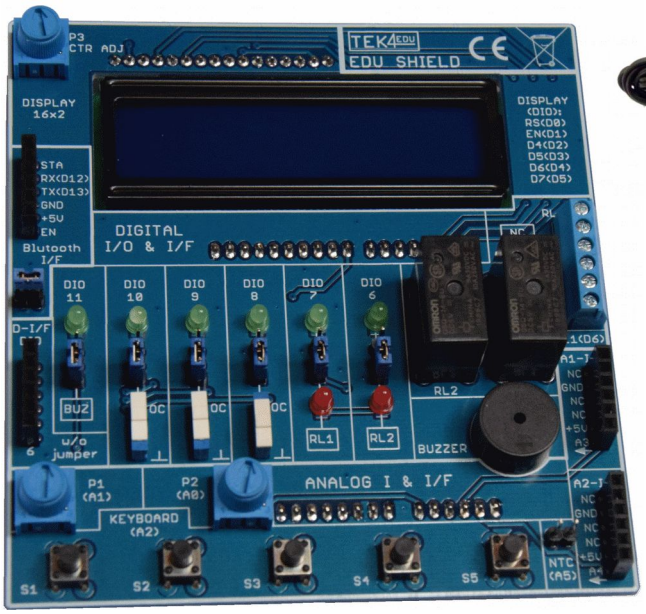
EDU SHIELD
mod.T4E-ASB-02

Arduino Shield Board



Temperature probe

Bluetooth

Google Play

App

TEK4EDU myEDU

Remote Monitoring

Remote Control

The **EDU SHIELD mod.T4E-ASB-02** board is an **Arduino/Genuino UNO Educational Shield** that allows you to build a compact and immediate system for Arduino's ***learning by doing***.

Using a **Power Bank** may be portable: its display shows the measurements or information you expect.

It is possible to run **12 different experiments**: for each experiment, the **Arduino code** and the **App** (if required) are provided for communication between the board and an **Android** device.

The board contains more ready-to-use devices, without having to perform complex and confusing cabling: you only need to upload the code (**sketch**) of the experiment that will enable the transducer or read the status of a sensor or show on-display the expected information, etc.

The presence of the **Bluetooth** interface allows sending or receiving information to or from an **Android** mobile device (smartphone or tablet).

Using this board you will be able to concentrate on the code to create complex systems without wiring, eliminating:
- the risk of fault due to incorrect or unstable connection, or
- damage to an Arduino port or an electronic component, due to incorrect circuit design.

The board configuration is flexible for the presence of jumpers that allow you to configure the Arduino board ports as input or output and select the required device.

Includes and manages LCD displays, LEDs, switches, relays, buzzer, potentiometers, keyboard with more buttons, temperature probe and Bluetooth interface.

There are **N.2 analog interfaces** (compatible with **analog BTA sensors of Vernier**) that can be used to acquire analog quantities supplied by experimental boards or external breadboard.

To use the shield you do not need to know the electronics: it was designed to be used in an "immediate" way. It's enough:
1. Insert the shield on an Arduino board
2. Connect the PC to the Arduino board
3. Install the **Arduino Software IDE**
4. Open and **upload** the sketch required for the experiment you want to run

The board is ready with its components and devices without the need for any wiring.

myEDU apps, which can be downloaded using the **QRcode** on the page, make it easy to use the board with an **Android** device.

Students, following the instructions in the manual, can build their own **Android** apps that will communicate with the board, using:
- Simple free apps downloadable by **Google Play** or
- other development environments, such as **MIT App Inventor 2 (AI2)**, which uses object oriented programming with drag-and-drop technique.

The board allows the **learning-by-doing** method with which the student has an active role in learning technology:
- Analyze how the system has been designed and changes it to evaluate its effects and understand the meaning of the actions taken
- Replicating the available experiments will make Arduino and App more complex

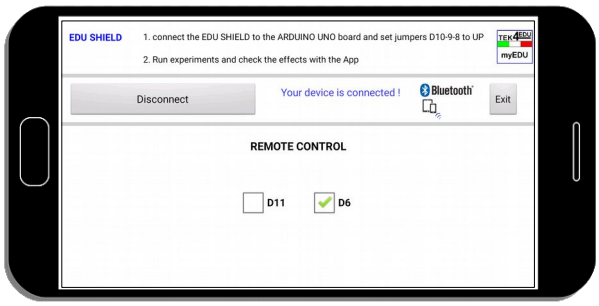
The following versions are available:

- already mounted	**mod.T4E-ASB-02**
- mounting kit	**mod.T4E-ASB-02-K**

The kit version includes all the components needed to assemble the shield and make it functional.

To assemble it, you must use a normal solderng iron and plier for electronics (**not included**).

The only SMD components are located on the bottom side and do not give particular mounting difficulties, with due care.



