10455

Submersible thermoplastic body
3/4″ un-threaded
350 GPH (that's 1324 liters)
12V 1.5 A

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VACUUM PUMP

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VACUUM PUMP

Vacuum Pump
Sparkfun ROB-10398

12V 1A

16″ Hg vacuum

DEMO

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INPUT

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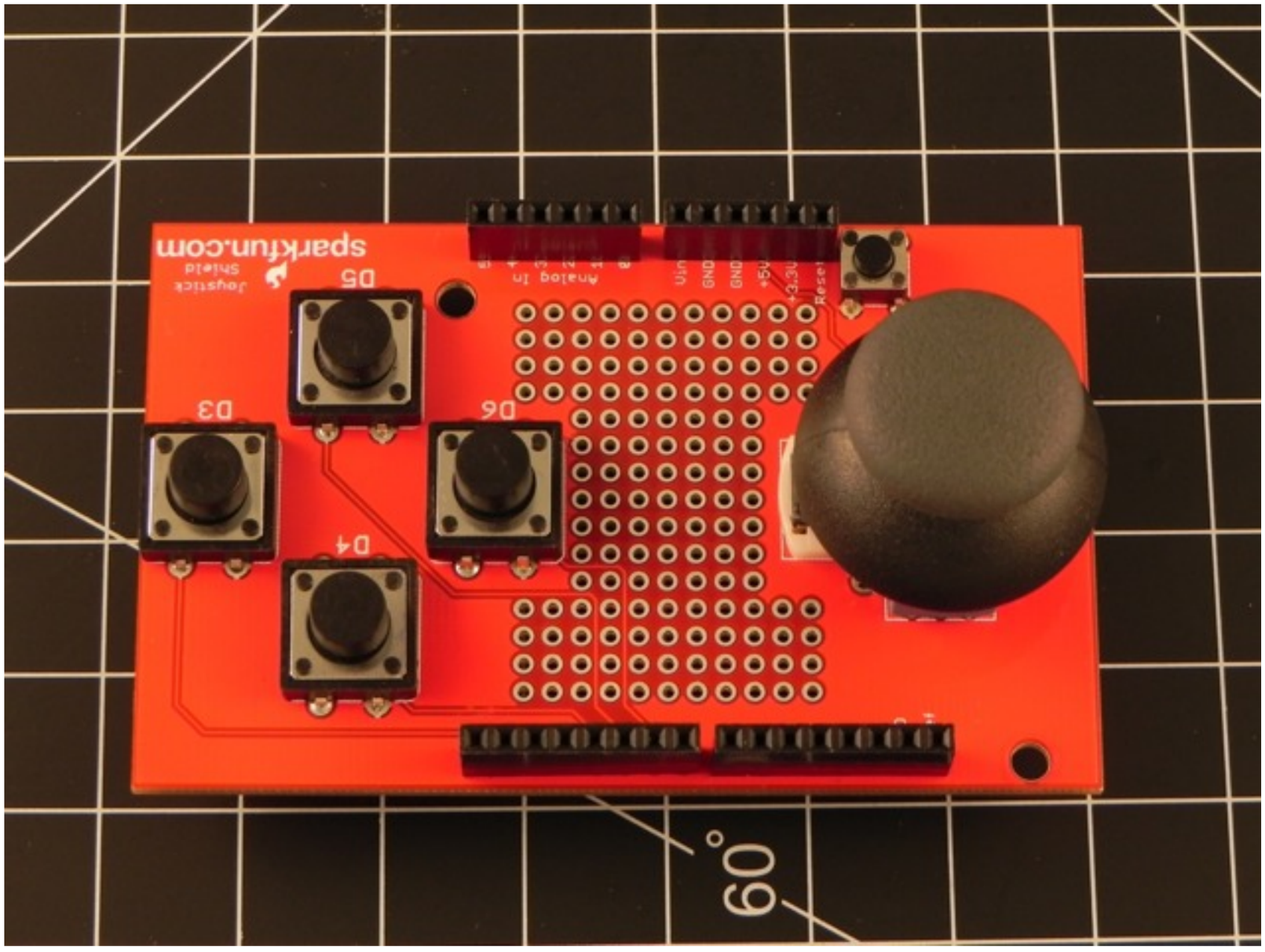
JOYSTICK



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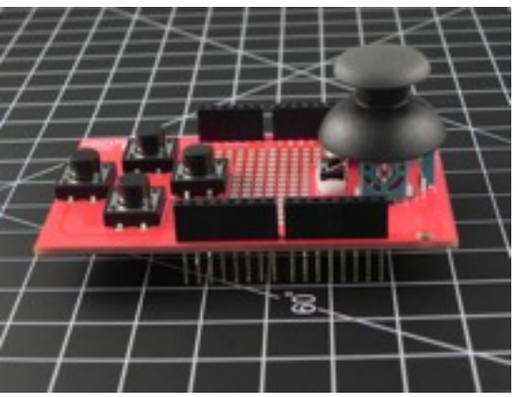
JOYSTICK



Joystick Shield Kit
Sparkfun DEV-09760

2-Axis Joystick
5 momentary push buttons

Pushbuttons are digital-in
Joystick position is analog voltage

DEMO

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NUNCHUK

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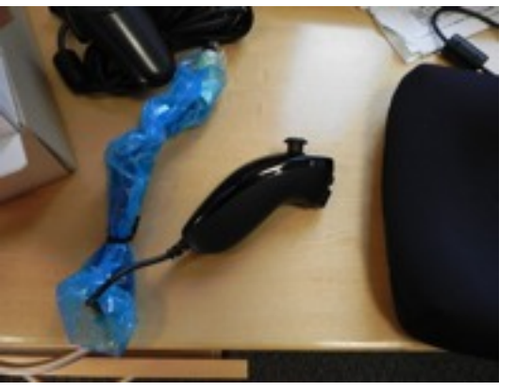
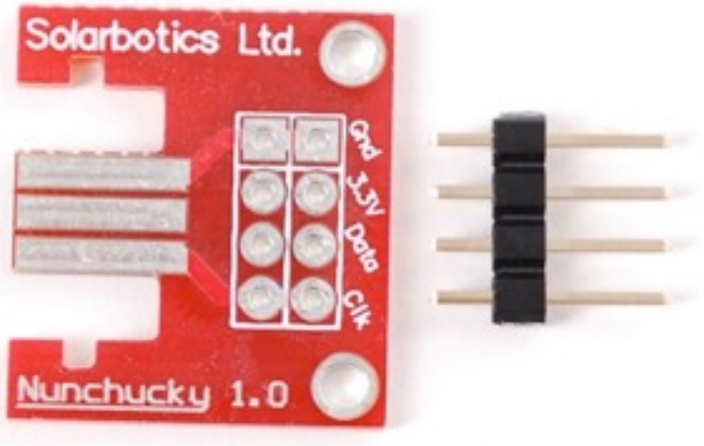
NUNCHUK



