

Hi-Link HLK-V20 Voice Recognition User Manual

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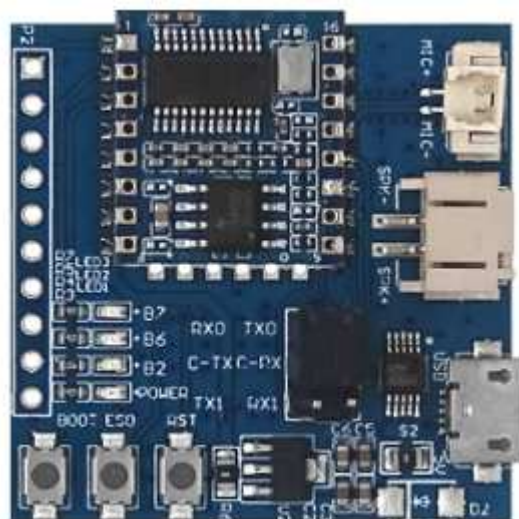
2. Introduction

The Hi-Link V20 is a powerful offline voice recognition module. Offline means that it does not need to connect to the internet to process the data. It can recognize any spoken words in both English and Chinese, and will respond with an audio message and optionally output a signal or send a code via the serial port. Both the words to be recognized and the respond message can be customized to anything you want.

There are two versions of the board: (a) the bare voice module and (b) the voice module mounted on a development board.



(a)



(b)

The development board version is recommended for initial testing because it comes with a mic, speaker, leds, and USB-C for power.

3. Initial Test

The instructions below are for the development board version.

The SDK firmware that comes with the development board module is in Chinese, so initially you'll hear and need to speak the commands in Chinese. You can either use the Chinese command recordings in the Audio folder or use Google Translate to translate from your language to Chinese (Simplified). See the Customization for English Command Words section below on how to change the SDK firmware to English.

Step 1. Plug in the mic and speaker to the board if they are not already plugged in. Plug in the USB type-C cable to power up the module. The red power light should turn on.

Step 2. You will hear the welcome message in Chinese.

Step 3. Say one of the three Wakeup words in Chinese (Xiaoke Xiaoke, Xiaoling Xiaoling, or Xiaohai Xiaohai). After recognizing the wakeup word, the module will respond with a message saying "Hi, what can I do for you?" in Chinese.

Step 4. Say one of the following action commands in Chinese. You can try to speak it using the Chinese pronunciations. Otherwise, you can either use the recordings in the Audio folder or use Google Translate to say it. It will respond with an appropriate message in Chinese and turn on/off one of the corresponding leds.

Command	Chinese Pronunciation	Led response	Serial output
Wakeup	Xiaoke Xiaoke		035A
Turn on the light	Kāi dēng	yellow led (pin B6) on	010A
Turn off the light	Guān dēng	yellow led off	011A
Turn on the air conditioner	Dǎkāi kòngtiáo	blue led (pin B7) on	07A
Turn off the air conditioner	Guānbì kòngtiáo	blue led off	08A
Turn on the switch	Dǎkāi kāiguān	green led (pin B2) on	029A
Turn off the switch	Guānbì kāiguān	green led off	02AA

The complete list of the default action commands are listed in the file HLK-V20 Demo firmware command words and broadcast words V1.3.xlsx.

The module will stop listening after 10 seconds of silence. It will say "Call me if you need me."

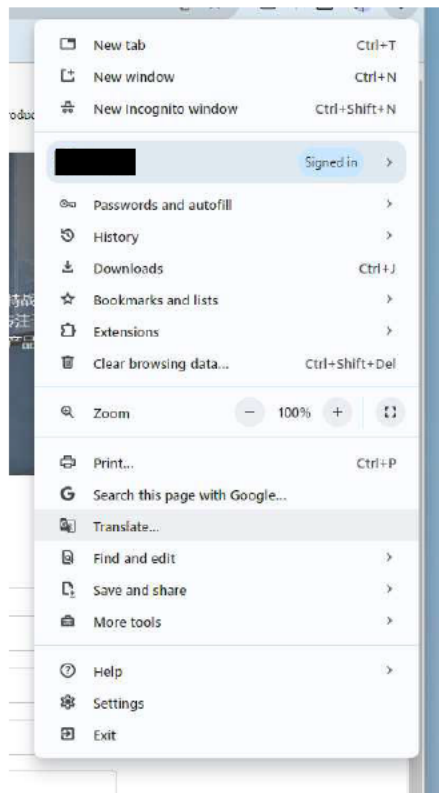
4. Customization for English Command Words

To customize the wakeup words and voice commands in English, follow the steps below:

Step 1. Go to this website to customize the command words and other settings.

