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) 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.idemolab.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 customisable 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 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 is 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 “get” allowing that signal to pass when the button is pressed. If there is no input signal, the Bit will generate one by pressing.

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.

IN-5 BargraphBit
This Bit contains a row of LEDs. When the electrical input signal reaches the threshold, one LED lights up. The magnitude of the signal is shown by the number of LEDs that lights up.

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-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.

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 press it on the backside.

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-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.

IN-1 BluetoothBit
This Bit has connections for a Bluetooth radio that can connect to any connected devices. You have to supply the Bluetooth module yourself.

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.

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.

Battery
AAA battery.

ProgrammingBit
Used for reprogramming the Bits. See www.idemolab.com for details.

Actuators

Magnet
To be used with the ReadBit.

Empty
Can hold a Bluetooth module for the BluetoothBit.

Contact

For any inquiries please contact IdemoLab: Tel. +45 72 19 40 00 or idemolab@delta.dk

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How to use the IdemoBits
Follow these steps to get started with IdemoBits

Sensor and actuator Bits
There are two overall kinds of IdemoBits - sensor (red) and actuator (blue). The sensor Bits read an external source (e.g., 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 (e.g., 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.

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 same Bit to tell them apart.

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.

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

PowerBit
Provides power for the other Bits.

IN-5 ReedBit
Reacts to magnets.

IN-3 ButtonBit
Push it.

IN-7 AccelerometerBit
Move it.

ProgrammingBit
Used for reprogramming the Bits. See www.idemobits.com for details.

IN-1 ThresholdBit
Turns a variable signal into an on/off signal.

IN-2 LatchBit
Can hold the signal on or off for you.

IN-4 PlusBit
Increases the signal.

IN-6 MinusBit
Decreases the signal.

IN-8 TouchBit
Touch it.

IN-9 PressureBit
Pressure sensitive.

OUT-1 BluetoothBit
Send/receive a signal wirelessly.

OUT-2 VibratorBit
Vibrates.

OUT-3 BuzzerBit
Buzzes.

OUT-4 LEDBit
Lights up.

OUT-5 BargraphBit
Lights up more.

OUT-6 ProtoBit
Signal inverter or build your own IdemoBit.

Magnet
To be used with the ReedBit.

Battery
AAA battery.

Empty
Can hold a Bluetooth module for the BluetoothBit.