Nintendo Wii Nunchuk
Nunchuky breakout board
Adafruit 345



Sony Playstation 2
PS2 Controller Breakout
Lynxmotion PS2C-1

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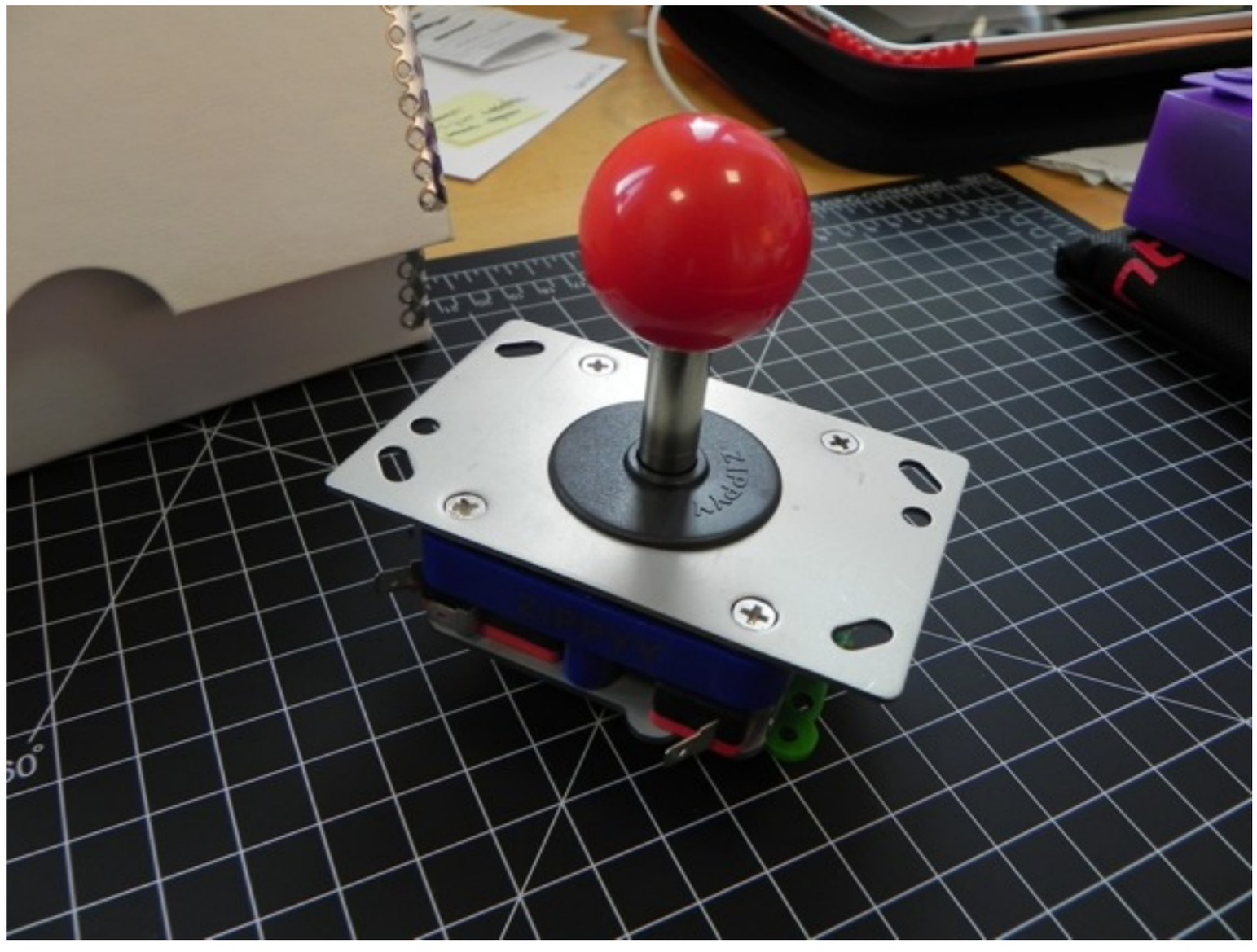
SERIOUSLY



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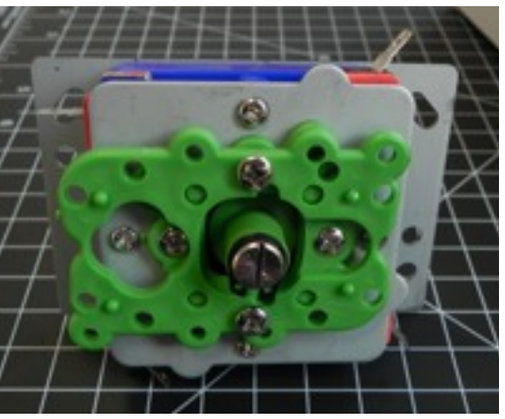

Arcade Joystick, short handle
Sparkfun COM-09182

Ridiculously solid, rugged unit
Metal + Plastic
Spring return to center

4 microswitches (digital contact)
2, 4, and 8-way modes

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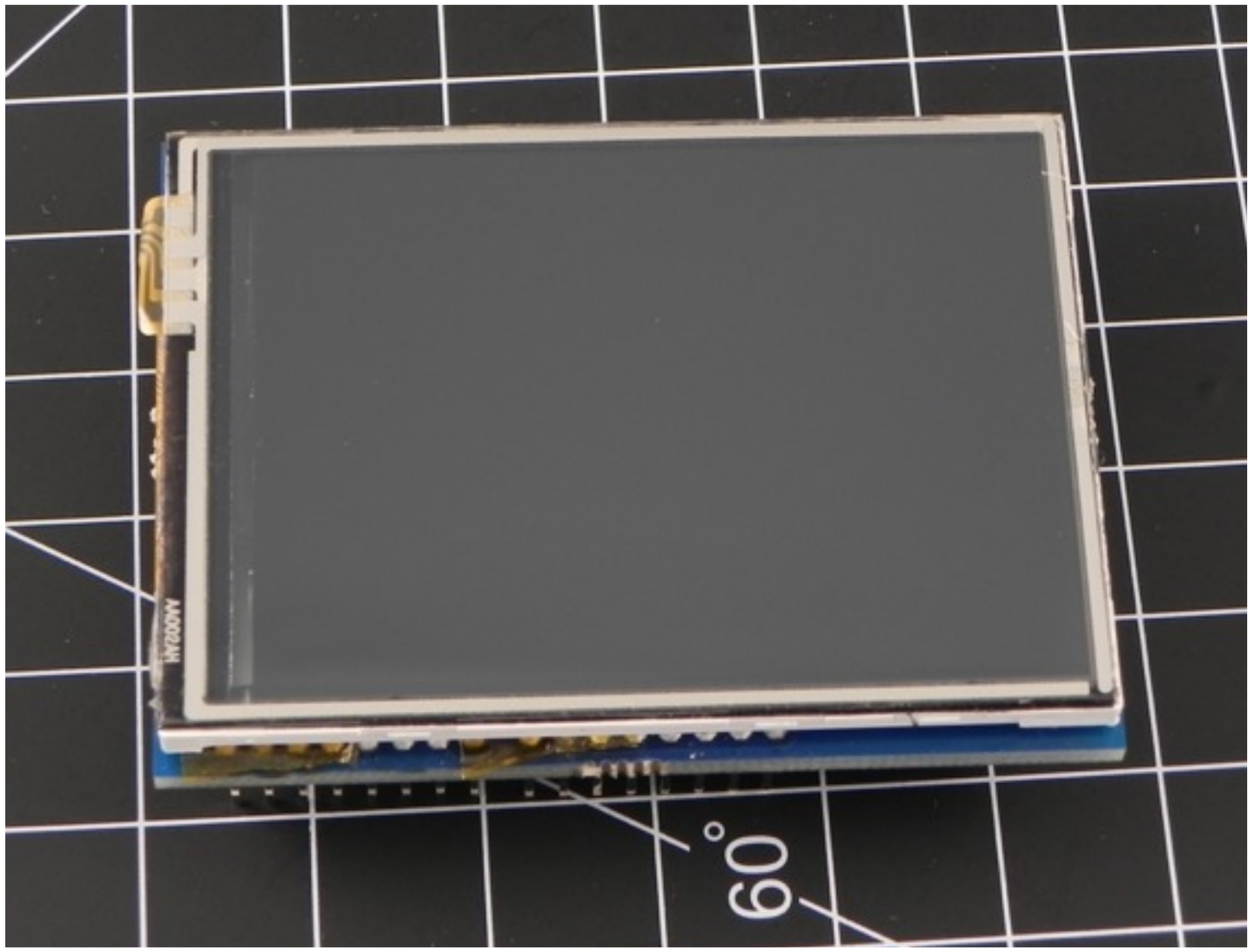
TOUCH