<http://voice.hlktech.com/yunSound/website/toAppkeyPage>

Turn on Translate to English in your Google Chrome browser.



You'll need to first create a free account using your email address. A verification code will be sent to confirm.

registered member

voice.hiktech.com/yunSound/website/toRegisterPage

LSU LSU gmail Gmail hwang laziera p3plzcpnl505818.pr...

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Login Account *

login password *

Confirm Password *

Nick name *

Email address *

Verification code *

Company Name

重新发送(31)

Confirm registration

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Product Center

HLK-V20

HLK-V40Y

HLK-W800

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address: Room 1705, 1706, 1709A, 17th Floor, Building E, Xinghe WORLD, Minle Community, Minzhi Street, Longhua District, Shenzhen, Guangdong

Click on the Create a product button



Click on Creating SDK. Note the message in the green box that you can only do this 30 times. After 30 times, you'll have to contact the company for more, (or just create another account using another email address).



SDK List

voice.hlktech.com/yunSound/website/toSdkPage?appkeyId=4053

LSU LSU gmail Gmail hwang.lasierra p3plzcpnl505818.pr...

front page Product Center **Product Access** personal information

1 CREATING SDK VERSIONS 2 CONFIGURING SDK CAPABILITIES 3 RELEASE SDK

Fill in SDK related information

language * English

Based on version Select Create based on version

version number * 0.1

plan * HLK-V20

describe Our dog Chip

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Shenzhen Hailingke Electronics Co., Ltd. Registration number: Guangdong ICP No. 12055399-1

Click on the SDK button that you've just created to start the customization.

Note that you can stop and close your browser anytime. Everything will be saved. Next time you log back in, you can continue with where you left off by clicking on the yellow Development button.

HLK-V20	Remaining SDK quantity 29Contact customer service to increase	Number of SDKs built 1	Download Information +Creating SDK
---------	--	---------------------------	---

id/version/language	state	describe	Update time	operate
8756/ 0.1/ English	To be released	Our dog Chip	2024-06-19 01:49:22	Development release

The next few screenshots show the customization of the command words.

The front-end signal processing device microphone configuration. The packaged SDK optimizes the signal according to different microphone conditions to make the device recognize voice more accurately. Only one of AEC echo cancellation and steady-state noise reduction can be enabled.

AEC echo cancellation ⓘ

☒ Open ☐ closure

Steady-state noise reduction ⓘ

☐ Open ☒ closure

distance ⓘ

☐ Near field 0~1m ☒ Far field 1~5m

Pin configuration can be customized to automatically generate code, so that GPIO, PWM, UART and other ports can output custom signals according to voice commands, and external devices can be controlled without code development.

Pin No	Function	Parameter 1	Parameter 2	Parameter 3	Parameter 4	Remark
16	UART1_TX	Baud rate 115200	Data bit 8	Stop bit 1	Verification bit N	
15	UART1_RX					When configuring the UART_RX function, Pin1 needs to be configured as the UART_TX function
12	GPIO_A25	Default low level				The default pulse level is high when the low level
5	GPIO_A26	Default low level				The default pulse level is high when the low level
4	GPIO_A27	Default low level				The default pulse level is high when the low level
6	GPIO_A28	Default low level				A28 is designed as the PA chip enable control pin on the standard example development board. Please make sure that the hardware design has been modified, otherwise the configuration will affect the audio broadcast function.
3	GPIO_B6	Default high level				The default pulse level is low when the high level
2	GPIO_B7	Default high level				The default pulse level is low when the high level
10	GPIO_B2	Default high level				The default pulse level is low when the high level
11	GPIO_B3	Default high level				The default pulse level is low when the high level

The default low/high level is the signal level of the GPIO pin on start up.

Enter your wakeup words and the responds.

