Network Modules

Version: 20210602

Online Version

Contents

Tuya provides a series of cost-effective proprietary network modules. These network modules support multiple communication protocols, specifications, working temperatures, and welding methods. They also apply to different product types and development solutions. You can choose them to support your product scenarios.

Network modules are classified based on different protocol types, specifications, and working temperatures. This topic describes the classification, naming rules, features, and development solutions of network modules. This allows you to easily select the network modules that meet your business requirements.

1 Protocols

Protocol	Description	Scenario
Wi-Fi 2.4 GHz	General 2.4 GHz Wi-Fi	Support 2.4 GHz router environments.
Low energy Wi-Fi	Low energy 2.4 GHz Wi-Fi	Support 2.4 GHz Wi-Fi products that have requirements on power consumption, such as battery-powered 2.4 GHz Wi-Fi products.
Wi-Fi and Bluetooth Low Energy combo module	2.4 GHz Wi-Fi and Bluetooth LE 4.2 combo module	Support 2.4 GHz routers and mobile Bluetooth control environments.
Wi-Fi 2.4 GHz and 5 GHz dual band	2.4 GHz and 5 GHz Wi-Fi dual band	Support 2.4 GHz and 5 GHz dual-band router environments.
Wi-Fi 2.4 GHz and 5 GHz and Bluetooth LE combo module and dual band	2.4 GHz and 5 GHz Wi-Fi dual band and Bluetooth LE 4.2	Support 2.4 GHz and 5 GHz dual-band combo module routers and mobile Bluetooth control environments.
Bluetooth LE	Bluetooth LE point-to-point communication	Support Bluetooth LE point-to-point communication scenarios.
Bluetooth LE Mesh	Bluetooth LE Mesh 4.2	Support batch control scenario of mobile phone Bluetooth and Bluetooth gateways.
General Packet Radio Service (GPRS)	GPRS	Support long-distance outdoor communication covered by 2G networks.

Protocol	Description	Scenario
Narrowband Internet of Things (NB-IoT)	NB-IoT	Support long-distance low energy outdoor communication covered by NB-IoT networks.
Sub-G	433 MHz and 868 MHz	Support low-energy, low-speed, high-penetration rate indoor and outdoor environments.

2 Naming rules

- General network modules are named in the following format: **(TY) + Protocol type + Chip platform + Series + Performance**.

  Example: The module name TYWB3S indicates TY (Tuya) + W (Wi-Fi) + B (Bluetooth LE) + 3 (series 3) + S (high performance).

- Dedicated network modules are named in the following format: **Protocol type + Chip platform + Dedicated name**.

  Example: The module name WBLC9 indicates W (Wi-Fi) + B (Bluetooth LE) + LC (Light control).

Certain modules use only some of these fields in the preceding naming rules. The following tables describe the naming rules of each series of network modules.

2.1 Wi-Fi modules

Series	Naming rule	Description
WR series	W (Wi-Fi) + R (Realtek)	Realtek 2.4 GHz Wi-Fi module
XR series	XR (Xradio)	Xradio low energy 2.4 GHz Wi-Fi module

Series	Naming rule	Description
WE series	W (Wi-Fi) + E (Espressif)	Espressif 2.4 GHz Wi-Fi module
RD series	RD (RDA)	RDA 2.4 GHz Wi-Fi module
TYJW series	TY (Tuya)+ J (Joint interface board)+ W (Wi-Fi)	Wi-Fi module with joint interface board
LC series	L (Light) + C (Control)	2.4 GHz Wi-Fi module dedicated for lighting products
VWXR series	V (Voice) + W (Wi-Fi) + XR (Xradio)	2.4 GHz Wi-Fi voice recognition module

2.2 Wi-Fi and Bluetooth LE combo modules

Series	Naming rule	Description
WB series	W (Wi-Fi) + B (Bluetooth LE)	2.4 GHz Wi-Fi and Bluetooth LE combo module
WBR series	W (Wi-Fi) + B (Bluetooth LE) + R (Realtek)	Realtek 2.4 GHz Wi-Fi and Bluetooth LE combo module
JWBR series	J (Joint interface board) + W (Wi-Fi) + B (Bluetooth LE) + R (Realtek)	2.4 GHz Wi-Fi and Bluetooth LE combo module that supports Realtek with a joint interface board
CB series	C (Combo) + B (Beken)	Beken 2.4 GHz Wi-Fi and Bluetooth LE combo module

Series	Naming rule	Description
CR series	C (Combo) + R (Realtek)	Realtek 2.4 GHz Wi-Fi and Bluetooth LE combo module

2.3 Bluetooth LE modules

Series	Naming rule	Description
BT series	B (Bluetooth LE) +T (Telink)	Telink Bluetooth module
BN series	B (Bluetooth LE) + N (Nordic)	Nordic Bluetooth module
BR series	B (Bluetooth LE) + R (Realtek)	Realtek platform Bluetooth module
TYBT series	TY (Tuya) + B (Bluetooth LE) +T (Telink)	Telink Bluetooth module that supports Tuya proprietary protocols

2.4 Zigbee modules

Series	Naming rule	Description
ZS series	Z (Zigbee) + S (Silicon Labs)	Silicon Labs MG21 Zigbee module
ZN series	Z (Zigbee) + N (NXP Semiconductors)	NXP Semiconductors module
TYZS series	TY (Tuya) + Z (Zigbee) + S (Silicon Labs)	Silicon Labs 13P72 Zigbee module
ZT series	Z (Zigbee) + T (Telink)	Telink Zigbee module

