

LITTLEBITS KURS

Straumen skule 11.02.2019

Lars J Liknes

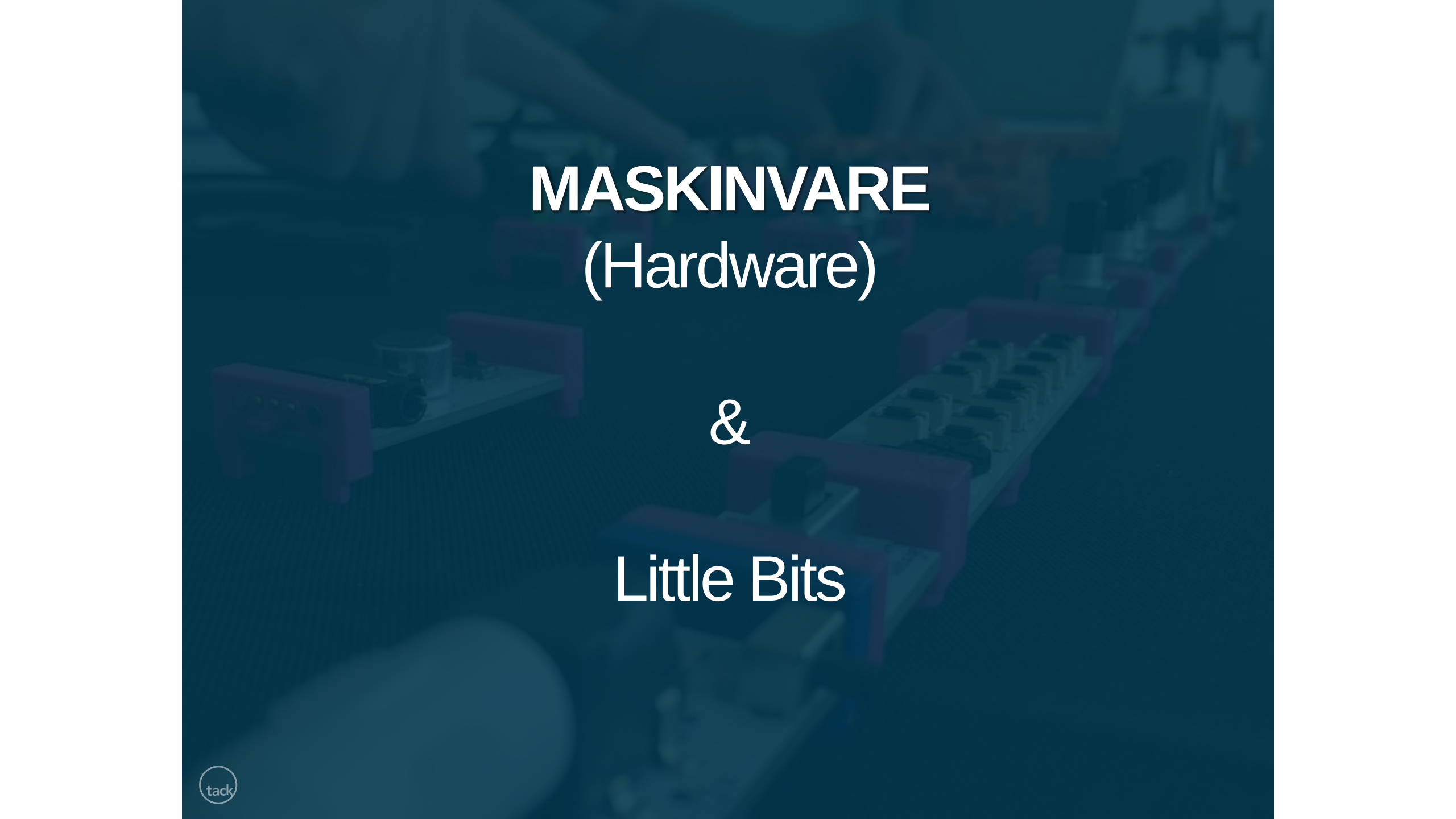
Gratulerer med little bits

- Bygg og lek deg fram til ny kunnskap
- Bruk nysgjerrigheita og eksperimenter
- Ferdige opplegg eller prøve ut på eiga hand
- Korleis virkar det....? Finn svar på reelle spørsmål



KORT OM DAGEN I DAG

- Kort presentasjon/demo
- Utdeling av utstyr, inndeling i grupper
- Oppgaveløysing i grupper
- Diskusjon om vegen vidare på straumen med little bits



MASKINVARE (Hardware)

&

Little Bits

Maskinvare er
elektronikk som
forbindes sammen
og kan gjøre noe nytt.

Tenk på ting rundt oss...

Fjernstyrt bil...



Videospill....

Nettbrett...



Alle desse er satt saman av
små deler....

Veldig ofte, veldig MANGE små deler...

Deler som dette:



Desse delene verkar saman for å
laga noko nytt

Aktivitets armband



[illegible]

Kan de tenkje på andre ting
som er sett saman av
små deler?

Korleis verkar desse delene
saman?

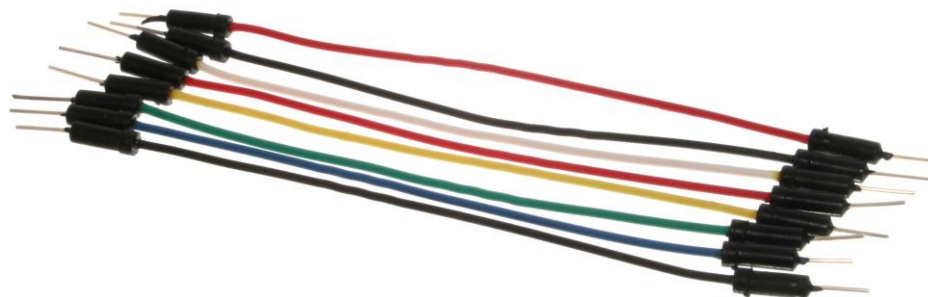
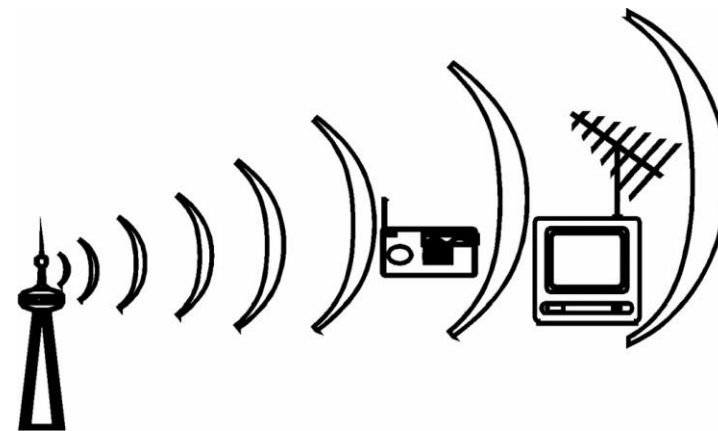
STRAUM er kraft som får ting til å verke