Wake-up word customization Say the wake-up word, the device is in the wake-up state, and voice interaction can be performed with it. It is recommended that the wake-up word be between 2-3 English characters, the total number of wake-up and no-wake-up is up to 10, and the maximum number of replies is 5. ([Wake-up word customization rules](#))

Wake-up sensitivity  ☐ Low  ☒ middle  ☐ high 

Wake-up word list

Hi Robot	
Hi Katy	
Hello Kitty	
Hello Doggy	
How are you	

Wake-up reply list

Hi what can I do for you?	
Hi what would you like me to do?	
Hi how can I help you?	

Wake-up word list:

Hi Robot

Hello Robot

Hi Katy

Hello Kitty

Hello Doggy

Wake-up reply list:

Hi what can I do for you?

Hi what would you like me to do?

Hi how can I help you?

Click on the **Add offline customization** button to add your command words. Action, command words and reply words are all defined by the user.

Add offline customization

Syntax format: action=command word 1|command word 2...@response word

The maximum number of characters that can be configured for a reply word is 1500

```
Blue_on=Turn on the blue light|Blue light on@Turning on the blue light|Blue light is on
Blue_off=Turn off the blue light|Blue light off@Turning off the blue light|Blue light is off
Yellow_on=Turn on the yellow light|Yellow light on@Turning on the yellow light|Yellow light is on
Yellow_off=Turn off the yellow light|Yellow light off@Turning off the yellow light|Yellow light is off
Green_on=Turn on the green light|Green light on@Turning on the green light|Green light is on
Green_off=Turn off the green light|Green light off@Turning off the green light|Green light is off
Say_hi=Say hi|Hello@Hi, how are you?
Stand_up=Stand up|Stand|Can you stand up|Please stand up@I am going to stand up|Standing up
Sit_down=Sit|Sit down|Can you sit|Butt down|Stay@I am going to sit|Sitting down
```

Note: If you want to adjust the device volume, please set the action to volumeUpUni (increase volume), volumeDownUni (decrease volume), volumeMaxUni (maximum volume), volumeMidUni (medium volume), volumeMinUni (minimum volume), otherwise it will not take effect.

Offline Command Word ☐ Low ☒ middle ☐ high
Sensitivity ☐

closure

keep

How_are_you=How are you@I am fine, thank you. How are you?

My_name=What is your name@My name is Katy. Nice to meet you. What is your name?

Blue_on=Turn on the blue light|Blue light on@Turning on the blue light|Blue light is on

Blue_off=Turn off the blue light|Blue light off@Turning off the blue light|Blue light is off

Yellow_on=Turn on the yellow light|Yellow light on@Turning on the yellow light|Yellow light is on

Yellow_off=Turn off the yellow light|Yellow light off@Turning off the yellow light|Yellow light is off

Green_on=Turn on the green light|Green light on@Turning on the green light|Green light is on

Green_off=Turn off the green light|Green light off@Turning off the green light|Green light is off

Red_on=Turn on the red light|Red light on@Turning on the red light|Red light is on

Red_off=Turn off the red light|Red light off@Turning off the red light|Red light is off

White_on=Turn on the white light|White light on@Turning on the white light|White light is on