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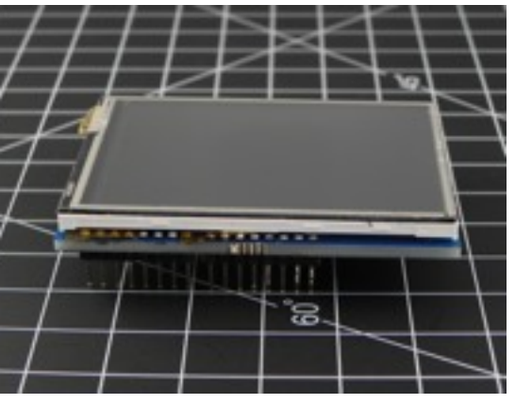
TOUCH

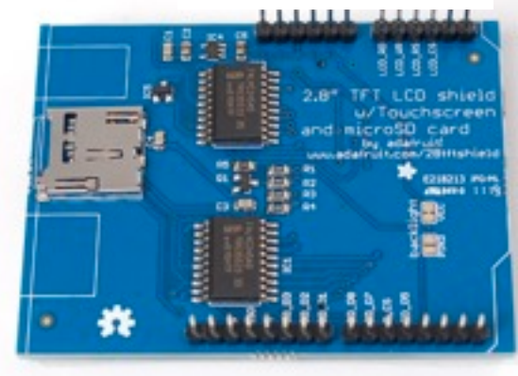


TFT Touch Shield for Arduino
Adafruit Industries 376

adafruit industries

2.8″ TFT Touch Shield
18-bit color
240x320 resolution
MicroSD built-in
resistive touchscreen

open hardware



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OUTPUT

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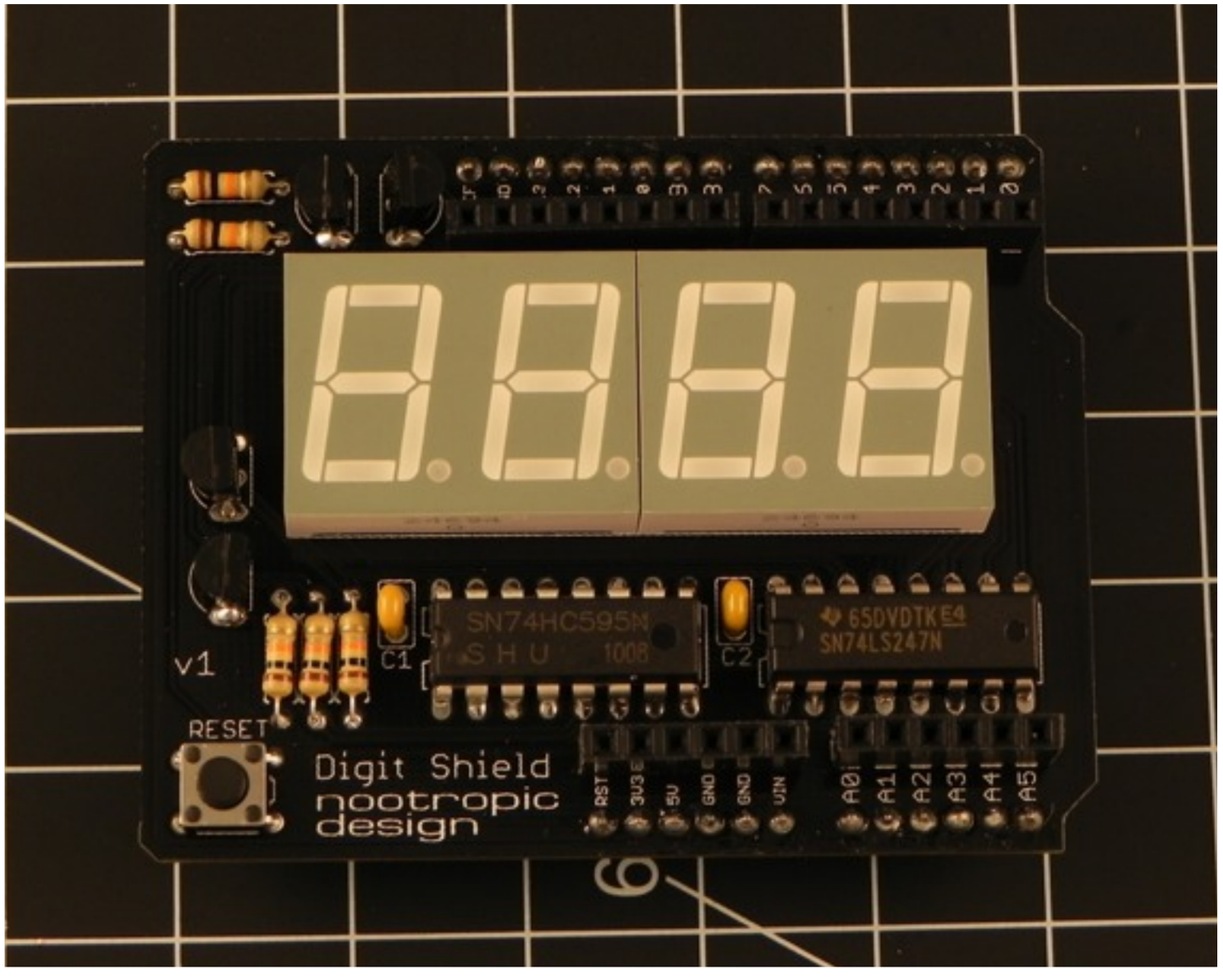
READOUTS



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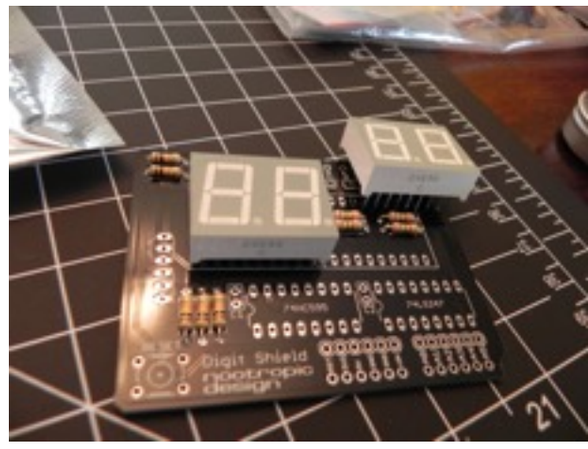
READOUTS