2.5 Sub-G modules

Series	Naming rule	Description
SS series	S (Sub-G) + S (Silicon Labs)	Silicon Labs Sub-G module

2.6 GPRS modules

Series	Naming rule	Description
GR series	G (GPRS) + R (RDA)	RDA GPRS module

2.7 NB-IoT modules

Series	Naming rule	Description
NM series	N (NB-IoT) + M (MediaTek)	MediaTek NB-IoT module
NE series	N (NB-IoT) + E (EigenCOMM)	EigenCOMM NB-IoT module

2.8 CoB

Naming rule	Description
C (Chip) + O (on) + B(Board)	Chip on board (CoB), a method used to integrate chips into a printed circuit board (PCB)

3 Features

3.1 Antenna types

Network modules support multiple antenna types. For example, onboard PCB antennas, onboard ceramic antennas, external spring antennas, external IPEX antennas, and external monopole antennas.

You can choose the module that uses the preferred antenna type to support your product structure and volume.

Antenna type	Supported module	Description
IPEX antenna	Modules suffixed with IPEX	Feature high directivity and efficiency, enable flexible adjustment of antenna directions, but require manual installation.
Monopole antenna	LC5 series modules	Flexible antenna that enables flexible adjustment of antenna directions, but requires manual welding.
Spring antenna	LC6 and LC7 series modules	Feature easy installation and excellent standing wave performance, but require manual welding.
Onboard ceramic antenna	LC8 and LC8 series modules	Feature small dimensions, and do not require manual welding.
Onboard PCB antenna	All modules except those mentioned for other types of antennas	Feature cost efficiency without manual welding.

3.2 Welding methods

Network modules can be welded on PCBs in attached, in-line, through-hole, or other modes. You can select network modules that use the required welding method to support your PCB solutions.

Welding method	Supported series	Description
Attached	1, 3, 5, and 7 series modules	Antennas are welded on PCBs in attached mode.
In-line	2, LC4, and LC5 series modules	Antennas are welded on PCBs in in-line mode.
Attached and through-hole	1L, 2L, 3L, and 4 series modules	Antennas are welded on PCBs in attached or through-hole mode.
Through-hole	LC6 and LC7 series modules	Antennas are welded on PCBs in attached or through-hole mode.
Side-insertion	5P, LC6, LC8, and 8P series modules	Antennas are welded on PCBs in side-insertion mode.

3.3 Volume types

Network modules support multiple volume types. You can select network modules that support your product volumes.

Volume type	Supported series	Description
Small volume	CoB, LC5, LC6, LC8, LC9, and 15 series modules	Suitable for solutions that require small volumes.
Regular volume	1S/L, 2S/L, LC2, 3S/L, 4, LC4, 5, 5P, 6, 7, LC7, 8P series modules	Suitable for solutions that are provided with sufficient volumes.

3.4 Working temperature

Network modules support up to 105°C working temperature. You can select network modules that are suitable for your product working environments.

Series	Working temperature	Description
Non-L series modules	Not higher than 85°C	Suitable for the products that work under regular temperatures.
L series modules	Not higher than 105°C	Suitable for the products that work under high temperatures, such as lighting products.

4 Selection example

Tuya provides multiple types of modules. You can choose the preferred modules that support the required product scenarios, volume types, and working temperature.

In the following example, a household filament lamp is used to describe how to select a suitable module.

Specification	Description	Series
Protocol	Select the modules that support the Wi-Fi protocol or Wi-Fi and Bluetooth LE protocols to interact with routers in household environments.	Wi-Fi module or Wi-Fi and Bluetooth LE combo module
Volume	Select the modules with small volumes to support the filament lamp PCB that is installed in the lamp holder.	CoB, LC5, LC6, LC8, LC9, and 15 series modules
Antenna type	Select the modules with exposed antennas to support the filament lamp PCB that is installed in the lamp holder. The direction of the antennas can be adjusted based on the structure.	External monopole modules

Specification	Description	Series
Working temperature	Select L-series high-temperature or dedicated lighting modules. In most cases, the working environment of the filament lamp is higher than 85°C.	L and LC series modules

In this example, WBLC5 series modules are selected to meet the preceding requirements.

5 Development solutions

5.1 No-code development

The Tuya IoT Platform provides a no-code development solution. You can use this solution, select the required module, and configure the firmware. Then, Tuya flashes the configured firmware and provides the module that supports the specified functions. This allows you to create and manage smart products without coding. For more information, see SoC Plug and Play Solution.

5.2 MCU SDK low-code development

You can create a smart product that integrates the custom microcontroller unit (MCU) SDK on the Tuya IoT Platform. Tuya provides the module to which general firmware is flashed. This type of module is used for pass-through transmission. You can the module to interact with your MCU. For more information, see MCU Connection Solution.

5.3 Module SDK development

You can create a smart product that integrates the custom module SDK on the Tuya IoT Platform. Tuya provides the module without firmware. You can flash your own firmware to the module before you can use the module. For more information, see Module SDK Development Access.

6 Recommended products

- The Tuya Sandwich development board integrates mainstream network modules. This allows you to efficiently prototype hardware products. For more information, see Sandwich Evaluation Kits.
- Tuya Module Debugging Assistant is a serial port debugging tool that integrates the communication protocols of Tuya modules. This product provides diversified functions and is easy to use. It applies to the development debugging of general MCU connection solutions. Tuya Module Debugging Assistant supports common serial port protocols of Tuya modules, for example, Wi-Fi, Bluetooth, Zigbee, and NB-IoT. This tool can simulate the module to verify the MCU code logic and simulate the MCU to debug the pairing function. For more information, see Module Debugging Assistant.