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HOPERF HPYKE24 Dual Band WIFI Module Owner's Manual

Contents

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Product Overview:

HPYKE24 is a dual-band Wi-Fi module developed by ShenZhen Hope Microelectronics based on the RTL8720DN. It supports dual-band WLAN (2.4GHz and 5GHz). The module integrates high-performance ARM V8 (Cortex-M4F compatible) and low-power ARM V8M (Cortex-M0 compatible) microcontrollers, WLAN (802.11 a/b/g/n), MAC, and RF baseband. It also provides multiple configurable GPIOs for controlling different peripheral devices.
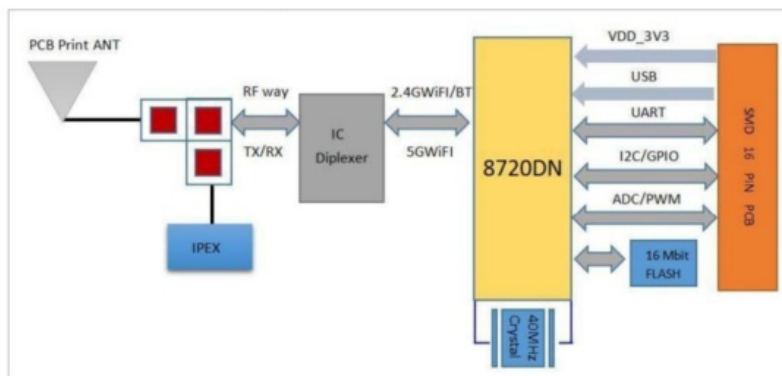
Figure 1. System architecture

Key Features:

- Supports 11a/b/g/n, 2.4GHz or 5GHz.
- Supports HT20/HT40
- Includes low-power beacon monitoring, receiving, and suspend
- Built-in AES/DES/SHA hardware
- Supports TrustZone-M and secure
- Supports SWD debugging port protection.
- Supports STA/AP/STA+AP operation
- Provides one-click network setup for Android/iOS using the Simple Config
- Local and remote firmware updates supported (FOTA).
- Programmable in Linux and Windows environments, and also supports Arduino development.

Module parameters

Table 1. Module parameters

Model	HPYKE24
Package	SMD-18.8
Dimensions	28*18.8*3(±0.2)MM
Antenna	PCB onboard or IPEX antenna
Frequency Range	2400-2483.5MHz (2.4GHz) or 5180-5825MHz (5GHz)
Frequency Range	2.402GHz – 2.480GHz
Operating Temperature	-40 ℃ ~ 85 ℃
Storage Conditions	-40 ℃ ~ 125 ℃ , < 90%RH
Power Supply	3.0V ~ 3.6V typical 3.3V current >500mA
Peripherals	UART/GPIO/ADC/PWM/IIC/SPI/SWD
Certification	RoHS, FCC
FLASH	16Mbit by default (supports 32Mbit, 64Mbit and 128Mbit options)

Electrical Characteristics

Table 2. Electrical Characteristics

Parameter	Min.	Typ.	Max.	Unit
Supply Voltage	3.0	3.3	3.6	V
Digital I/O supply voltage	1.76	1.8-3.3	3.3	mA
I/O Rating current			50	mA

Table 3. ESD Characteristics

Reliability Test	Standards	Test condition	Result
Human Body Model (HBM)	JEDEC EIA / JESD22-A114	±2000V	Pass
Charge Device Model (CDM)	JEDEC EIA / JESD22-C101	±500V	Pass

Note:

The HPYKE24 module is sensitive to electrostatic discharge (ESD). Special precautions should be taken, such as adding ESD protection devices during use.

Radio Characteristics

Table 4. Radio Characteristics

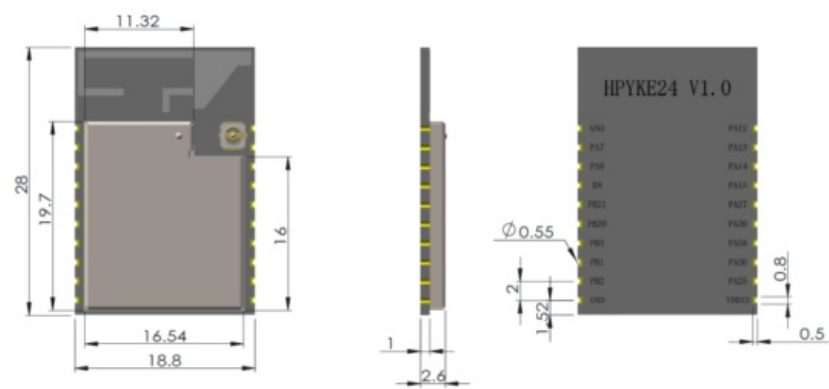| Description	Typ.	Unit
Frequency Range	2400-2483.5 or 5180-5825	MHz
Output power		
802.11a mode, PA output	14±2	dBm
802.11n mode, PA output	14±2	dBm
802.11g mode, PA output	15±2	dBm
802.11b mode, PA output	16±2	dBm
Rx Sensitivity		
CCK, 1 Mbps	-90	dBm
CCK, 11 Mbps	-85	dBm
6 Mbps (1/2 BPSK)	-88	dBm
54 Mbps (3/4 64-QAM)	-70	dBm

