

BOXKIT-DAQ

Advantech DAQ DemoBox



Features

- Portable, all-in-one design — carry the whole platform in one case
- One box, one complete signal-chain training
- Abstract concepts become visible the moment students touch them
- Lab code can be carried over to real production-line projects
- Industrial scenario simulation

Overview

The training box is a portable, all-in-one experimental platform designed for new engineering education. Built around the TPC-307W industrial touch panel computer as the human-machine interaction and computing unit, and the USB-4704 multifunction data acquisition (DAQ) module as the core for signal acquisition and control, the platform integrates digital input/output, analog input/output, PWM signals, sound sensing, digital display, and graphical software — forming a complete teaching loop from signal input, through data analysis, to control output.

Highlights

- One complete signal chain in a single box: sensing, acquisition, conditioning, display, and output are all completed inside the box — no need to assemble multiple instruments for each class.
- Abstract concepts become visible through hands-on operation: turn a potentiometer and watch the curve, flip a switch and watch the LED, speak into the microphone and watch the waveform — signal changes are seen in real time.
- The same toolchain as industry: DAQNav supports C#, LabVIEW, and MATLAB, so lab code can be carried over to real production-line projects.
- Ready to teach out of the box, easy to carry: the computer, DAQ module, panel, and power supply are integrated into one case — zero setup before class, and easy to share across classrooms.

Technical Architecture



System Architecture

Step	Signal Chain	Observable Results for Students
1. Signal Input	Digital/analog signals generated by switches, potentiometers, PWM, the microphone, etc.	Panel device states and signal-source changes
2. Data Acquisition	USB-4704 reads AI, DI, PWM, and sound signals	Channel data and waveforms displayed in real time by the software
3. Analysis & Processing	Range settings, time-domain/frequency-domain switching, cursor analysis, data recording	Waveforms, spectra, record files, and analysis conclusions
4. Output Control	The software writes AO/DO to drive digital displays, LEDs, and other devices	Setpoints and output status fed back in sync

Software Training Content

Function	Description	Competency Developed
Parameter Settings	Select the device, channel, range, sampling rate, and data block length	Understanding the basic parameters of an acquisition system
Time-Domain Analysis	Real-time voltage/current waveforms with zoom and cursor measurement	Understanding signal amplitude, period, and trends
Frequency-Domain Analysis	View frequency composition via FFT	Understanding spectra, harmonics, and filtering
Data Recording	Buffer continuous data with replay; export TXT or images	Archiving experiment data and completing reports
DIO/AO Operation	Read switch states, control LEDs, and set output voltage	Digital control and analog output

Note: The software user interface and functions are subject to the actually delivered version.

Applicable Majors

Major Directions	Key Applications
Measurement & Control Technology and Instruments; Automation; Electrical Engineering and Automation	Sensor detection, DAQ, AI/AO, digital control, virtual instrumentation
Electronic Information Engineering; Communication Engineering; Mechatronic Engineering; Vehicle Engineering	Signal acquisition, FFT, vibration/sound analysis, PWM, and test systems
Computer Science; Internet of Things Engineering; vocational programs in Electrical Automation and Mechatronics	SDK development, data export, edge acquisition, remote I/O, and capstone projects

Courses & Subjects

Course Area	Representative Courses	Training Content
Detection & Sensing	Sensor and Measurement Technology; Mechanical Engineering Testing Technology	Signal input, acquisition range, calibration, error analysis
Signals & Instrumentation	Signals and Systems; Digital Signal Processing; Virtual Instrumentation	Time/frequency-domain analysis, FFT, data recording, software development
Control & Electronics	Automatic Control Theory; Analog/Digital Electronics	DIO control, AO output, PWM, logic verification
Industrial IoT	Industrial Networks; Internet of Things Engineering; Edge Computing	Ethernet I/O, wireless I/O, gateways, and sensor expansion

General Specifications

Item	Specification
Case & Dimensions	Aluminum multifunction display/storage case; acrylic panel approx. 44 × 31.8 × 0.8 cm; interior approx. 44 × 31.8 × 10.5 cm; exterior approx. 45.5 × 34 × 13 cm
Power	85 – 132 / 176 – 264 VAC, 47 – 63 Hz; outputs 5 VDC / 2.2 A and 24 VDC / 1 A, 35 W total; AC power switch integrated on the panel

Core Module Specifications

Module	Key Specifications
USB-4704	8-ch AI; up to 48 kS/s; 14-bit; 8-ch DI / 8-ch DO; 2-ch AO; one 32-bit counter; USB 2.0
TPC-307W	Intel Atom X6211E; 7-inch 1024 × 600 PCAP touchscreen; 2 × GbE; front panel IP66; -20 to 60 ° C
Training Software	Parameter configuration, DIO, AI, AO, high-speed recording, time/frequency-domain analysis, TXT/image export

Standard Configuration

Category	Contents
Core Devices	TPC-307W × 1; USB-4704 × 1; aluminum case, acrylic panel, power supply, power cord, and mounting hardware
Teaching Panel	4 toggle switches, 4 LEDs, 2 AI potentiometers, 2 AO digital displays, PWM module, amplitude adjustment, MIC sound input
Software & Documentation	Training software, user manual, wiring instructions, and SDK resources

Ordering Information

Item	Description
Product Name / Part Number	Advantech High-Speed Precision Test & Measurement Training Box (BOXKIT-DAQ). Please confirm the ordering part number with Advantech sales or your local FAE.