Digit Shield
Nootropic Design

nootropic design

4 digit, 7-segment display
decimal point

Green, red and ultra-bright blue



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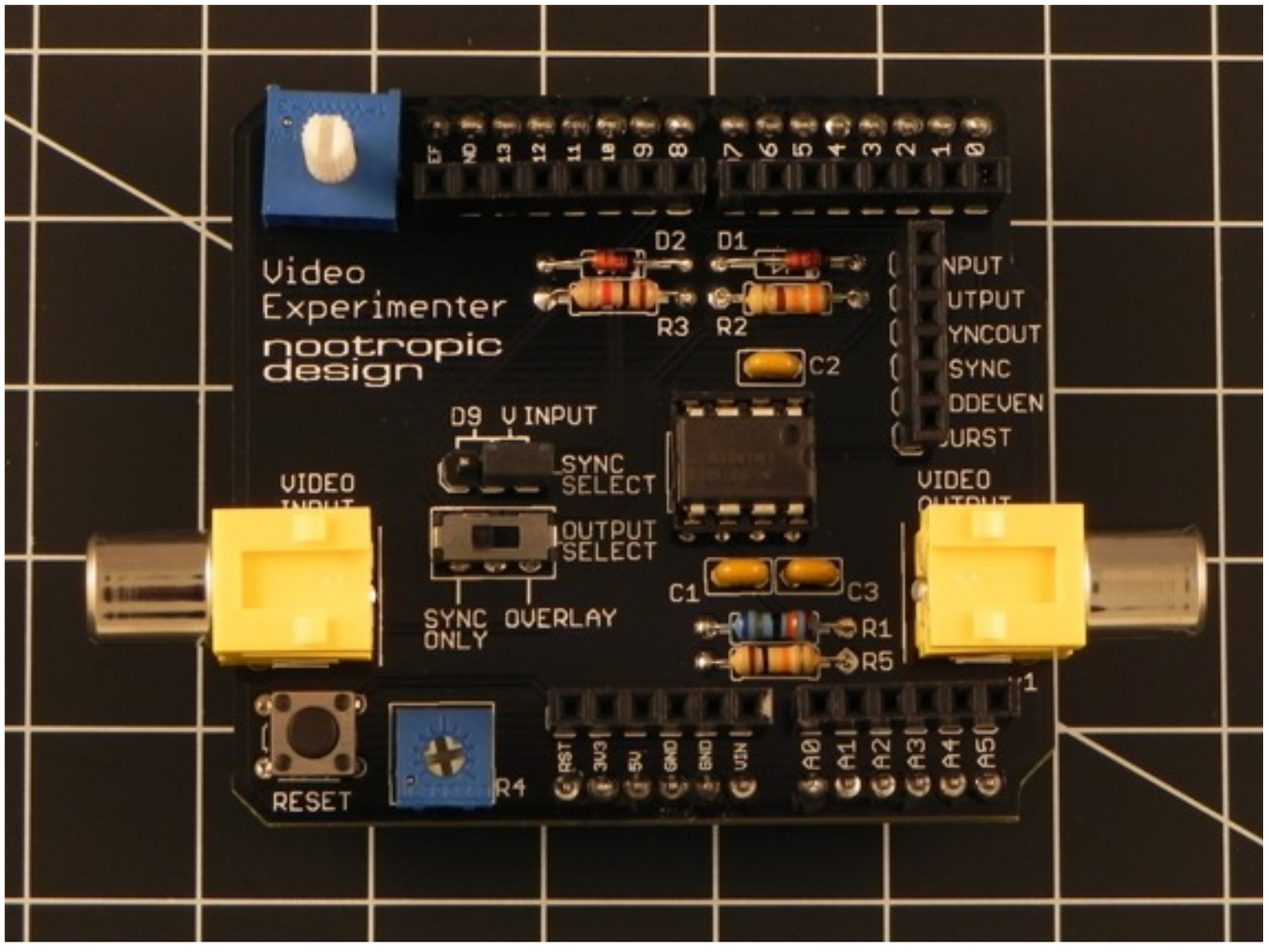
VIDEO



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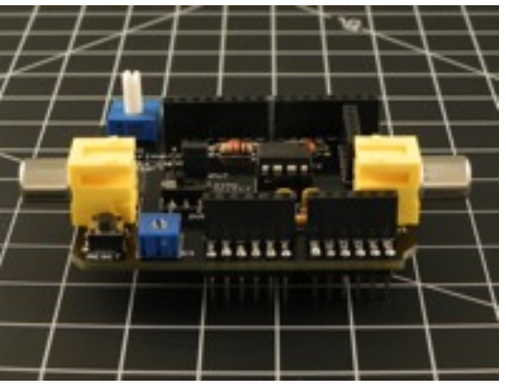
VIDEO



Video Experimenter Kit
Nootropic Design

nootropic design

LM1881 video sync separator
NTSC and PAL Supported

TVout library

Will not work with the Mega

DEMO

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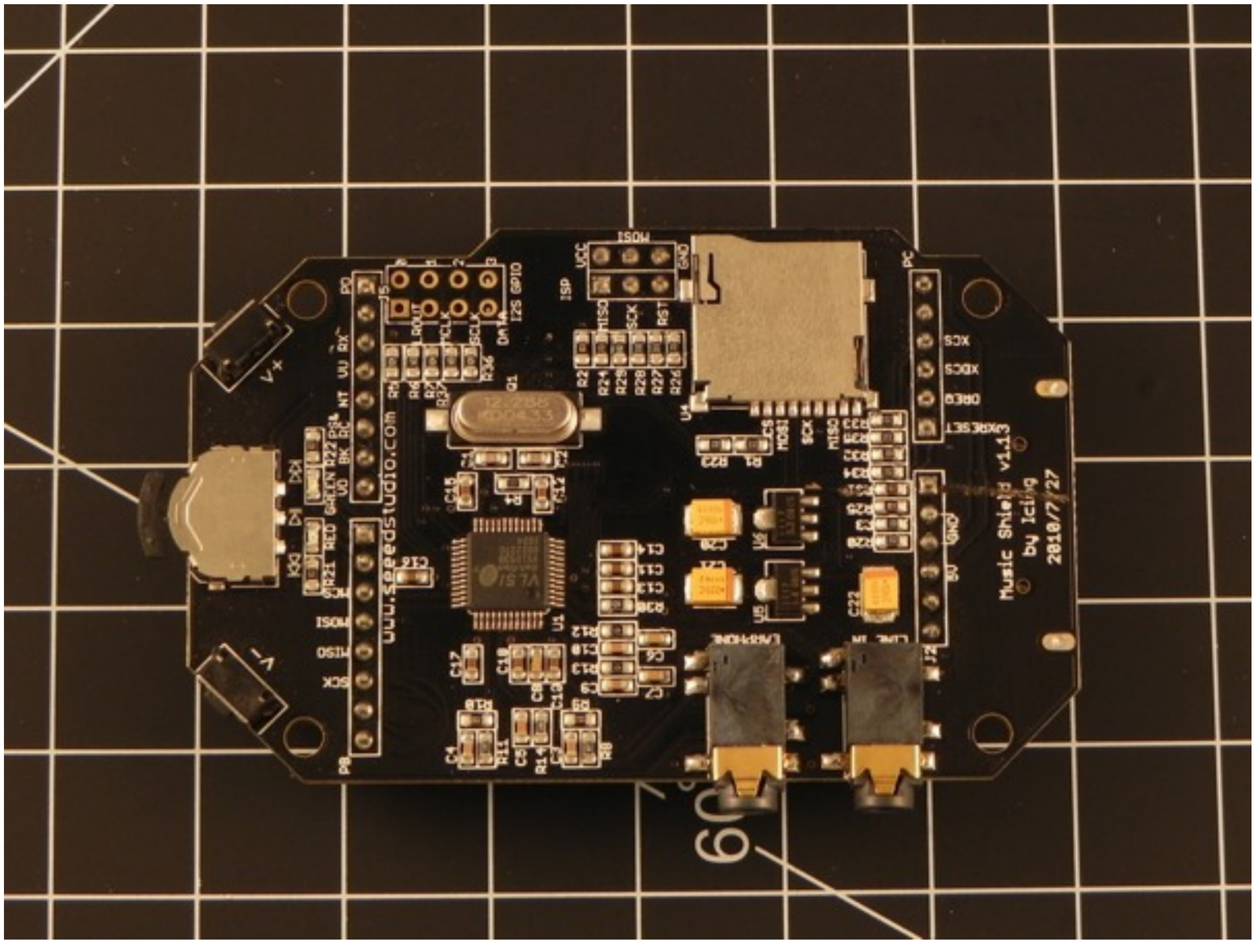
MUSIC