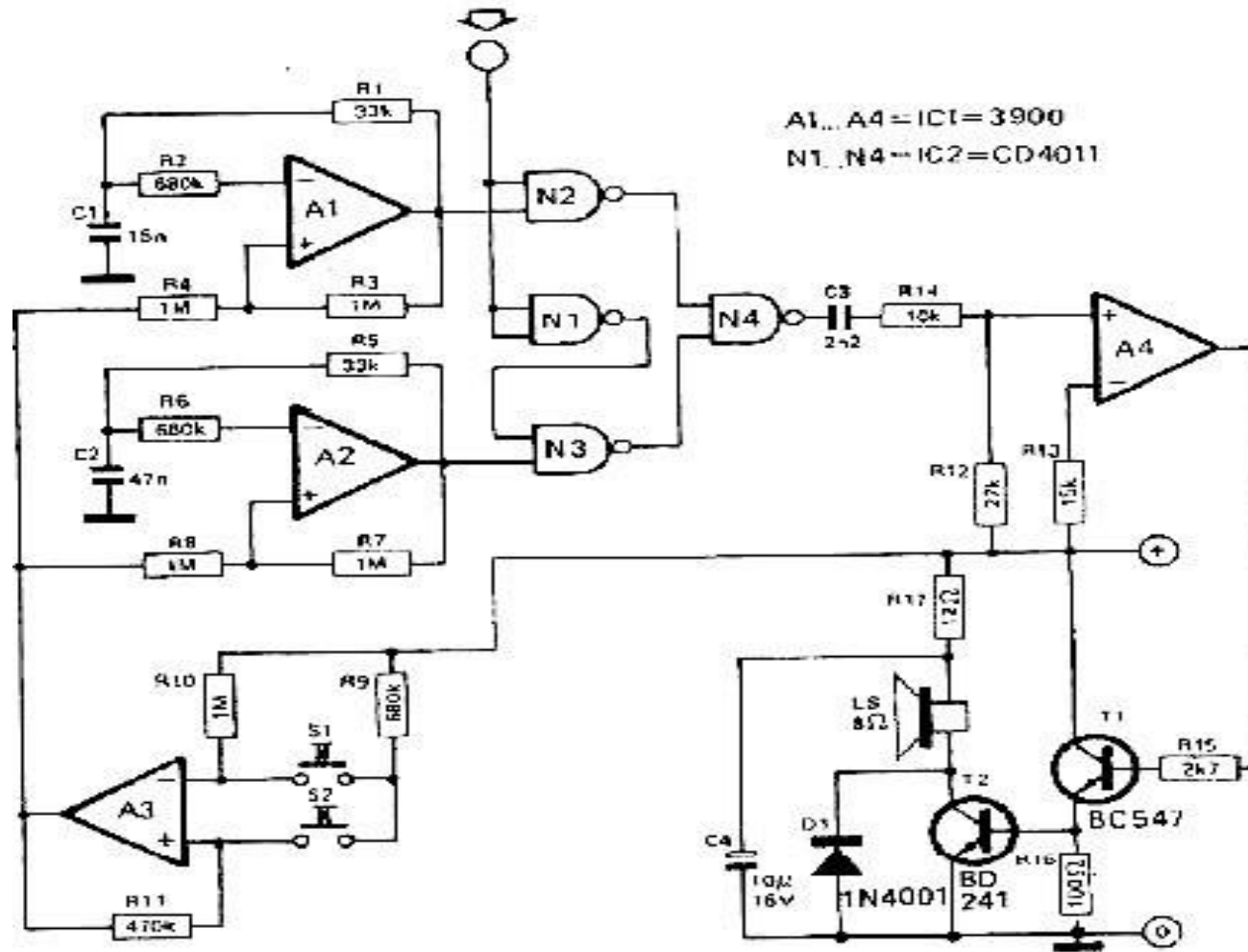
Output er det som skjer



Koblingar gjer at deler kan snakka saman

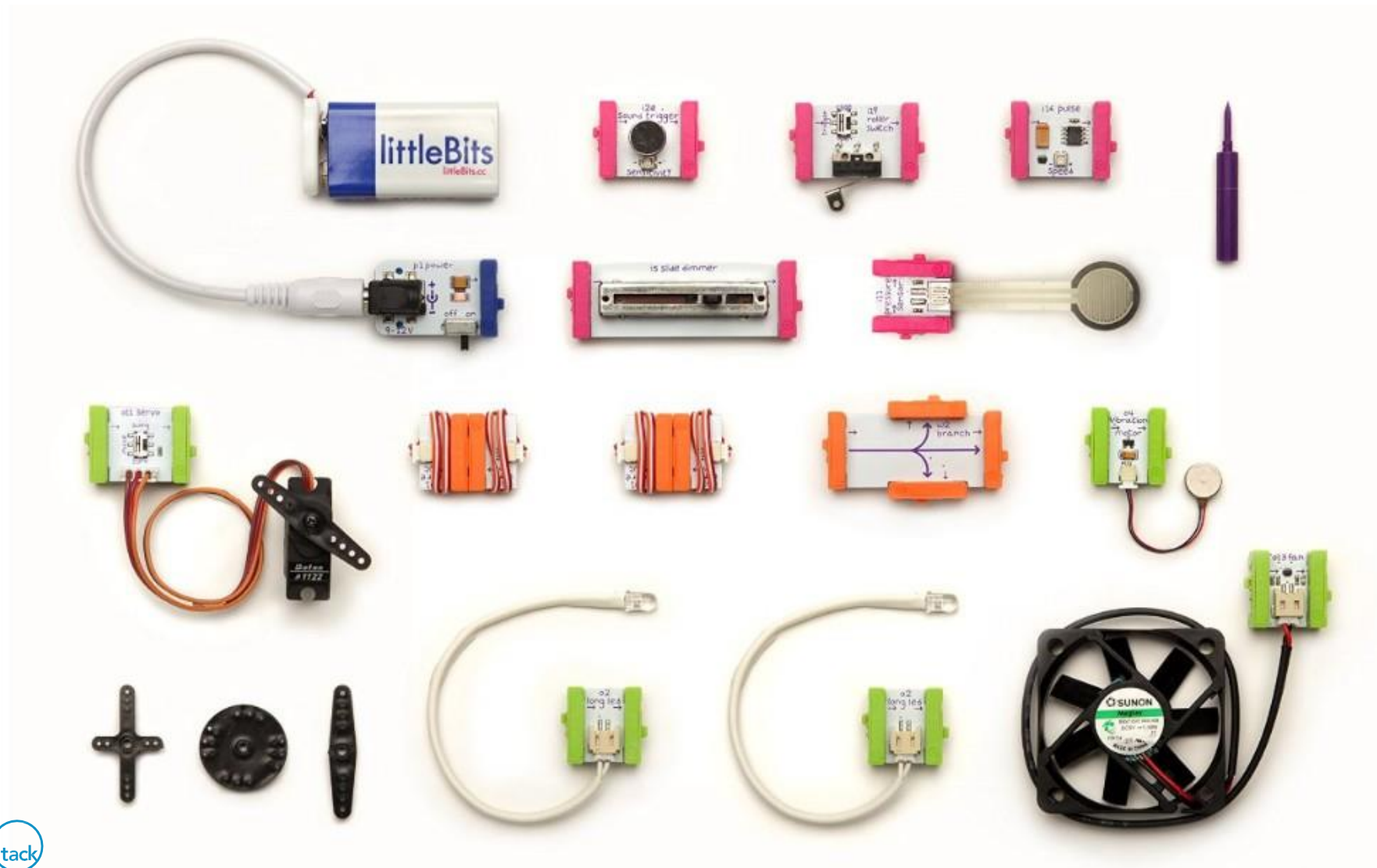


Logikk er tanken om korleis vi ynskjer