Dimension

Figure 2. Module Dimension

Pin Definition

The HPYKE24 module has 16 pins with different functions such as power supply, UART communication, and GPIO interfaces. The figure below illustrates the pin definition

Figure 3. Pin definition (Bottom view)

Table 2. Module pin definition

Pin	Name	Description
1	PA13	LP_PWM1/SPI1_MISO
2	PB3	ADC/SWD_CLK
3	CHIP_EN	Enable pin, pull-up to enable the module
4	PA15	SPI1_CS
5	PA8	UART_LOG_RXD, RX port for firmware programming and command input.
6	PA27	SWD_DATA
7	PA26	LP_I2C_SDA/LP_PWM5
8	VDD_3V3	3.3V Power supply (VDD)
9	GND	Ground
10	PA25	LP_I2C_SCL/LP_PWM4
11	PA7	UART_LOG_TXD, TX port for firmware programming and log output
12	PA14	SPI1_CLK
13	PA30	LP_PWM1
14	PA12	SPI1_MOSI/LP_PWM0

15	PB2	LP_UART_RXD, RX port for the AT command interface
16	PB1	LP_UART_TXD, TX port for the AT command interface

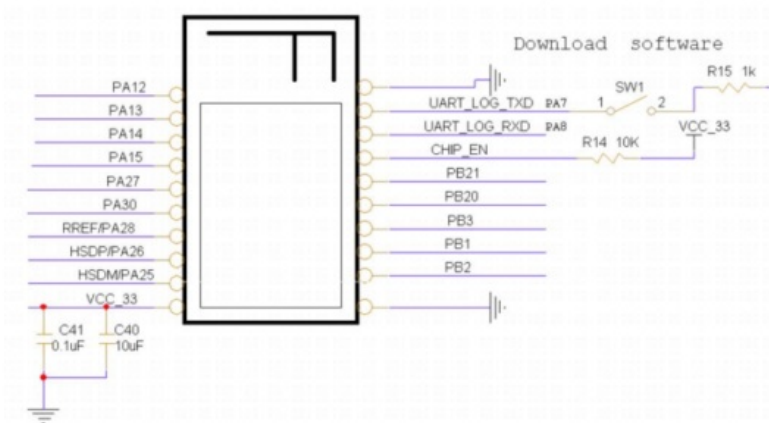## Design Guidelines

Reference circuit design of the HPYKE24

Figure 4. Reference schematic

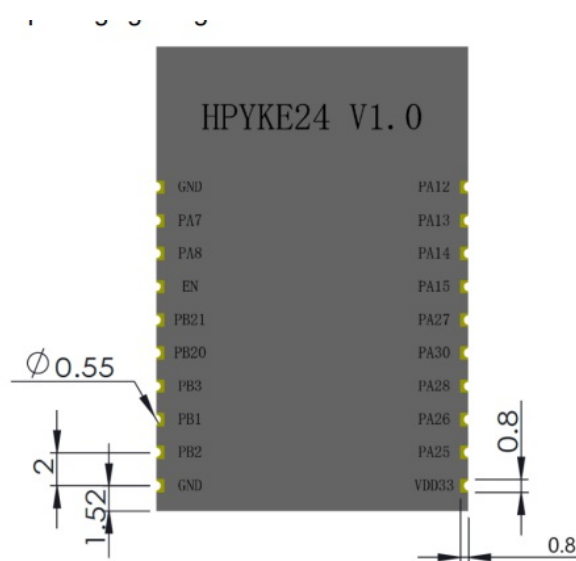Recommended module packaging design dimensions

Figure 5. Module package

PCB Layout and Placement

For optimal performance of the WiFi module
Option 1: Place the module aligned to the edge of the application PCB or leave the antenna area out of the application PCB, as illustrated in the figures below.
Option 2: Leave the antenna clearance area void of any traces, components, or copper on all layers of the application PCB if you are going to use the on-board chip antenna

Note:

Do not place plastic or any other dielectric material in contact with the antenna.
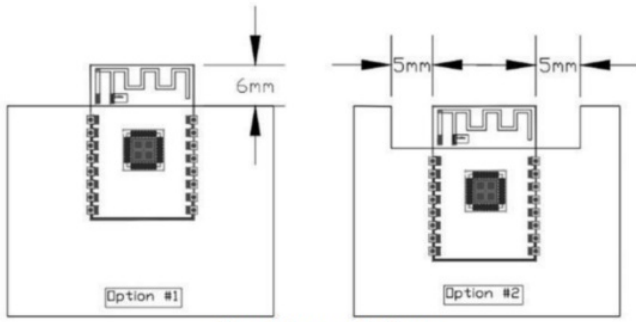
Figure 6. Recommended Layout

Power Supply

Recommend 3.3V voltage with a current supply above 500mA.