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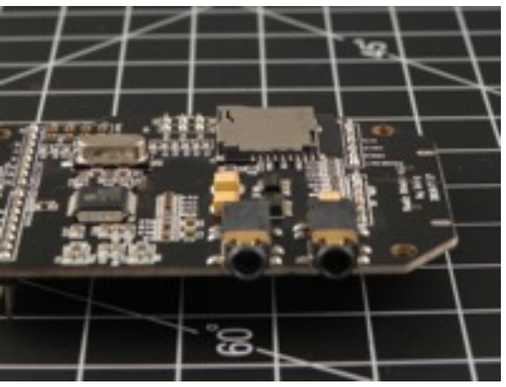
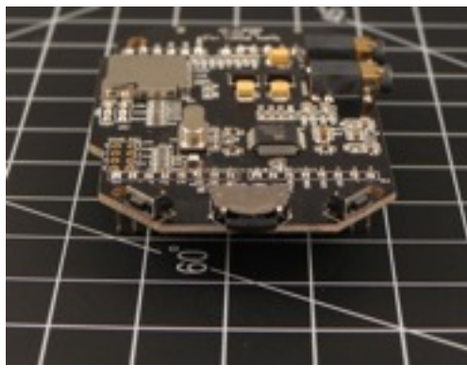
MUSIC



Music Shield
Seeed Studio Bazaar

MP3 Media Player
2 push buttons, 1 knob switch
1 headphone line-out
1 line in

MP3,WMA,WAV,MIDI,Ogg,FLAC



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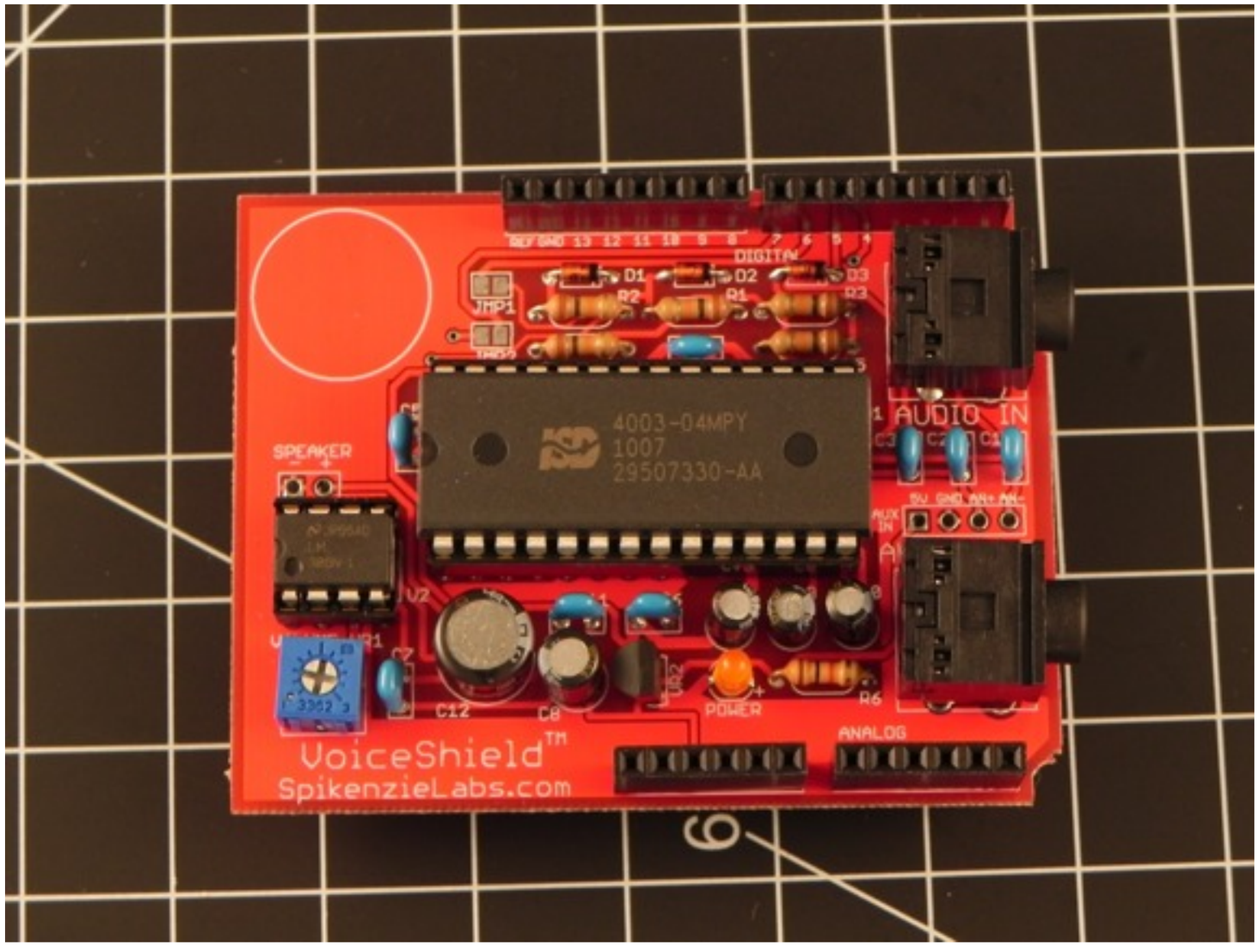
AUDIO



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AUDIO

Voice Shield Slim
Spikenzie Labs SPL-005010

input and output jacks

4-minutes of audio

optional 15mm speaker

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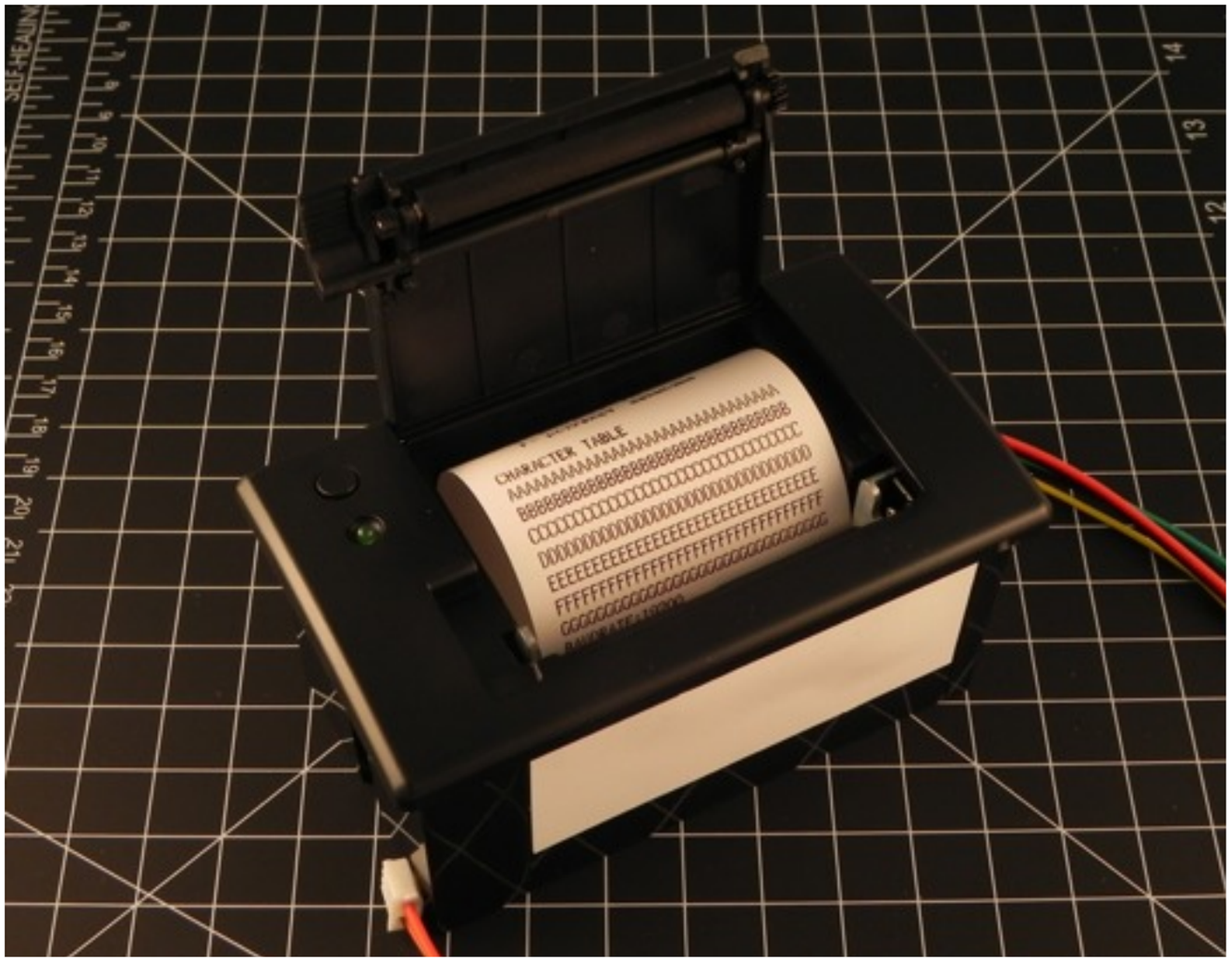
PRINTING