at ting skal skje og henge saman



No er det du som skal
byggje noko!

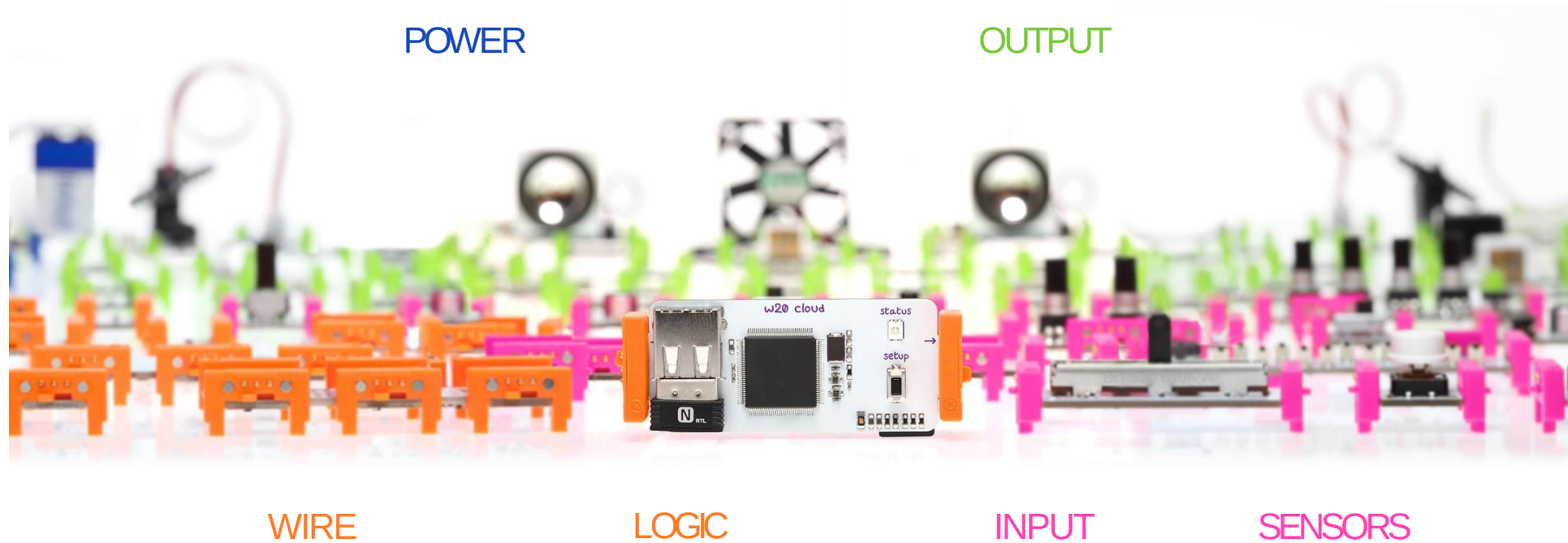
Vi skal bruke **LittleBits** (små deler)