White_off=Turn off the white light|White light off@Turning off the white light|White light is off
 Light_on=Turn on the light|Light on@Turning on the light
 Light_off=Turn off the light|Light off@Turning off the light
 Music_on=Turn on the music|Music on@Turning on the music|The music is on
 Music_off=Turn off the music|Music off@Turning off the music|The music is off
 Next_song=Next song@Playing the next song
 Previous_song=Previous song@Playing the previous song
 Go_forward=Go forward|Move forward|Step forward@Going forward
 Turn_left=Turn left@Turning left
 Turn_right=Turn right@Turning right
 Go_backward=Go backward|Move backward@Going backward
 Speed_up=Speed up@Going faster
 Slow_down=Slow down@Going slower
 Stop=Stop|Stop motor@Okay
 Back_flip=Back flip@Let me try
 Boxing=Boxing@Watch me box
 Crawl=Crawl@Okay
 Dance=Dance@Yes I can dance, watch me|Will you dance with me
 Front_flip=Front flip@Let me try
 Good_job=Good job|Good boy@Thank you
 Hands_up=Hands up@Okay
 Handshake=Handshake@Nice to meet you
 Handstand=Handstand|Do a handstand@Watch out, I might fall down
 High_five=High five|Give my five@Give me five
 Jump=Jump|Can you jump@See how high I can jump
 Play_dead=Play dead@Ouch
 Police_car=Police car@Move aside, police car is coming
 Push_ups=Push ups@Okay, one, two, three
 Rainbow_lights=Rainbow lights@Beautiful light show for you
 Sleep=Rest|Go to sleep|Take a break@Okay, I am going to sleep
 Spin_around=Spin around|Ring around the rosie@Spinning around|Ring around the rosie
 Stand_up=Stand up@I am going to stand up|Standing up
 Star_wars=Star wars@May the force be with you
 Sit_down=Sit|Sit down|Stay@I am going to sit|Sitting down
 Walk=Walk@Okay
 Work=What do you do@I am Doctor Wongs robot assistant
 Office=Where is Doctor Wongs office@Doctor Wongs office is in Price Science Complex room 255

Here is the syntax for the command words

5. Command word rules:

action=command word 1|command word 2...@reply

Example: TempSet15=Set fifteen degrees|fifteen degrees Celsius@Okay, the temperature is set

Action, command words, and reply words are all defined by the user

1. The action consists of English, underscore "_" and numbers. It must start with English and is not case sensitive. It must be within 15 characters.

2. The maximum number of command words supported is 1 - 10 English words per command word. Only English and spaces are supported.

3. An action can only support one "@" to define a reply, and a single reply cannot exceed 500 characters. Replies support English, numbers, English commas, English periods, question marks, and spaces. If there are multiple replies, separate them with "|".

action is a unique identifier for a control command. When the user says "Set fifteen degrees" or "fifteen degrees Celsius" to the device and it is semantically understood, if the device is docked, the semantic understanding module will pass TempSet15 to the device.

The command word is a voice phrase that the user wants to define. The user must say it according to the defined phrase to make it effective. For example, the user can use "Set fifteen degrees" or "fifteen degrees Celsius" to control the same temperature setting of 15 degrees.

6. Reply rules:

The reply is the device reply broadcast for this control command.

Tags are supported in replies to specify the pronunciation of certain words:

<value>: The number needs to be reported as a numerical value

Example: Adjusted to <value>15</value> degrees

The report is: Adjusted to fifteen degrees

<code>: The numbers need to be broadcast bit by bit according to the digital string

Example: Adjusted to <code>15</code> degrees

Report: Adjusted to one five degrees

Click the Keep button when you're done. You can repeat this as many times as you need.

Customize offline command words and response words If you want to control your own devices, come and configure custom command words to make your devices smarter. [See how to customize](#)

Basic Information		Control Details			+ Add offline customization
Serial number	Behavior	Command word	Reply	operate	
1	How_are_you	How are you	I am fine, thank you. How are you?	delete	
2	My_name	What is your name	My name is Katy. Nice to meet you. What is your name?	delete	
3	Blue_on	Turn on the blue light/Blue light on	Turning on the blue light/Blue light is on	delete	
4	Blue_off	Turn off the blue light/Blue light off	Turning off the blue light/Blue light is off	delete	
5	Yellow_on	Turn on the yellow light/Yellow light on	Turning on the yellow light/Yellow light is on	delete	
6	Yellow_off	Turn off the yellow light/Yellow light off	Turning off the yellow light/Yellow light is off	delete	
7	Green_on	Turn on the green light/Green light on	Turning on the green light/Green light is on	delete	
8	Green_off	Turn off the green light/Green light off	Turning off the green light/Green light is off	delete	
9	Light_on	Turn on the light	Turning on the light/Light on	delete	
10	Light_off	Turn off the light	Turning off the light/Light off	delete	
11	Music_on	Turn on the music/Music on	Turning on the music/The music is on	delete	
12	Music_off	Turn off the music/Music off	Turning off the music/The music is off	delete	

To generate a signal through a GPIO pin for a specific command or send a serial code, click on the **Control Details** tab. Click on the **Adding Controls** button for the command you want.

For the **Control functions**, select one of the GPIO pin or UART1_TX.