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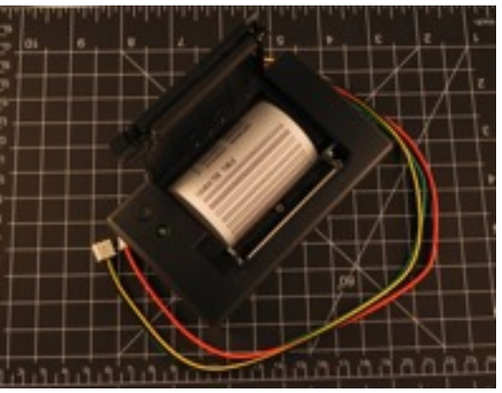
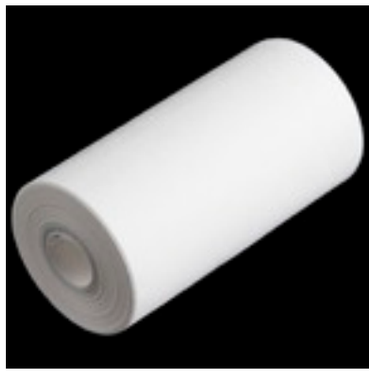
PRINTING



Thermal Paper Printer
Sparkfun COM-10438
Paper (34') COM-10560

57mm paper output, 50Km print life
19200 bps (default) serial
5V 1A (but heard reports up to 2A)



DEMO

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POWER

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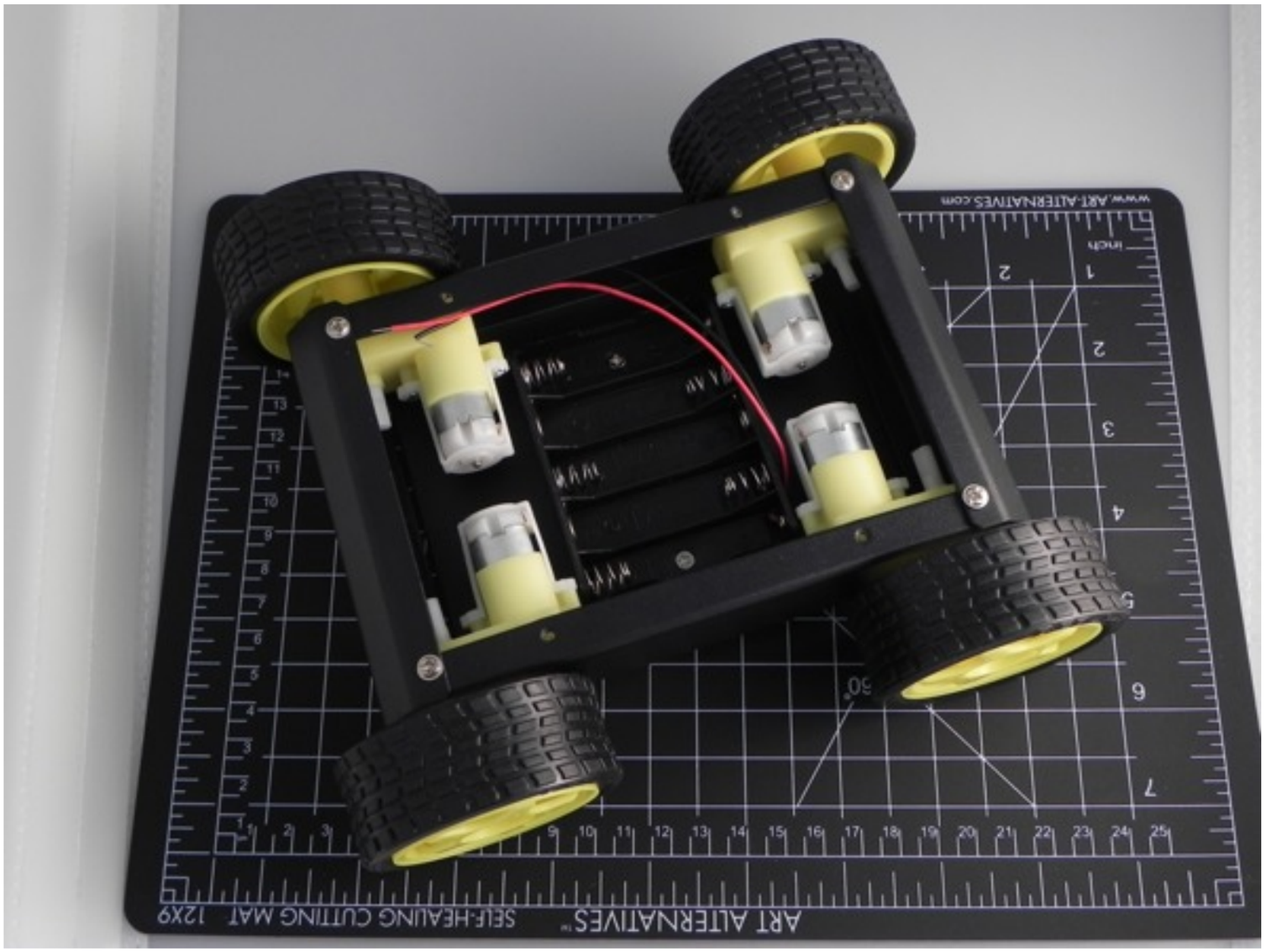
4-WHEEL DRIVE



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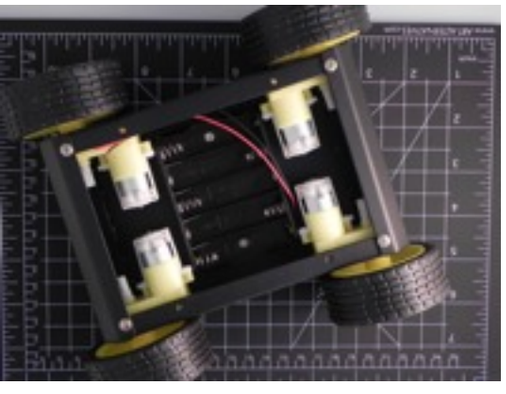
4-WHEEL DRIVE