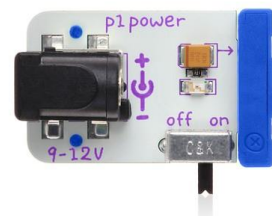
Dette er som elektronisk LEGO



Det finnes ulike typer



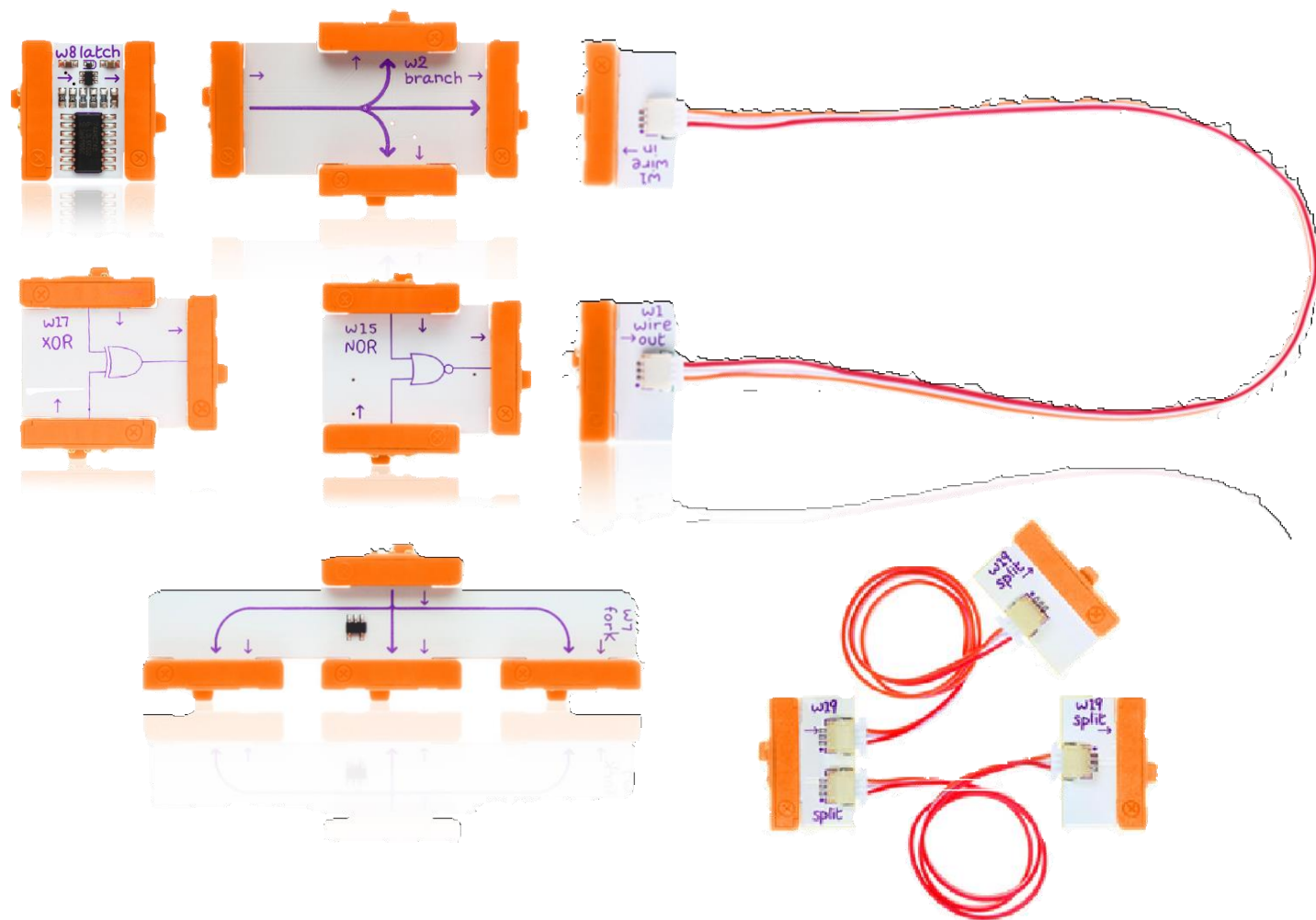
Kraft-delar er blå



Input er rosa



Koplingar er oransje

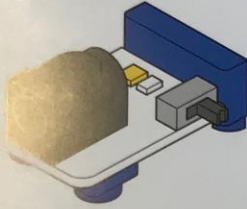


Output er grønn



**Er du klar for å
byggje noko enkelt?**

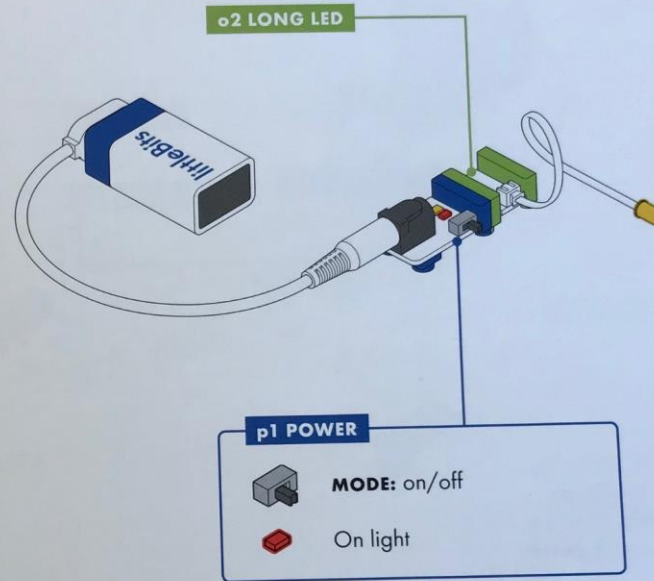
p1 POWER



MEET THE BIT

Every circuit starts with power. It provides the electricity that makes your Bits spin, buzz, blink, and shine.

SAMPLE CIRCUIT

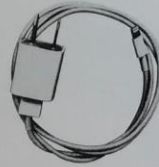


HOW IT WORKS

The power Bit converts the 9 volts of electricity in the battery to the 5 volts that littleBits circuits run on.

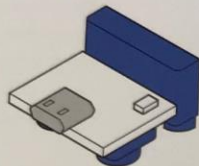
The power Bit also sends a signal through your circuit. Controlling this signal with inputs is how you control your circuit.

REAL WORLD ANALOGIES



PHONE CHARGER

p3 USB POWER



MEET THE BIT

The USB power may be the smallest in the series, but it's big enough to send electricity to all your creations. This Bit lets you power your circuit through a micro USB cable. It can be connected to a computer or wall adapter for non-stop power.

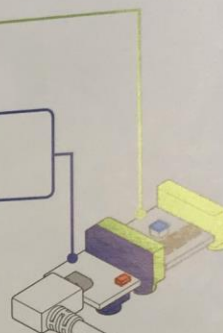
SAMPLE CIRCUIT

o3 RGB LED

p3 USB POWER



On light



HOW IT WORKS

Like the power Bit, the USB power Bit sends a 5 volt signal through your circuit, which allows you to control your Bits.

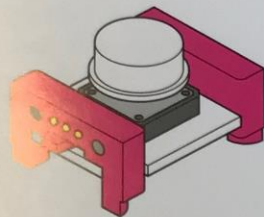
Instructions for the projects in this Kit use the p1 power Bit, but you can use the USB power for all of them as well.

REAL WORLD ANALOGIES



PHONE CHARGER

i3 BUTTON



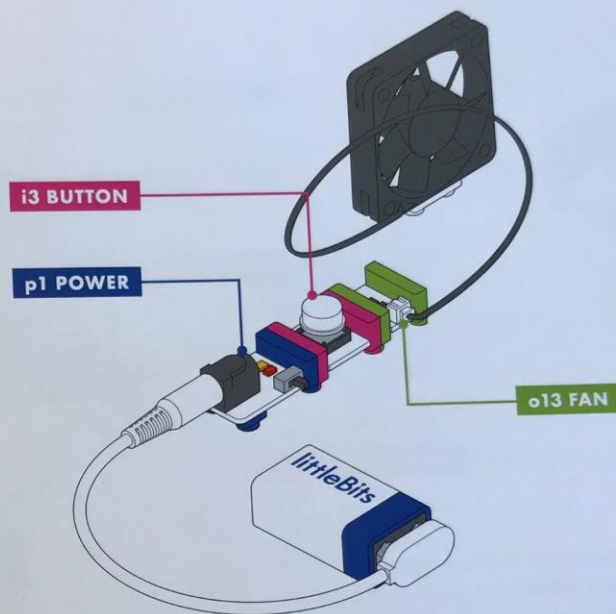
MEET THE BIT

The button Bit is a classic: big, round, and springy for comfortable pressing! Push it to turn something on and release it to turn it off.

