

Bluetooth Low Energy (BLE) Modules

DT Workshop Equipment Reference — D&T / STEM resource for school workshops | Sensors & Modules



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BLE modules add low-power Bluetooth to projects, letting them talk to phones, tablets and other BLE devices for remote control, sensors and beacons. The HM-10 and ESP32 BLE options dominate school work.

Key Features

- HM-10 serial BLE modules
- BLE 4.0-5.0 support
- UART serial interface
- Low power consumption
- Pairing and notification modes

Typical Uses in the Workshop

- Control robots from a phone app
- Send sensor data to a phone or tablet
- Build beacons and proximity demos
- Wireless diagnostics

Safe Operation

1. Configure the module baud rate first
2. Wire TX and RX to the microcontroller
3. Pair from the phone settings or app
4. Test the data loop with a terminal app
5. Secure the module with antenna clear

SAFETY NOTES

- Check the module voltage (3.3 V for HM-10)
- Keep the antenna away from metal
- Do not connect modules to mains circuits
- Handle static carefully
- Store modules in antistatic bags

Maintenance & Consumables

- Check the wiring and connectors
- Verify the firmware version
- Test range and re-pair as needed
- Keep spare modules in stock
- Document the configuration

Specification & Buying Notes

HM-10 modules suit classic serial projects; ESP32 boards give native BLE with more power. Quality modules keep pairing stable; cheap clones drop connections.