



# IdemoBits

*IdemoBits are a kit of electronic building blocks, that can be combined in endless ways to make interactive electronics easily.*

IdemoBits are developed and maintained by IdemoLab, DELTA. They were developed as a tool to aid IdemoLab in the Electronic Sketching process ([www.idemolab.com](http://www.idemolab.com)) to make it easier and faster to build simple interactive models of new ideas and concepts for evaluation. IdemoBits can now be used by everyone who want to build quick and easy electronic circuits, and learn how various sensors and actuators work.

## Advanced instructions

All the IdemoBits is shipped with one functionality, so they is ready for use. Some of them can be reprogrammed using Arduino, to give them extended or alternative functionality. For instructions on how to reprogram your IdemoBits see [www.idemobits.com](http://www.idemobits.com).

## Intended use & users (application)

IdemoBits are a development and educational tool for use by designers, engineers and students who want to make fast and customizable electronic circuits. IdemoBits is not a toy and should not be used by children under the age of 10 or without proper supervision by a trained professional in electronics.

## Safety & Risks

- IdemoBits are powered by a AAA 1.5V battery or by a USB-supply.
- IdemoBits can only be used with a USB capable device or supply that is CE-certified.
- IdemoBits contain exposed electronic circuits. They have been designed in such a way as to minimize the risk of getting hurt, but for safety reasons the IdemoBits should always be used by people with proper training in electronics or under supervision of people with proper training in electronics.
- IdemoBits contain sharp and pointy edges, and should be handled carefully.

- IdemoBits should not be put in the mouth.
- IdemoBits should not be used or placed on metal or other conductive surfaces.
- IdemoBits should not be touched on open contacts and surfaces of electronic components.
- IdemoBits should not be placed on top of each other when powered due to risk of short circuits.
- IdemoBits should not be used in moist or damp surroundings, and should not be exposed to water.
- IdemoBits should not be connected to anything else than approved IdemoBits.
- IdemoBits should not be used in any other ways than what is described in this manual.
- Before each use, IdemoBits should be visually checked for defects and dirt that can cause IdemoBits to malfunction.
- For each connected set of IdemoBits, only one power supply can be used. A power supply is the PowerBit, the ProgrammingBit or any other IdemoBits that supply power.

## Environmental concerns

IdemoBits contain a AAA battery, which should be disposed of properly according to the local regulations after use. IdemoBits should not be thrown out, but disposed off according to local regulations.

## Conformity

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the

instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This product meets the EMC requirements of EU directive 2004/108/EC.



## Contact

For any inquiries please contact IdemoLab:  
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# IdemoBits overview

*Description of IdemoBits functionality*

## Sensors

### PowerBit

This Bit is the power source. It needs an AAA battery to run, and make sure to observe the right polarity before inserting the battery. There is an on/off switch next to the battery and a LED to indicate when it is turned on. Remember to turn it off after use so the battery is not drained. You need one of these every time you want to make something with IdemoBits.

### IN-5 ReedBit

This Bit contains a magnet switch. If a magnet is held close to the Bit, the input signal will be passed on to the next Bit, otherwise it will block the output signal.

### IN-3 ButtonBit

This Bit contains a simple push button. If there is a signal to the input it will act as a "gate" allowing that signal to pass when the button is pressed. If there is no input signal, the Bit will generate one when pressed.

### IN-7 AccelerometerBit

This Bit contains an accelerometer. This is similar to what is inside a phone to detect which way it is turned. The accelerometer can detect movement in 3 directions, as marked on the Bit, and selected with the small switches. If all switches are turned on at the same time, the Bit turns into a "Shake-O-Meter" – the more you shake it, the higher a signal it will generate.

## Sensors

### IN-1 ThresholdBit

This Bit contains a potentiometer. When it gets an input signal it compares it to the level set by the potentiometer. If the input level is lower than the level set with the potentiometer the output signal is turned off. If the input level is higher the output is turned on.

### IN-2 LatchBit

This bit contains a latch function, that works as an on/off switch. When the input signal reaches the threshold set with the potentiometer the output signal will be turned on. The output will stay on until the input signal reaches the threshold again after having been lowered under the threshold.

### IN-4 PlusBit

This Bit contains a potentiometer. When the potentiometer is turned up and down, the output signal will get bigger or smaller accordingly.

### IN-6 MinusBit

This Bit contains a potentiometer similar to the PlusBit, but it works in reverse. When the potentiometer is turned up the electrical input signal is reduced accordingly, and sent to the output. The MinusBit doesn't generate a signal, so it only works when it gets an input signal.

## Sensors

### IN-8 TouchBit

This Bit contains a touch sensor. If you touch the big icon on the Bit the input signal is passed on, or else the output signal is blocked. You can use it to make hidden buttons under a piece of paper. It also works if you touch it on the backside.

### IN-9 PressureBit

This Bit contains a pressure sensor. When you press on the circular tab, the signal is turned up and down depending on how hard you press.

## Actuators

### IN-1 BluetoothBit

This Bit has connections for a Bluetooth radio that can connect to your computer or smartphone. When it is connected to an input Bit it will convert the electrical input signal to a value between 0 - 255 and send it to any connected devices. You have to supply the Bluetooth module yourself.

### IN-2 VibratorBit

This Bit contains a vibrating motor similar to the one in a phone. When the Bit gets a signal the motor vibrates. The higher the signal, the more powerful the vibration will be.

## Actuators

### IN-3 BuzzerBit

This Bit contains a piezo buzzer which is like a small loudspeaker. When the Bit gets a signal the buzzer will make a sound. The magnitude of the signal controls the pitch of the sound.