MINI-CHALLENGE

Can you invent a chair that makes noise when you sit down?

SAMPLE CIRCUIT



HOW IT WORKS

The button is like a door. When you press it, the door opens, letting the signal pass through the Bit and on to the next Bits in the circuit. The button is a momentary switch, you must continue to press it for the signal to flow. When you release the button, the door closes, stopping the signal from passing on to other Bits.

REAL WORLD ANALOGIES



VIDEO GAME CONTROLLER

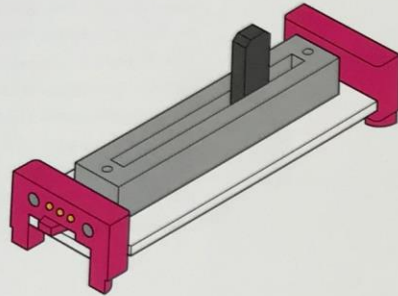


ELEVATOR BUTTON



GAME SHOW BUZZER

i5 SLIDE DIMMER



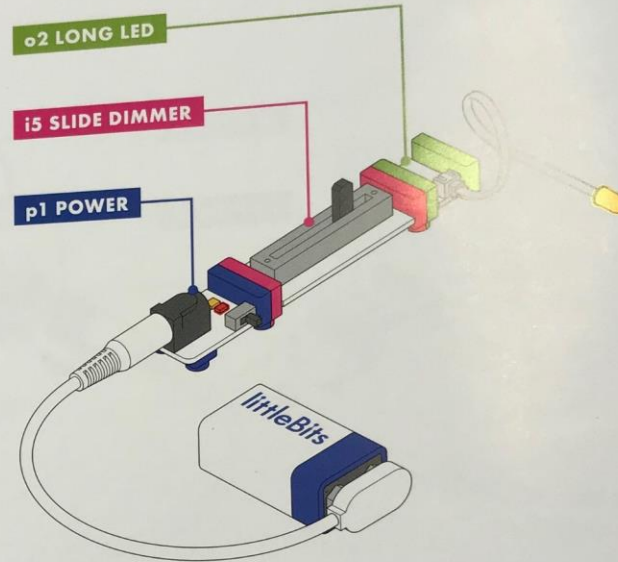
MEET THE BIT

Slide this dimmer back and forth to control your circuit. As you slide it up, more signal goes to the Bits that follow, brightening lights, speeding up motors, and raising the volume on your buzzer.

MINI-CHALLENGE

Can you invent something with the slide dimmer that waves a flag back and forth? How could you change the speed it waves?

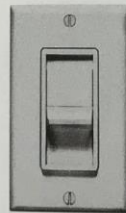
SAMPLE CIRCUIT



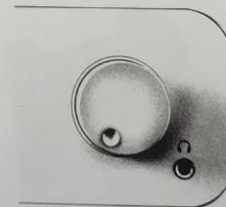
HOW IT WORKS

When the slider is all the way to the left, it's sending an off or 0 volt signal. When the slider is all the way to the right, it's sending a 5 volt signal. The slider can be positioned to send any signal between 0 and 5 volts.

REAL WORLD ANALOGIES



HOUSEHOLD
DIMMER SWITCH



STEREO VOLUME CONTROL



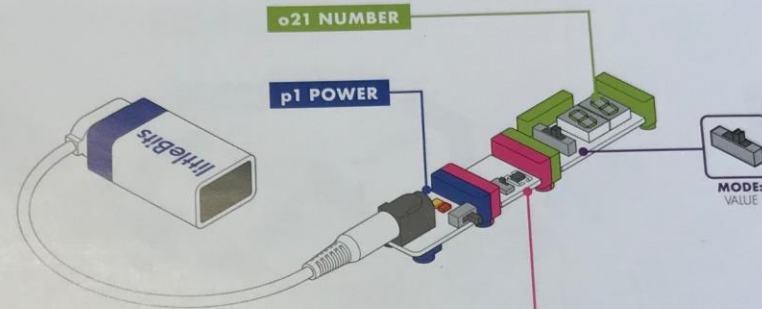
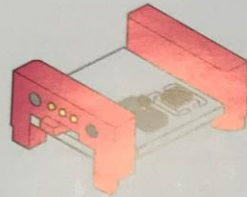
CAR PEDAL

i12 TEMPERATURE SENSOR

SAMPLE CIRCUIT

HOW IT WORKS

The temperature sensor takes a measurement from the environment and translates it into a signal. The higher the temperature it senses, the more signal it sends out to the following Bits (making lights brighter and motors turn faster).



MEET THE BIT

With the temperature sensor you can use the temperature in the surrounding air to control your circuit. It's especially useful for gathering data when paired with the number Bit set to **VALUE** mode.

i12 TEMPERATURE SENSOR



MODE: F° or C°

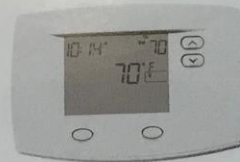


This is the component that measures the temperature.

MINI-CHALLENGE

Can you invent a temperature-controlled gadget to beat the summer heat?

REAL WORLD ANALOGIES



THERMOSTAT



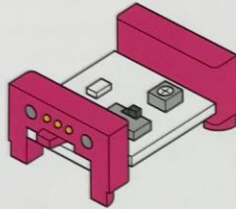
MEDICAL THERMOMETER



A temperature sensor tells your automatic kettle when to turn off.