App *Remote Control*
myEDU

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COURSE PROGRAM

- Description of the shield and its devices
- Description of the Arduino board inputs / outputs that are used by the shield
- Description of the Bluetooth protocol used to send commands and receive information on the mobile device
- Installing the shield
- Connecting the **Arduino board (not included)** to the PC with USB cable and starting PC
- Install **Arduino Software IDE** and open the file that contains the **included** code (**Sketch**)
- Installing the **included Android apps** (**.apk** file), pair shield to mobile device, and starting app
- Description of how to make an Android app that is compatible with the shield using a free downloadable application from **Google Play**
- Analysis of **proprietary Android apps included** (source file **.aia** for **MIT App Inventor 2** development environment) that allow bidirectional communication between the shield and the **Android device (not included)** using **Bluetooth** technology
- **N.12 Experiments** (each one provided with required code):

1. Control and activation of LED, buzzer, relay (DO-digital outputs)
2. Control and activation of led, buzzer, relay (DO) using switches (DI-digital inputs)
3. Control and activation of led, buzzer, relay (DO) using the keyboard (AI-analog input)
4. Control and activation of led, buzzer, relay (DO) using the keyboard (AI) with memory function (bistable) for relays. Each button controls an output.
5. Control and activation of the Nr.6 DO (led, buzzer, relay) using the potentiometer (AI). Bargraph effect.
6. Control and manage of information shown on the Display
7. Thermometer with temperature probe (AI) and visualization on display of: voltage on probe, probe resistance and temperature (°C)
8. Thermometer with light or sound alarm to overcome the temperature threshold
9. **Vernier Sensor** (AI): Use of **Sound Level Sensor (not included)** with visualization of: voltage on sensor and sound pressure level (dB)
10. Remote Monitoring with Android device using Bluetooth interface. The App shows the status of the three switches in the shield
11. Remote Control with Android device using Bluetooth interface. There are two switches in the App that control the status of two configurable shield outputs (led, buzzer, relay)
12. Change the name of the Bluetooth interface visible to your Android devices, using the **AT commands**

TECHNICAL SPECIFICATIONS

Nr.1 LCD Display:
- 16 characters x 2 lines
- Blue LCD with white LED backlight
- Contrast adjustment

Nr.6 green LED for light signaling
Nr.3 switch "slide" type
Nr.2 relay: SPDT, 10A / 250VAC, NO / NC contacts available on screw connector
Nr.1 buzzer 4kHz
Nr.2 potentiometers 10kOhm
Nr.1 keyboard with Nr.5 buttons
Nr.1 Bluetooth Module
- plug-in module based on BlueCore4-External IC of Cambridge Silicon Radio
- device control via TX / RX serial signals
- Bluetooth V2.0 3Mbps + EDR protocol compatibility
- ISM band: 2.4 GHz

Nr.6 DIO with jumper selectable mode of operation:
- inserted (up): DO = Led
- inserted (dw): DO = Buzzer and relay, DI = switches
- not inserted: use of the Digital interface

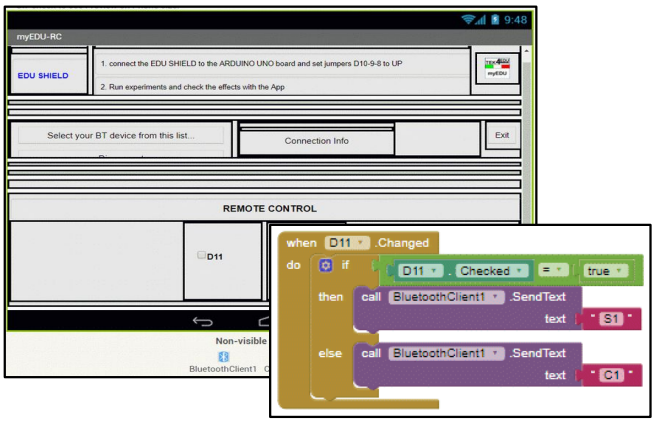
Nr.1 Digital interface with N.6 DIO, for connection to external experimental board or breadboard
Nr.2 Analog interfaces for:
- connection to **analog BTA sensors of Vernier** (Analog Protoboard Adapter **BTA-ELV** required**, not included**)
- acquisition of analog signal provided by external experimental board or breadboard

Nr.12 Arduino codes (sketch): one for each experiment
Ergonomics: Blue color with white silk screen to ensure contrast and readability
Included Accessories:
- Student Manual: describes how to use the shield, sketches, and Android apps
- **sketches** for Arduino board
- Nr.2 proprietary apps for Android devices
- Nr.1 temperature probe: -50 to +120C°, NTC sensor 10k (1%), Beta (K) = 3435, 1.5m, steel capsule

Power supply:
- from the Arduino board connected to Personal Computer or Power Bank or external power supply **(all not included)**

Dimensions and weight: 103x110x34 mm, Total weight: 0.15kg

App designed with free application downloaded from **Google Play**



source file **.aia (included)** of the **myEDU App** designed with **AI2** (sections **Designer** and **Blocks**)

Option:
- 12V PS ADAPTER mod.T4E-ACC-03

Accessories included:
- **Student manual**
- **Nr.2 proprietary Android App**
- **Nr.1 Temperature probe -50 to +120C°**

Accessories not included:
- **Computer, Android device**
- **Arduino UNO board**
- **Vernier Sensors and accessories**

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