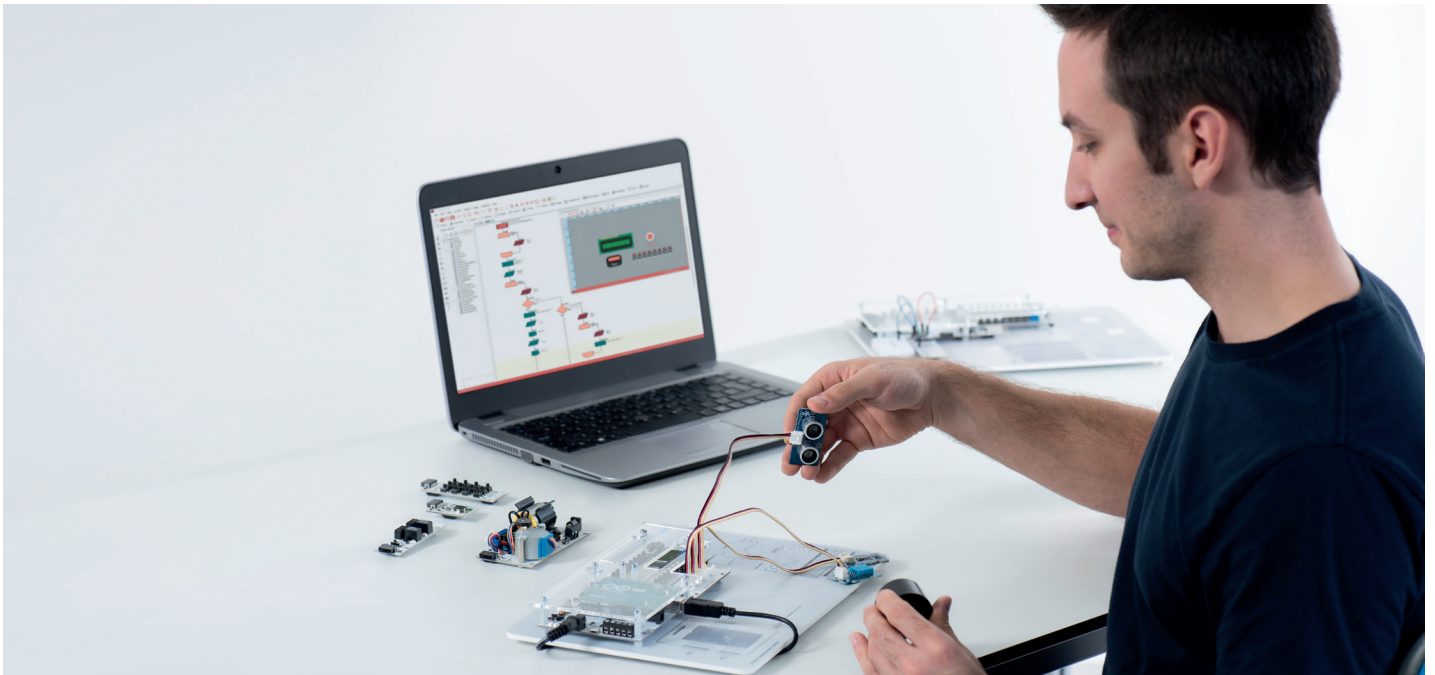


Microcontroller Development Systems TP 1515/1516

A complete learning solution to develop sound microcontroller programming skills



Highlights

- Arduino or 8-bit PIC microcontrollers
- Rugged, and safe design
- Graphical programming environment
- Many expansion possibilities
- 50-hour course included
- Suitable for STEM, college, or university students

A deep understanding of microcontroller systems and the development of sound problem-solving and computational thinking skills are best developed through extensive practical experimentation using relevant tools adapted to students' skill level.