AUTOMATIC TEA KETTLE

i13 LIGHT SENSOR



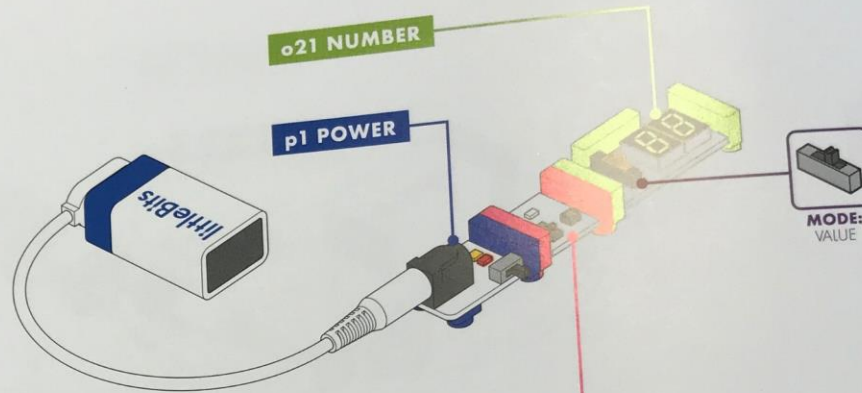
MEET THE BIT

Use this Bit to control your circuits with light! The amount of light shining on the sensor will change how your circuit behaves. It's a great way to activate your circuit without hands and is perfect for alarms!

MINI-CHALLENGE

Can you invent something that moves when the lights go out?

SAMPLE CIRCUIT



i13 LIGHT SENSOR



MODE: light or dark



SENSITIVITY: "-" decrease, "+" increase



This is the component that measures light.

HOW IT WORKS

The light sensor measures how much light is on it. It has two modes. In **LIGHT** mode, light shining on it gets brighter, it passes through lights brighter turn faster). In the signal increases gets darker.

Use the purple turn the dial much light it the signal. C increases se clockwise c

REAL WORLD ANALOGIES



NIGHT LIGHT SENSOR



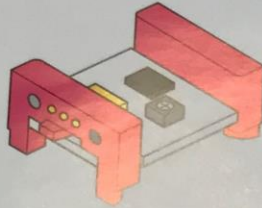
PHOTOGRAPHER'S LIGHT METER



FINGER PULSE METER

A pulse meter into your sensor to n

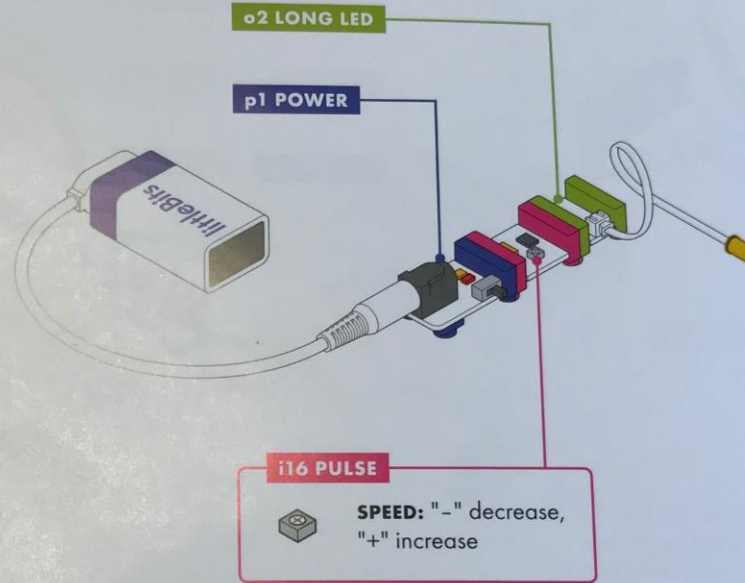
i16 PULSE



MEET THE BIT

The pulse is like a heartbeat that makes the Bits after it turn on and off in a steady rhythm.

SAMPLE CIRCUIT



HOW IT WORKS

The pulse is a switch that opens and closes over and over again. When it's open, the signal from the previous Bit passes through to the next Bit. When the switch closes, the signal is blocked.

Use the purple screwdriver to adjust the dial. You can change the speed of the rhythm by turning the small dial on the Bit with your purple screwdriver.

MINI-CHALLENGE

Can you invent a warning signal with the pulse? How can you make the signal pulse faster or slower?

REAL WORLD ANALOGIES



POLICE SIREN



FIREFLY

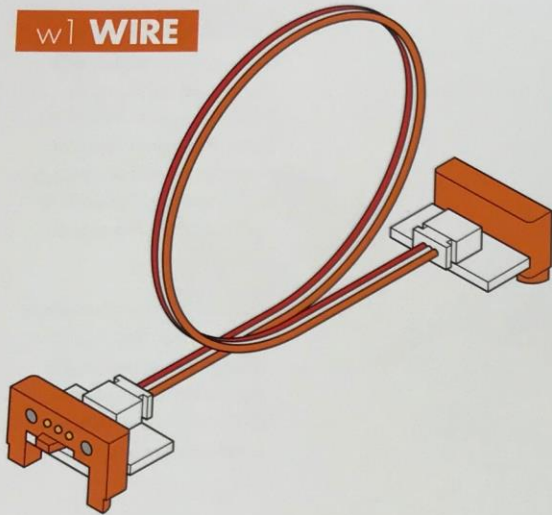


TURN SIGNAL



CLOCK SECONDHAND

w1 WIRE



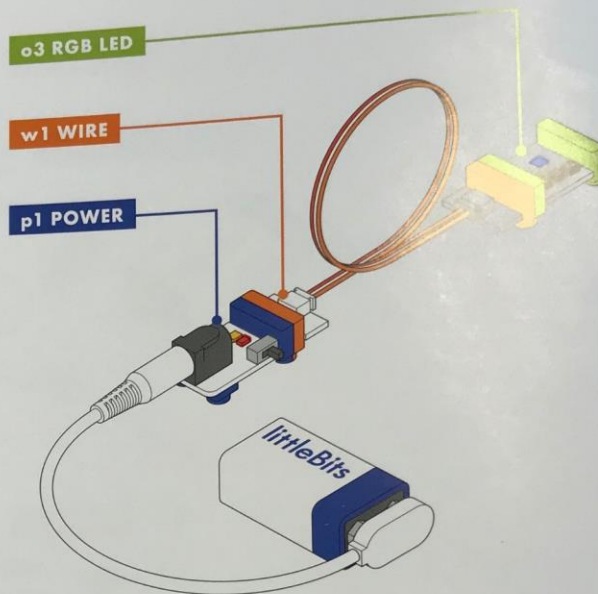
MEET THE BIT

The wire Bit has a flexible wire running between its two bitSnaps. This allows you to place your Bits farther apart, turn corners, and make connections that can twist, turn, and spin.

MINI-CHALLENGE

Can you invent a circuit that uses the wire to shine the RGB LED on the light sensor?

SAMPLE CIRCUIT



HOW IT WORKS

The wire doesn't change the signal in any way – it just carries it over from one Bit to another.