It is suggested to use an LDO for power supply; if a DC-DC design is used, it is recommended to control the ripple within 30mV.

It is advised to reserve space for a dynamic response capacitor in the DC-DC power supply circuit to optimize output ripple during large load changes.

It is recommended to add ESD protection devices to the 3.3V power supply interface

GPIO Pins

The HPYKE24 includes some GPIO ports and it is recommended to connect a 10-100 ohm resistor in series with the I/O port. This can suppress overshoot and stabilize the voltage levels on both sides. It also helps with EMI and ESD protection.

For special I/O ports with pull-up or pull-down configurations, refer to the usage instructions in the specification. This can affect the module's startup configuration.

The module's I/O ports operate at 3.3V. If the main controller's I/O voltage level does not match the module, a level-shifting circuit will be needed.

If the I/O ports are directly connected to peripheral interfaces or pins, it is recommended to reserve space for ESD protection devices near the terminals on the I/O traces.
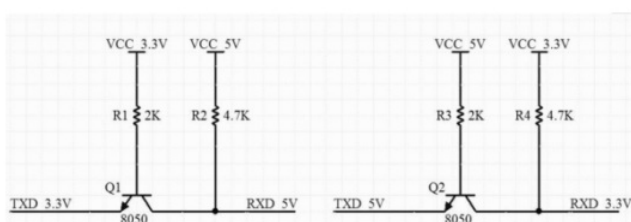

Figure 7. Voltage level-shifting circuit

Soldering Recommendations

It is recommended that final PCB assembly of the HPYKE24 module follows the industry standard as identified by the Institute for Printed Circuits (IPC). Sometimes a PCB must be reflowed multiple times based on the nature of the design and components used or limitations of the assembly line. During a single reflow cycle, every component is exposed to and stressed with high temperature. Exposing parts to high temperature for multiple times can damage the parts. It is always recommended to avoid more than two reflow cycles of the parts. The figure below illustrates the recommended reflow profile that follows IPC / JEDEC-020, and the peak temperature should not exceed 250°C.

Certifications

FCC Statement

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference. (2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
This equipment generates uses and can radiate radio frequence energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.
However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving
- Increase the separation between the equipment and
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for

The device has been evaluated to meet general RF exposure requirements. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.
The Module is designed to comply with the FCC statement. FCC ID is 2ASEO-HPYKE24. The host system using the Module should have a label indicating it contains the modular's FCC ID:
2ASEO-HPYKE24. This radio module must not installed to co-locate and operating simultaneously with other radios in host system additional testing and equipment authorization may be required to operating simultaneously with other radio

The Module and its antenna must not be co-located or operating in conjunction with any other transmitter or antenna within a host device.
The modular must be installed in the host that is assigned by Company name: Shenzhen HOPE Microelectronics Co., Ltd, Model no.: HPYKE24. If other host types used would need
further evaluation and possible C2PC if they are not significantly similar to the one tested The WIFI Module is designed for a compact PCB design. It should be installed and operated with host or other minimum distance of 20 centimeters between the radiator and your body." To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed 1 dBi in the 2.4G band and 4 dBi in the 5G band. The module uses a PCB antenna interface and ping angle interface antenna, this antenna is sold with the module.

Notice to OEM integrator

The end user manual shall include all required regulatory information/warning as shown in this manual. The OEM integrator is responsible for testing their end product for any additionalcompliance requirements required with this module installed. If the final product contains circuits of other FCC PART 15 Subparts, the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed. The intended use is generally not for the general public, it is generally for industry/commercial use. The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not normally required, the user has no access to the connector. Installation must be controlled. Installation requires special training. This device complies with Part 15 of the FCC Rules. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.
Operations in the 5.15-5.25GHz band are restricted to indoors usage only.

Version History

Date	Version	Modification
2023.07.23	V1.0	Initial version

Liability Disclaimer

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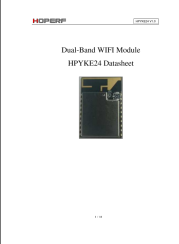
Life Support Applications

Shenzhen Hope Microelectronics Co., Ltd's products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Shenzhen Hope Microelectronics Co., Ltd customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Shenzhen Hope Microelectronics Co., Ltd for any damages resulting from such improper use or sale.

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HPYKE24, HPYKE24 Dual Band WIFI Module, Dual Band WIFI Module, Band WIFI Module, WIFI Module, Module

References

- **H HOPERF - Reliable original manufacturer of IoT key components**
- **H HOPERF - Reliable original manufacturer of IoT key components**
- **User Manual**