### IN-4 LEDBit

This Bit contains a simple LED which is like a small lamp. When the Bit gets a signal the LED will light up. The magnitude of the signal controls the luminosity of the LED.

### IN-5 BargraphBit

This Bit contains a row of LEDs. When the electrical input signal is increased more of the LEDs will light up and vice versa.

### ProtoBit

This Bit is a signal inverter, i.e. if the input signal is high, the output signal will be low. Besides that, this Bit is a bare playground for you to do whatever you want, but it requires knowledge and training in electronics and programming. As an example you can use it to connect a small DC motor to your IdemoBits and control the speed with the PlusBit. You can use the ProgrammingBit to reprogram it after you have attached your own sensor or actuator.

## ProgrammingBit

Used for reprogramming the Bits.  
See [www.idemobits.com](http://www.idemobits.com) for details.

## Magnet

To be used with the ReedBit.

## Battery

AAA battery.

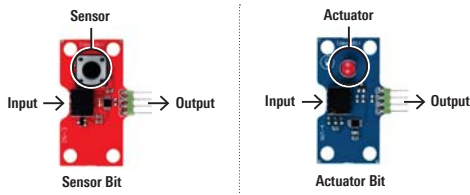
## Empty

Can hold a Bluetooth module for the BluetoothBit.

# How to use the IdemoBits

Follow these steps to get started with IdemoBits

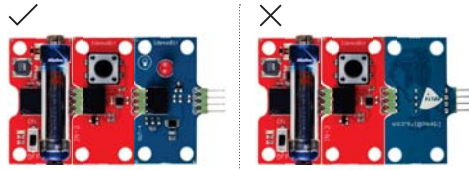
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### Sensor and actuator Bits

There are two overall kinds of IdemoBits - sensor (red) and actuator (blue). The sensor Bits read an external source (eg. your finger) and translate it into an electrical signal. This signal is mixed with the input signal to the Bit (if there is any) and then the combined signal is the output. The actuator Bits get a signal from a sensor Bit and use that to create an action (eg. a LED lighting up). They also pass on the input signal to the output without changing it. In this way you can have many actuator Bits connected and all reacting to the same input.

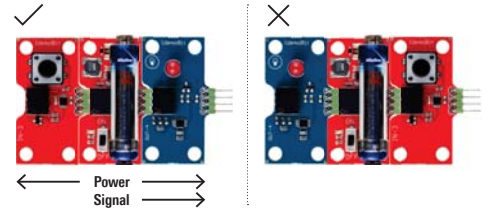
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### Pin it together

To make something with the IdemoBits you should always start with the PowerBit. After that you need a sensor Bit to generate a signal and then an actuator Bit to react to the signal. You can only use one PowerBit for each connected set of IdemoBits, but you can use as many sensor and actuator Bits as you want. You can use the overview at the bottom of this page or the detailed description on the opposite side to see which Bits do what, and you can use the pictures and the numbers (e.g. IN-1 or OUT-3) on the Bits to tell them apart.

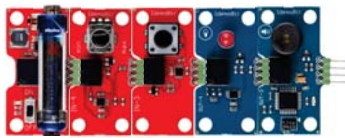
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### Current and signal paths

When you connect the IdemoBits, it's important to do it in the right order. There are two things to keep in mind here; power and signal. The power from the PowerBit travels in both directions, and thus it doesn't matter where in the chain the powerBit is placed. The signal is different as it only travels in one direction; from the input to the output on a bit. This means that if you want to light up the LEDBit when you press the ButtonBit you should make sure that the output of the ButtonBit is connected to the input of the LEDBit.

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### Example of use

To help you get started you can try to make this combination of IdemoBits. The PlusBit will react to how much you turn the knob and send the signal to the ButtonBit which allows you to pass on the signal to the ActuatorBits when the button is pressed. The LEDBit will light up depending on the signal, and the BuzzerBit will change its sound accordingly. Try to experiment with different combinations of Bits, to learn what they do.

## IdemoBits overview

Short introduction to the various IdemoBits

<p><b>PowerBit</b> Provides power for the other Bits.</p>	<p><b>IN-1 ThresholdBit</b> Turns a variable signal into an on/off signal.</p>	<p><b>IN-8 TouchBit</b> Touch it.</p>	<p><b>OUT-3 BuzzerBit</b> Buzzes.</p>
<p><b>IN-5 ReedBit</b> Reacts to magnets.</p>	<p><b>IN-2 LatchBit</b> Can hold the signal on or off for you.</p>	<p><b>IN-9 PressureBit</b> Pressure sensitive.</p>	<p><b>OUT-4 LEDBit</b> Lights up.</p>
<p><b>IN-3 ButtonBit</b> Push it.</p>	<p><b>IN-4 PlusBit</b> Increases the signal.</p>	<p><b>OUT-1 BluetoothBit</b> Send/receive a signal wirelessly.</p>	<p><b>OUT-5 BargraphBit</b> Lights up more.</p>
<p><b>IN-7 AccelerometerBit</b> Move it.</p>	<p><b>IN-6 MinusBit</b> Decreases the signal.</p>	<p><b>OUT-2 VibratorBit</b> Vibrates.</p>	<p><b>ProtoBit</b> Signal inverter or build your own IdemoBit.</p>
<p><b>ProgrammingBit</b> Used for reprogramming the Bits. See <a href="http://www.idemobits.com">www.idemobits.com</a> for details.</p>	<p><b>Magnet</b> To be used with the ReedBit.</p>	<p><b>Battery</b> AAA battery.</p>	<p><b>Empty</b> Can hold a Bluetooth module for the BluetoothBit.</p>