REAL WORLD ANALOGIES



EXTENSION CORD

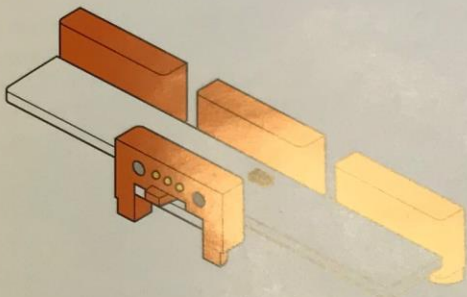


POWER LINES



STRING OF LIGHTS

w7 FORK



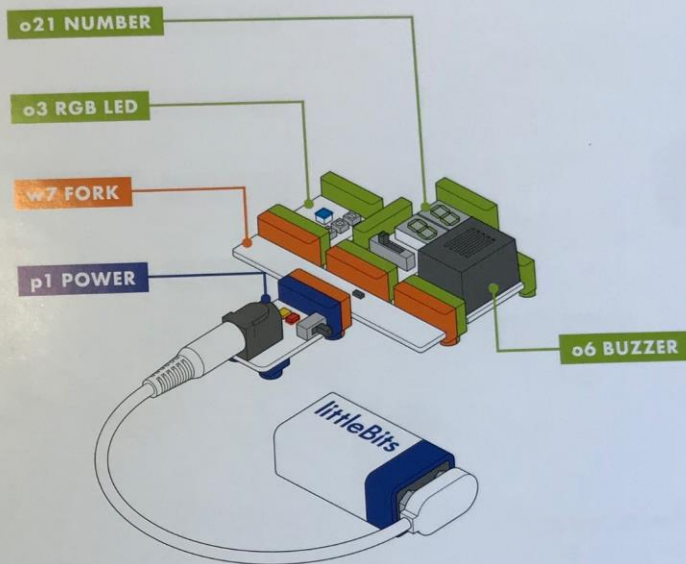
MEET THE BIT

The fork gives you more options for connecting your Bits; it lets you connect a single Bit to as many as three others. If you place an input before the fork, it will control all three outputs at once, such as light, sound, and motion.

MINI-CHALLENGE

Can you invent a circuit where an input controls three outputs?

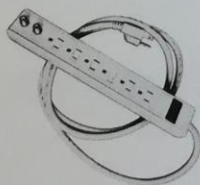
SAMPLE CIRCUIT



HOW IT WORKS

The fork takes the incoming signal and sends it to all three output bitSnaps.

REAL WORLD ANALOGIES

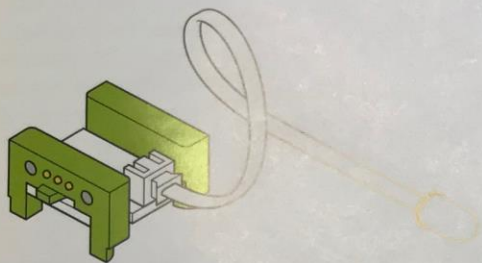


POWER STRIP



FORK IN THE ROAD

o2 LONG LED



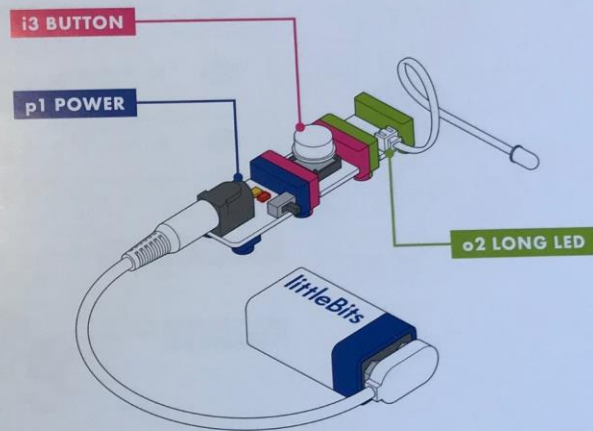
MEET THE BIT

The long LED is a flexible lighting option. We call it the "long" LED because the light is connected to the board by a cable, which lets you put the light in some interesting places.

MINI-CHALLENGE

Can you invent a new wearable accessory using the long LED?

SAMPLE CIRCUIT



HOW IT WORKS

This Bit uses a light-emitting diode (LED) to turn electricity into light. The more signal you send the Bit, the brighter the light shines.

REAL WORLD ANALOGIES



FLASHLIGHT

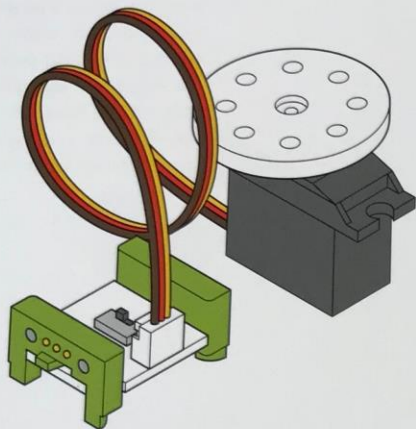


STREET LAMP



ANGLERFISH

o11 SERVO



MEET THE BIT

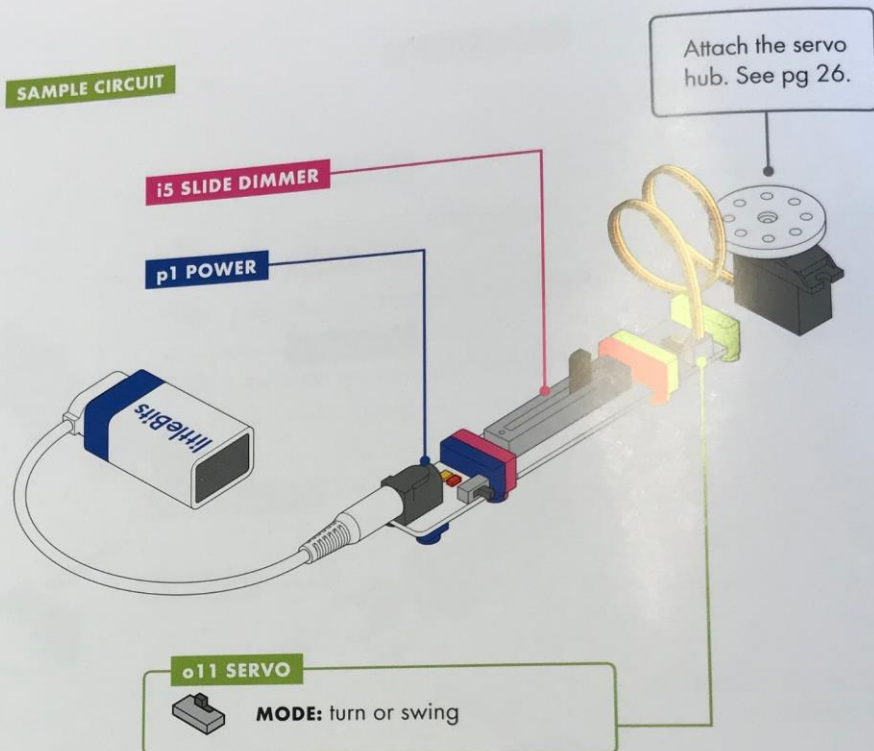
The servo is a motor that can swing back and forth or be turned to a specific position.