Create microcontroller programs to control embedded systems

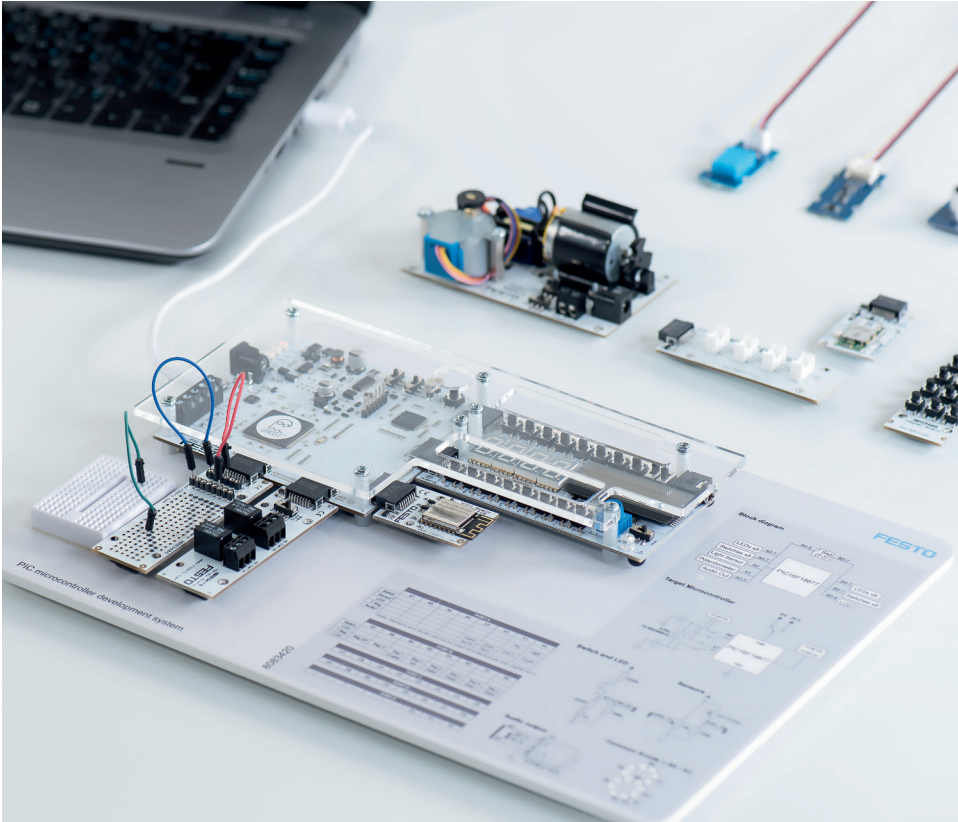
Microcontrollers are tiny computers embedded in countless domestic, commercial, and industrial applications and equipment. The increasing reliance on electronics, broadened by the rise of Industry 4.0 and connected devices, increases competency requirements for many workers.

The equipment sets Microcontroller Development Systems TP 1515/1516 are flexible and affordable learning solutions for in-depth study of microcontroller systems and programming.

They allow students to assemble a wide range of digital electronic circuits using real-life components and code, test, and troubleshoot microcontroller programs to control them.

Students plan and assemble electronic systems using electronics components...

The mounting panel: the starting point of creative projects



Included workbook



This 50-hour course teaches the basics of developing projects based on microcontrollers using Flowcode. Perfect for self-paced learning!

Basic equipment

Each equipment set consists of a A4-sized mounting panel that includes a programmer board featuring an 8-bit PIC (TP 1515) or Arduino (TP 1516) microcontroller, and a combo board – a versatile board that integrates several basic technologies (LED, switches, a display...)

This equipment, paired with Flowcode, is all what is required to perform the activities of the workbook.

Expansion possibilities

A selection of optional expansion boards can be added to the programmer and combo boards.

Each expansion board features a specific technology. Boards are quickly snapped together using har-flex® connectors that route power and signal.

Communication boards, such as CAN bus, Bluetooth, Ethernet and Wi-Fi introduce students to the Internet of Things.

Grove modules can also be added to the systems.