4WD Arduino Compatible Mobile Platform
Maker Shed MKSEED8

DFROBOT
DRIVE THE FUTURE

Aluminum chassis, plastic and rubber tires
200mmX170mmX105mmX660g



3-12V DC motors - 90 cm/sec
100 RPM at 3V, 60mA
1.92Kgcm torque at 6V

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WIRELESS

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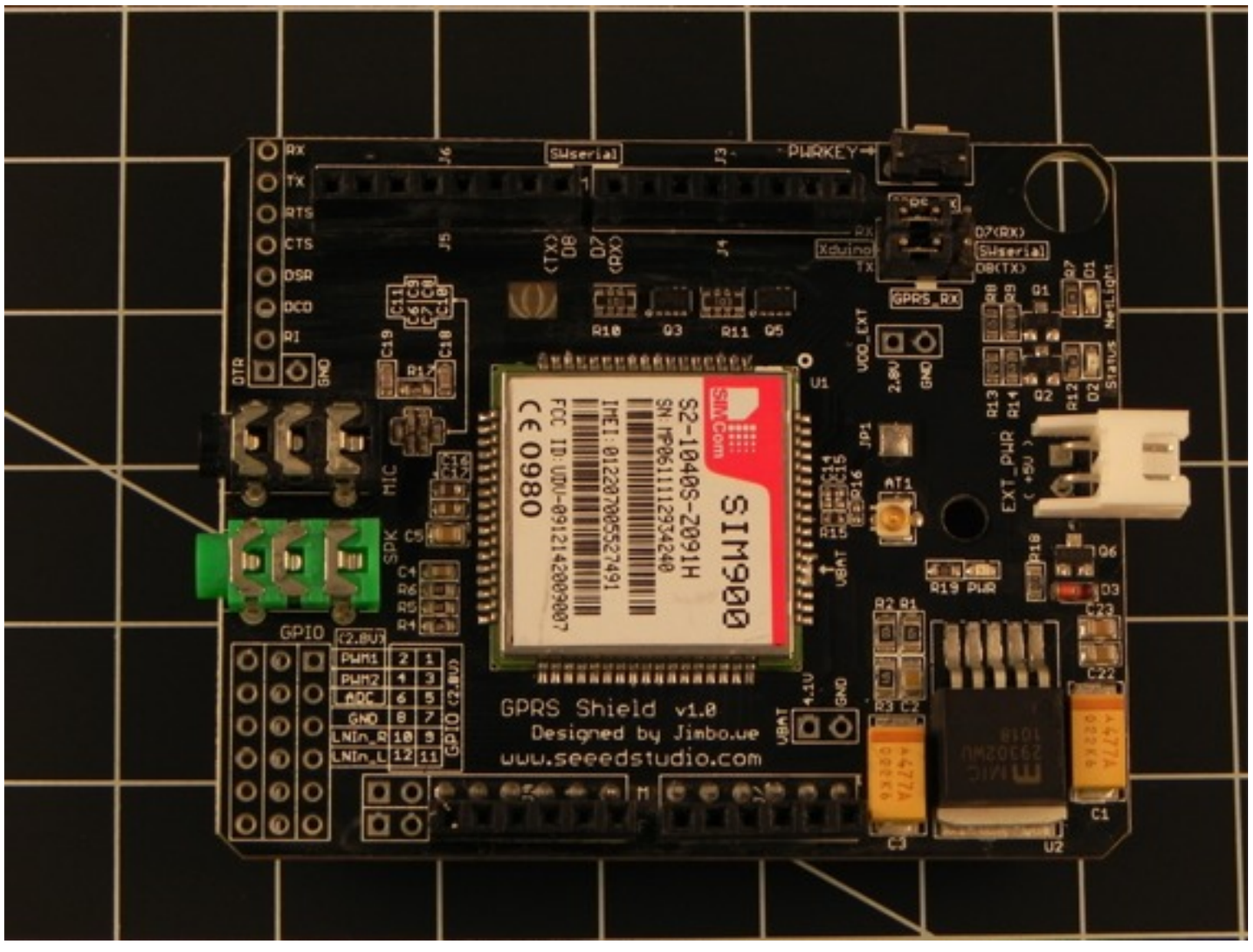
GSM



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GSM

GPRS Shield

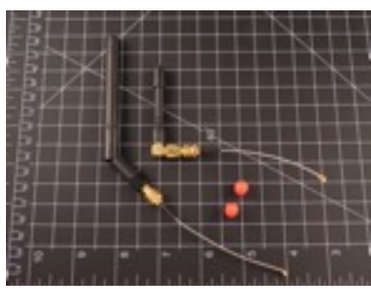
Seeed Studio Bazaar SLD33149P

GSM/GPRS 850/900/1800/1900MHz

SMS, Data, and Fax

AT command set

Low power sleep mode 1.5 mA



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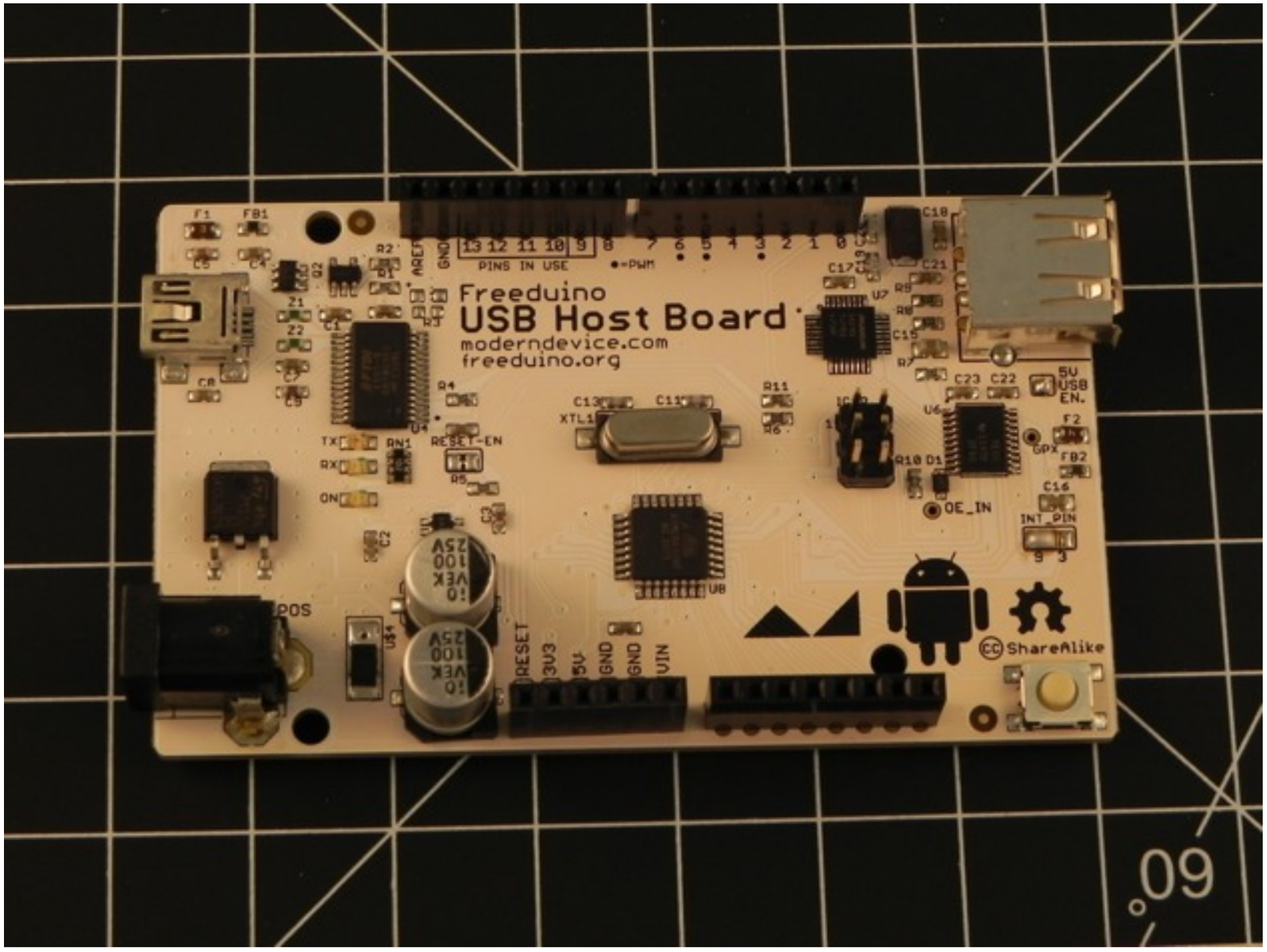
ANDROID