There are a few accessories you can use with the servo (like the mechanical arm). You can find out how to use those on pages 26 and 27.

MINI-CHALLENGE

Can you invent something that uses the servo to clean up your desk?

SAMPLE CIRCUIT



HOW IT WORKS

The servo has two modes. In **TURN** mode, the input from other Bits determines the position of the hub - try using a dimmer to set the angle you want. In **SWING** mode, the servo will move back and forth on its own like a pair of windshield wipers - the input signal controls the speed of the swing.

The servo's range of motion is about 110 degrees.

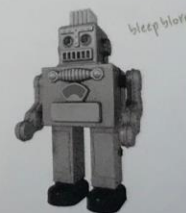
REAL WORLD ANALOGIES



TRUCK CRANE

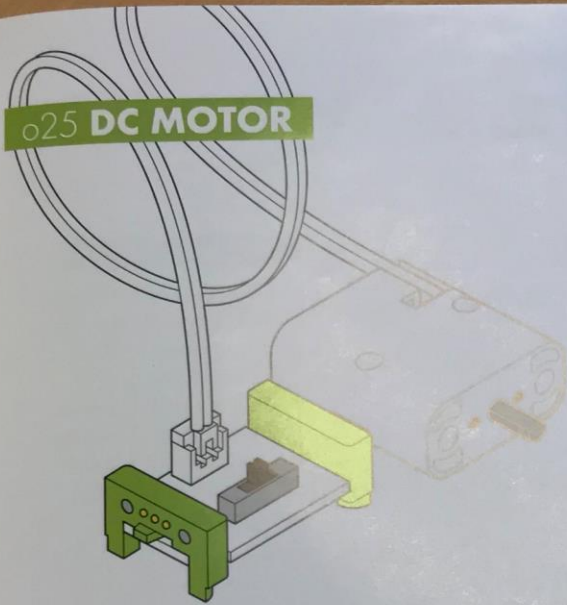


WINDSHIELD WIPERS



ROBOT

o25 DC MOTOR



MEET THE BIT

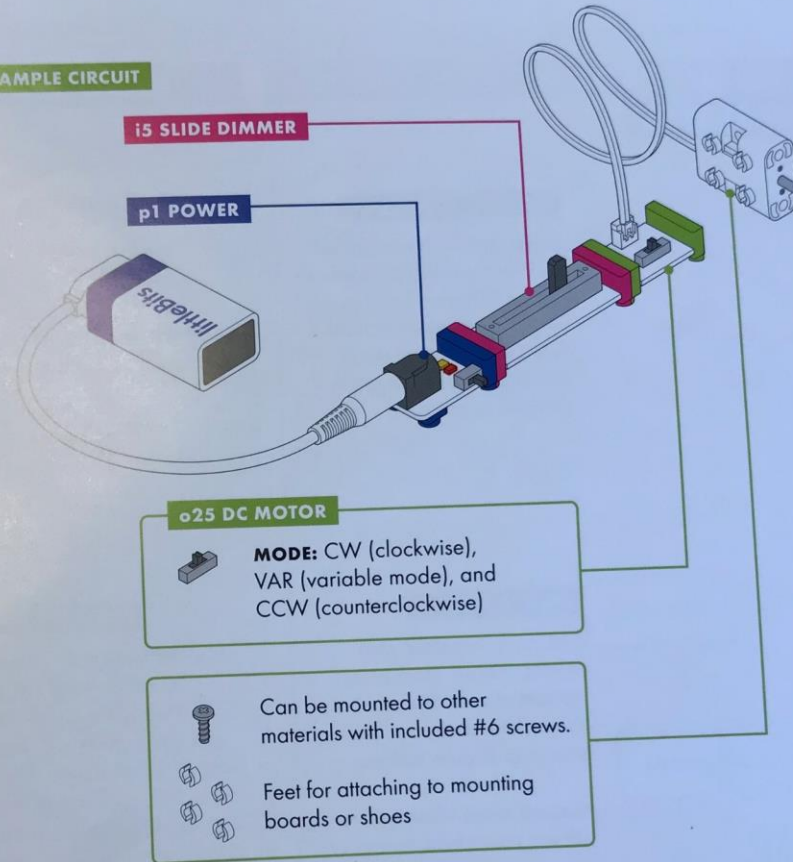
Use the motor to spin, turn, twist, and roll.

There are a few accessories you can use with the DC motor (like wheels). You can find out how to use those on pages 25 - 27.

MINI-CHALLENGE

Can you invent something using the DC motor that travels across the table?

SAMPLE CIRCUIT



HOW IT WORKS

The DC (or "direct current") motor rotates a shaft when it receives a signal. The more signal it receives, the faster the motor will spin.

A switch on the board lets you choose which direction the motor spins. **CW** spins clockwise and **CCW** spins counterclockwise. When the switch is in **VAR** (variable) mode, the amount of signal the motor receives from previous Bits allows you to control the speed and direction (clockwise or counterclockwise) of its motion. In this mode, using an input like a slide dimmer makes steering easy!

REAL WORLD ANALOGIES



CAR ENGINE



DRILL



FERRIS WHEEL

Nokon idear om kva vi kan
lage?

Lyd kontrollert bil?



Ekorn kamera?



Vær kreativ!



LITTLEBITS + ANNA MATERIALE

- A FINN noko å bygge frå andre
- B FINN OPP noko nytt
- C BLANDING av A og B

KVA har vi lært?

- Hardware er laga av mindre deler.
- Det er ulike deler med ulike funksjonar.
- Mange delar kan snakka med kvarandre.
- Vi har utforska LittleBits
- Du har laga noko unikt 😊

Koding og LITTLEBITS

- Bruke ipad eller PC til å kode.
- Lærarintroduksjon på engelsk.

Meir å lære

- littleBits.cc/student-set
- littleBits.cc/invention