Safety features

For increased students' safety and equipment lifetime:

- Plastic protection covers
- No use of laser technology
- Powered on low voltage
- Provided in trays for organization and storage
- Boards specially designed to include damage protection resistors, avoiding damage by programming errors

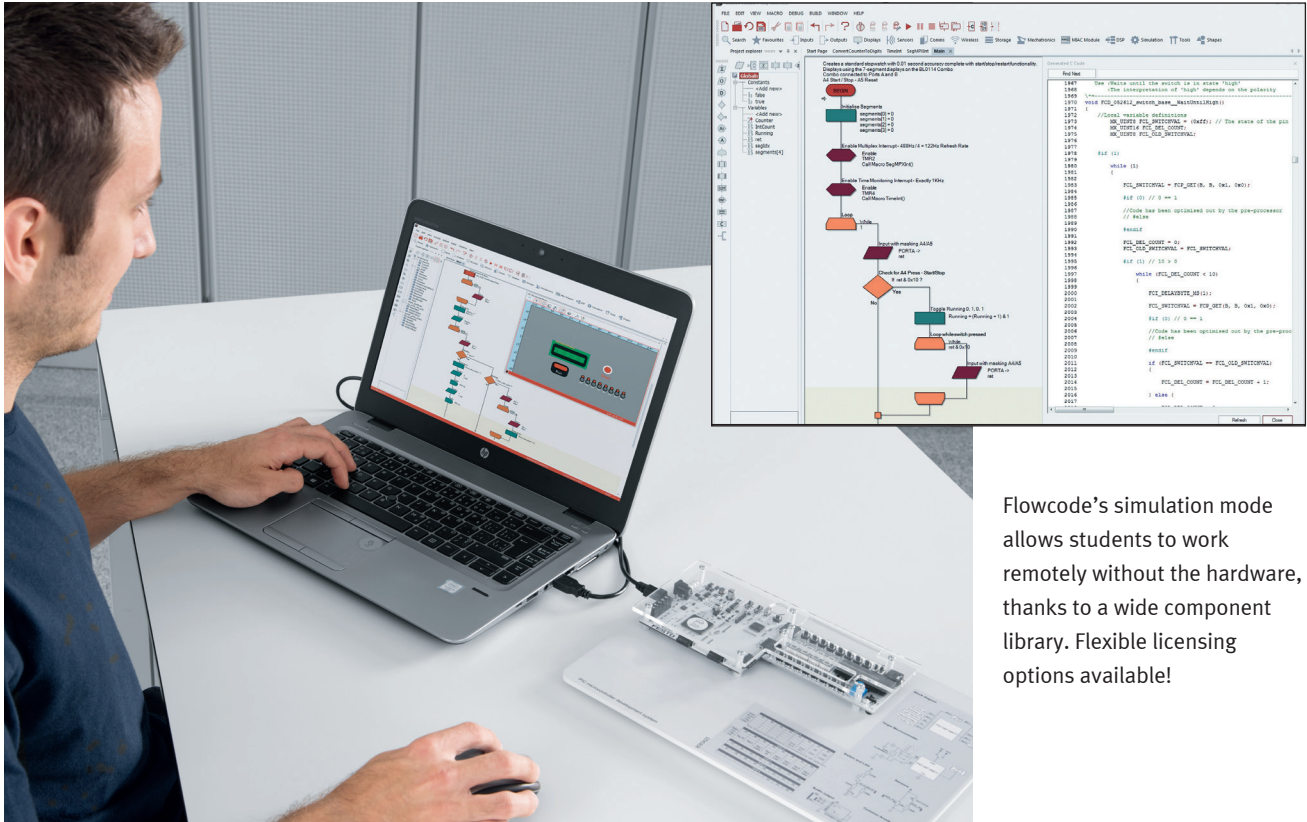
Learning objectives:

- Microcontroller chip architecture and hardware
- Coding structures: if-else, variable type, while, delays, break, case, read/write, etc.
- Simple programming of I/O, LED, switch
- Analog and digital signals
- Communication and devices
- Sensors signal processing, motor controls
- Interrupts, timer, loops

The Internet of Things and microcontroller-based systems with communication capabilities are **basic tenets of Industry 4.0**

... then use a software to code, simulate, test, and debug a microcontroller program.

Flowcode: a user-friendly graphical programming environment that saves time



Flowcode’s simulation mode allows students to work remotely without the hardware, thanks to a wide component library. Flexible licensing options available!

Fast and easy programming
Microcontrollers programs can be developed, simulated, and tested using Flowcode – an advanced, graphical, integrated development environment (IDE) for electronic and electromechanical system development.

