

USB-to-UART Serial Converters

DT Workshop Equipment Reference — D&T / STEM resource for school workshops | Electronics & Prototyping

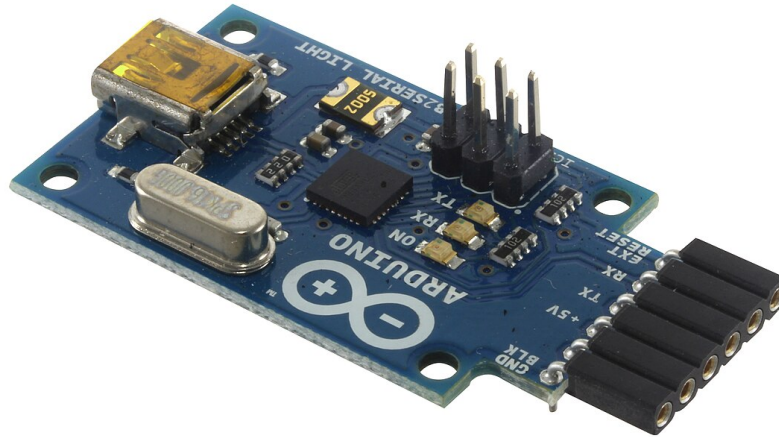


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A USB-to-UART converter (like CP2102 and CH340 boards) provides a serial connection between a computer and microcontroller or module that lacks onboard USB. It is the standard adapter for programming ESP8266, bare ESP32 modules and debugging serial devices.

Key Features

- CP2102, CH340 and FTDI chip versions
- 3.3 V and 5 V logic levels with jumpers
- TX, RX, RTS, CTS, DTR pins
- USB-micro or USB-C connectors
- Driver support for all majors

Typical Uses in the Workshop

- Program modules without onboard USB
- Debug serial output from projects
- Connect GPS and Bluetooth modules to a PC
- Recover boards with dead bootloaders

Safe Operation

1. Install the driver for the chip
2. Wire TX to RX and RX to TX
3. Set the logic level jumper to the target
4. Open the serial monitor at the right baud
5. Do not power the target from the converter unless rated

SAFETY NOTES

- Double-check connections before powering
- Avoid powering targets from USB-only adapters
- Keep the adapter away from metal
- Check the board's ESD handling
- Store in antistatic bags

Maintenance & Consumables

- Check the USB connector and cable
- Clean the pin headers
- Update drivers when needed
- Keep the adapter labelled
- Test with a loopback before class

Specification & Buying Notes

Buy adapters with a logic level switch and enough pins for TX, RX, DTR and CTS. A pack of five covers class programming sessions. Prefer boards with a status LED and reset support.