Adding Controls

Behavior

How_are_you

Control functions 10 *

UART1_TX

UART1_TX

GPIO_A25

GPIO_A26

GPIO_A27

GPIO_A28

GPIO_B6

GPIO_B7

GPIO_B2

GPIO_B3

action *

data *

The value is in hexadecimal format without 0x, for example: 00 01 0A, the value cannot exceed 16

closure

save

Select the action and data value that you want to set.

Control Function	Action	Data	Comment
GPIO	Set up	High/Low level	Send a high or low signal through the pin
GPIO	Pulse	Cycle time ms Frequency	Length of a period in ms Number of cycles to generate
UART1_TX	Send	Hex value to send	Send hex value through serial port

On the test board, the blue led is connected to GPIO pin B7, the yellow led to B6, and the green led to B2.
A LOW turns on the led, and a HIGH turns off the led.

Customize offline command words and response words. If you want to control your own devices, come and configure custom command words to make your devices smarter.

[See how to customize](#)

Basic Information

Control Details

+ Add offline customization

Serial number	Behavior	Command word	Control Type	action	Action Parameters	operate
1	Blue_on	Turn on the blue light/Blue light on	GPIO_B7	set up	High level	delete
					Adding Controls	
2	Blue_off	Turn off the blue light/Blue light off	GPIO_B7	set up	Low level	delete
					Adding Controls	
3	Yellow_on	Turn on the yellow light/Yellow light on	GPIO_B6	set up	High level	delete
					Adding Controls	
4	Yellow_off	Turn off the yellow light/Yellow light off	GPIO_B6	set up	Low level	delete
					Adding Controls	
5	Green_on	Turn on the green light/Green light on	GPIO_B2	set up	High level	delete
					Adding Controls	
6	Green_off	Turn off the green light/Green light off	GPIO_B2	set up	Low level	delete
					Adding Controls	
7	Say_hi	Say hi/Hello	GPIO_A25	pulse	Cycle: 100ms, times: 1	delete
					Adding Controls	

Customize the command words that do not require the wakeup word. Note that after using one of these the module is NOT in the wakeup mode.

The wake-up-free command word does not require wake-up. You can control the device by speaking the command word. After the wake-up-free command word is spoken, the device is in the wake-up state. The total number of wake-up-free command words and wake-up words shall not exceed 10.

choose

Rainbow lights

Add to

Turn on the light

Turn off the light

Turn on the music

Turn off the music

Rainbow lights

Turn on the light

Turn off the light

Turn on the music

Turn off the music

Rainbow lights

Finish the rest of the customizations to your liking.

Speaker configuration allows the device to speak with the voice you define. Click the speaker icon to listen

Pronounced by

☒ Xuanxuan

☐ Lingling

☐ day by day

☐ KIYO

☐ Xiaofeng

☐ Xiaowen

volume

50

pitch

50

Speech rate

50

brightness

50

Other settings include welcome message and exit command. You can enter up to 3 exit commands and 2 replies.

Startup Announcement

☐ Default ringtone

☒ customize

☐ No broadcast

Customized announcement

I am alive

Active exit command

Goodbye

Add to

Bye

Actively exit reply

Goodbye

Add to

Timeout (seconds)

15

Timeout Exit Reply

I am going to take a break let me know

Add to

I am alive

~~I am going to take a break now, let me know when you need more help.~~

7. Generate SDK Firmware

After you are done with all the customization, you can click the blue **Next Step** button, and then click on the red **For Immediate Release** button to generate the SDK firmware.



Congratulations, version "1.0" of the product "Chip v2" has been developed.

Next, you can return to the product details page to publish and download, or click "Publish Now" on this page.

The publishing process will take some time, please come back to download later~

Previous

For immediate release

You are prompted one last time whether you are sure you want to publish the SDK firmware.

Note that once you do this, you CANNOT make any more changes.



Are you sure you want to publish? You cannot
modify it after publishing, please operate with
caution!

Cancel

Sure

Alternatively, you can click on the red Release button on the SDK list screen to generate the SDK firmware. Again, you are prompted one last time whether you are sure you want to publish the SDK firmware.