Flowcode offers tools to make the coding experience easier. All boards feature an **AutoID device** that eases system configuration and allows the complete system to be analyzed for potential issues and speed up programming in Flowcode.

Prior to deploying code to the microcontroller, the **program can be simulated** (including C code) to ensure it is accurate and will run error-free.

Several **test and debugging functionalities** speed up development time:

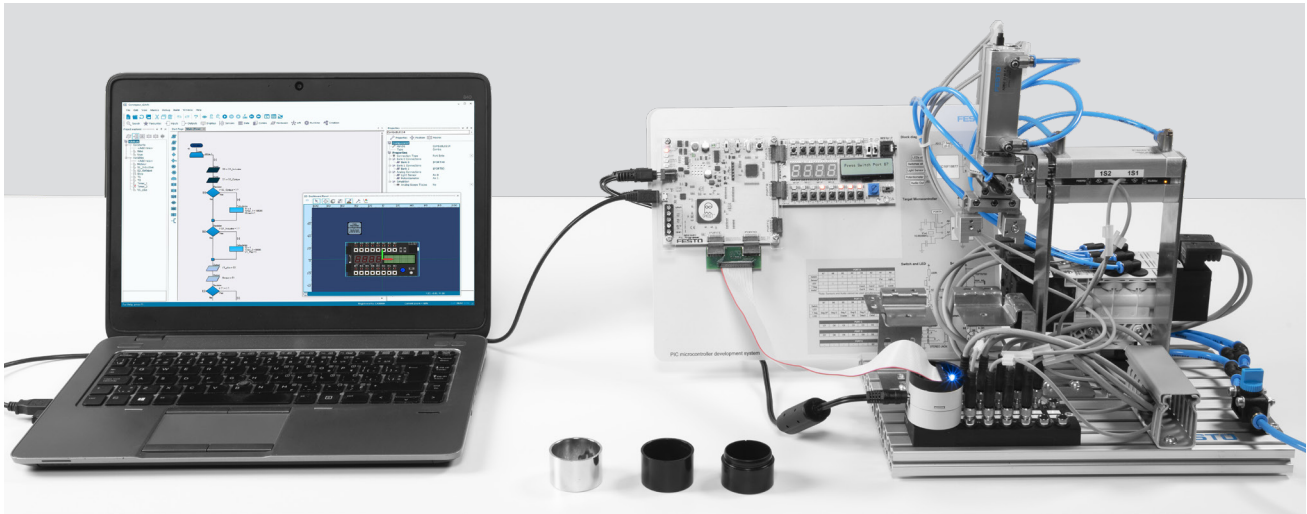
- Ghost technology monitors every pin and variable on the microcontroller and interprets serial data inputs and outputs
- Simulation debugger
- Code profiling
- In-circuit-test and in-circuit-debugging

Programming languages

To adapt to various learning projects, two graphical modes of programming – **Flowcharts** or **Blocks** – are available, as well as two scripted coding modes – **Pseudocode** or **C language** – to adapt to the student’s coding skills level.

Using graphical icons allows students to view and learn code side-by-side for easier learning. Converting C code into graphical programs and graphical programs into C helps develop and grow understanding of this important language.

A fertile ground for developing microcontroller programming skills



A powerful combination of learning solutions

Interface microcontrollers with mechatronic applications

To further develop and sharpen microcontroller programming skills and provide stimulating experimentation opportunities, microcontrollers of the equipment sets can be connected to a mechatronic application and control its components.

The MecLab® Interface is an optional component that connects the microcontroller located on the programmer board to any of the three MecLab® Stations, which represent typical industrial processes in automated plants.

Project-based approach

The versatility entailed by the combination of learning tools allows for creation of learning activities tailored to specific pedagogical objectives and students' skills level, in various training scenarios.

Rewarding experiences

Handling microcontroller devices, connecting hardware, coding in a visual environment, see components move or react as their program runs: this boosts students' engagement and motivation, while strengthening creativity, problem-solving, and computational thinking skills.



For more details:

Learn everything about these microcontroller programming learning solutions on our website: www.festo-didactic.com.