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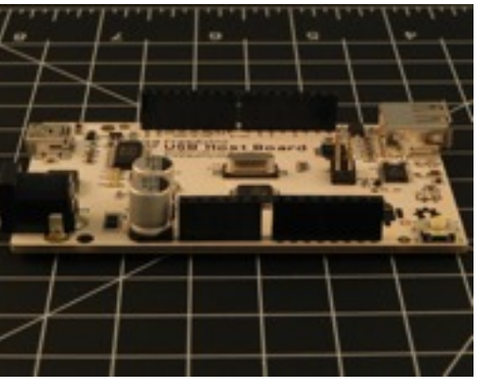
ANDROID



Freeduino USB Host Board
Modern Device MD0FHB

Android ADK firmware support
Accessory is USB Host
Delivers charging 500 mA 5V
6-9V external power

CC-SA Open Source Hardware

open hardware

DEMO

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MULTIPLEXING

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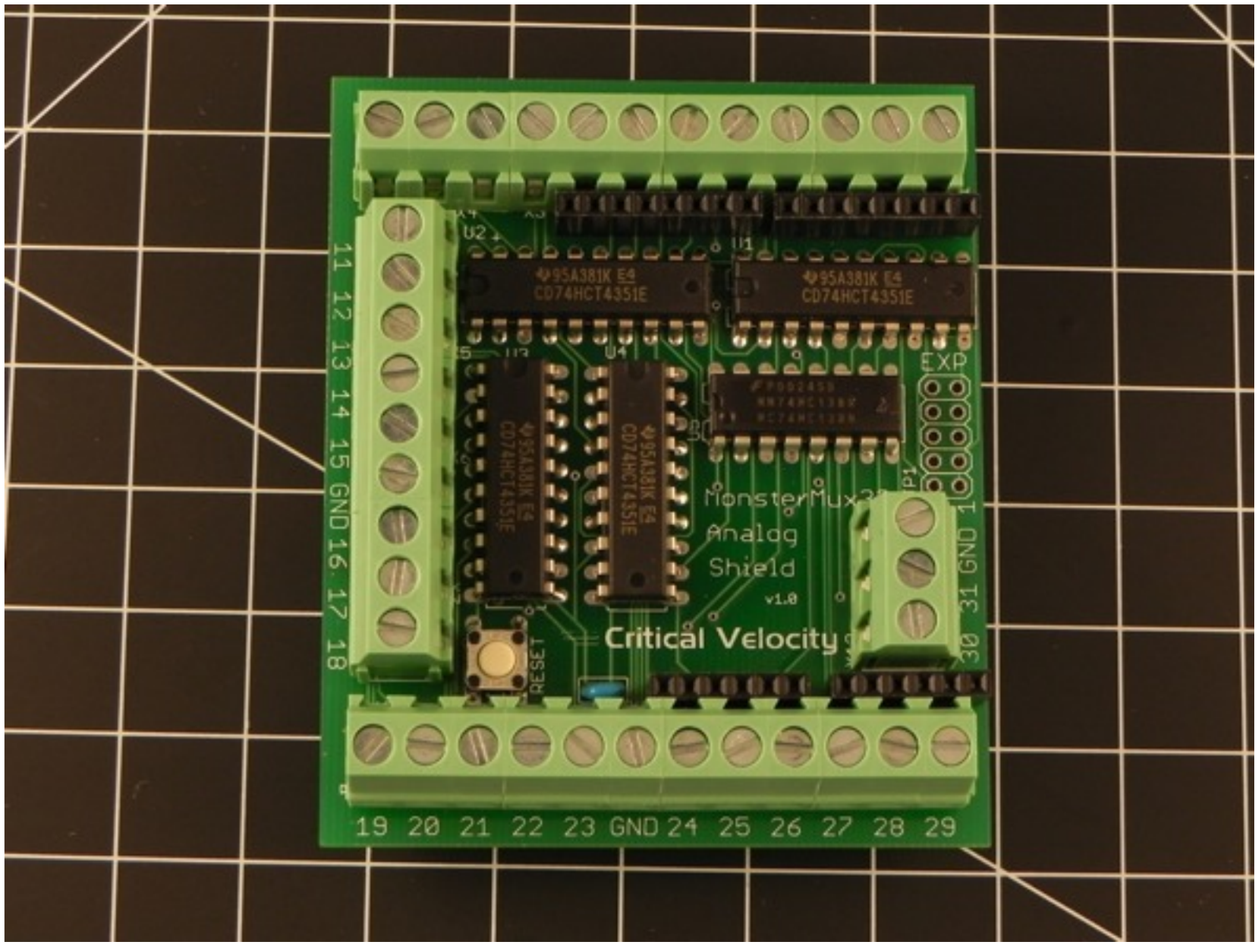
ANALOG



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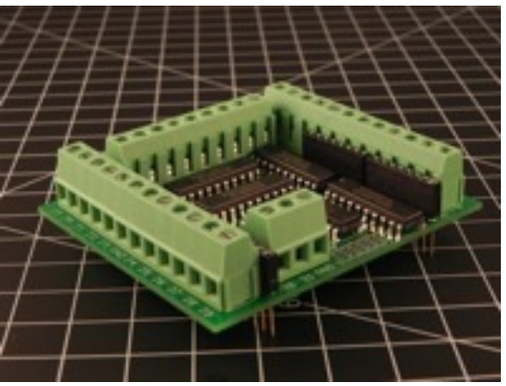
ANALOG



Monster Analog Shield
Critical Velocity MMUX32

32 Analog channels into 1 arduino pin

Block connectors for easy wiring

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INSPIRATION

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CONCLUSIONS

A wondrous Hacking Platform

A ridiculous number of extensions

Many interfaces already HOWTO'd

Join us in finding new great uses for it!

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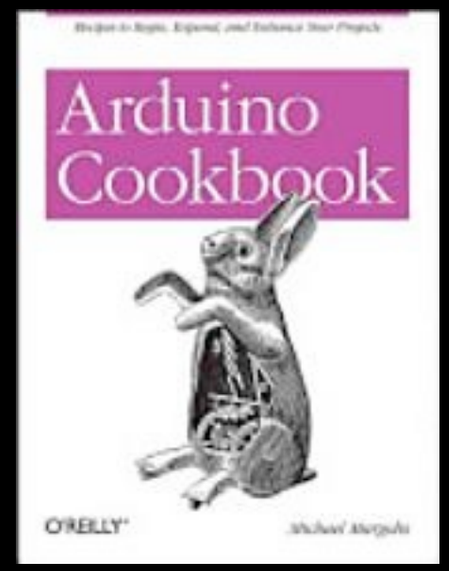
RESOURCES

The Arduino Cookbook



Adafruit Industries Tutorials

Arduino Shield List (http://shieldlist.org)

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QUESTIONS

CONTACT

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