Product List / SDK List

Chip v2

HLK-V20

Remaining SDK quantity

29Contact customer service to increase

Number of SDKs built

1

Download Information

+Creating SDK

id/version/language	state	describe	Update time	operate
8835/ 1.0/ English	To be released	Our dog Chip	2024-06-26 08:41:02	Development release

See **Hi-Link voice product customization management system operation guide_V1.1 (2).docx** for detail instructions.

Product List / SDK List

Chip v2

HLK-V20

Remaining SDK quantity

29Contact customer service to increase

Number of SDKs built

1

Download Information

+Creating SDK

id/version/language	state	describe	Update time	operate
8835/ 1.0/ English	in the line	Our dog Chip	2024-06-26 08:41:02	Check refresh

It takes about 30 minutes for the SDK firmware to be generated. You can keep refreshing the project to see the status.

After the SDK firmware is successfully generated, click on the **download** button to download your customized firmware bin file. Unzip the file. There are four .bin files in the zip folder. Only use the one named **uni_app_release_update.bin**.

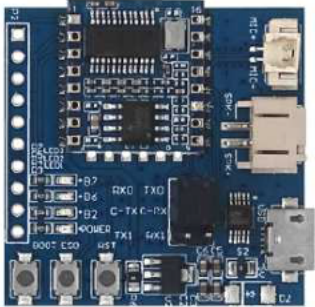
8. Upload the Customized Firmware (bin) File to Module

Parts needed: A USB to Serial adapter.

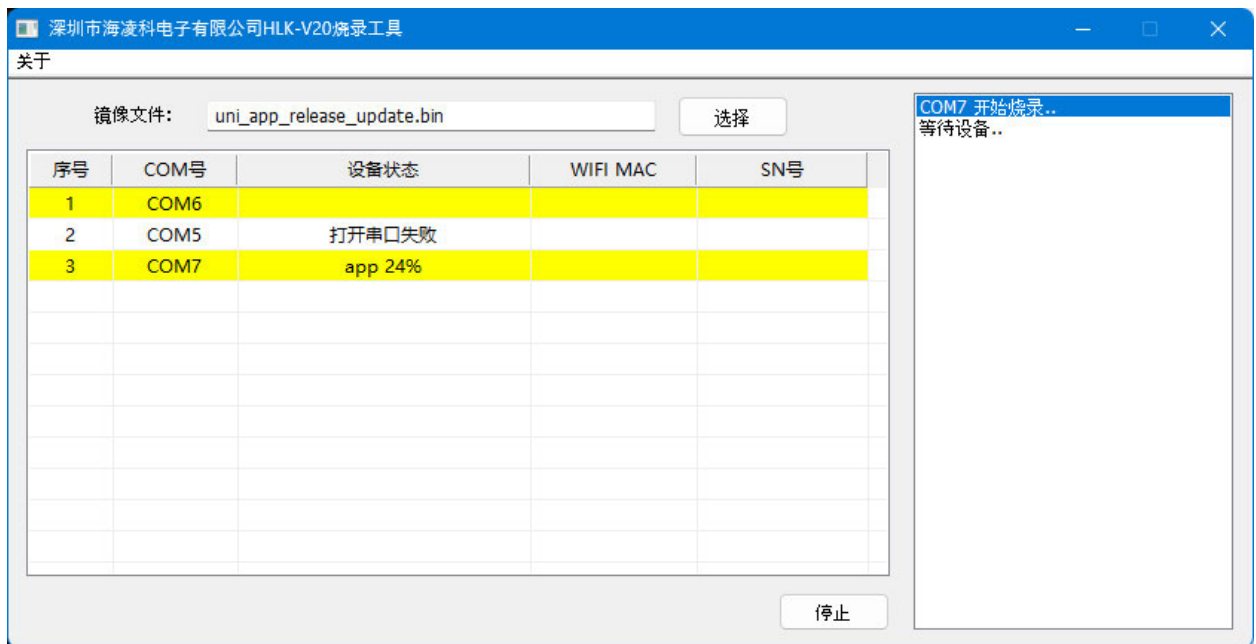
Step 1. Make the following connections depending on which version of the voice module you have.

USB to Serial Adapter	Development Module	Bare Voice Module
RXD	B7	B7
TXD	B6	B6
GND	GND	GND
+5V	VCC	do not connect this yet

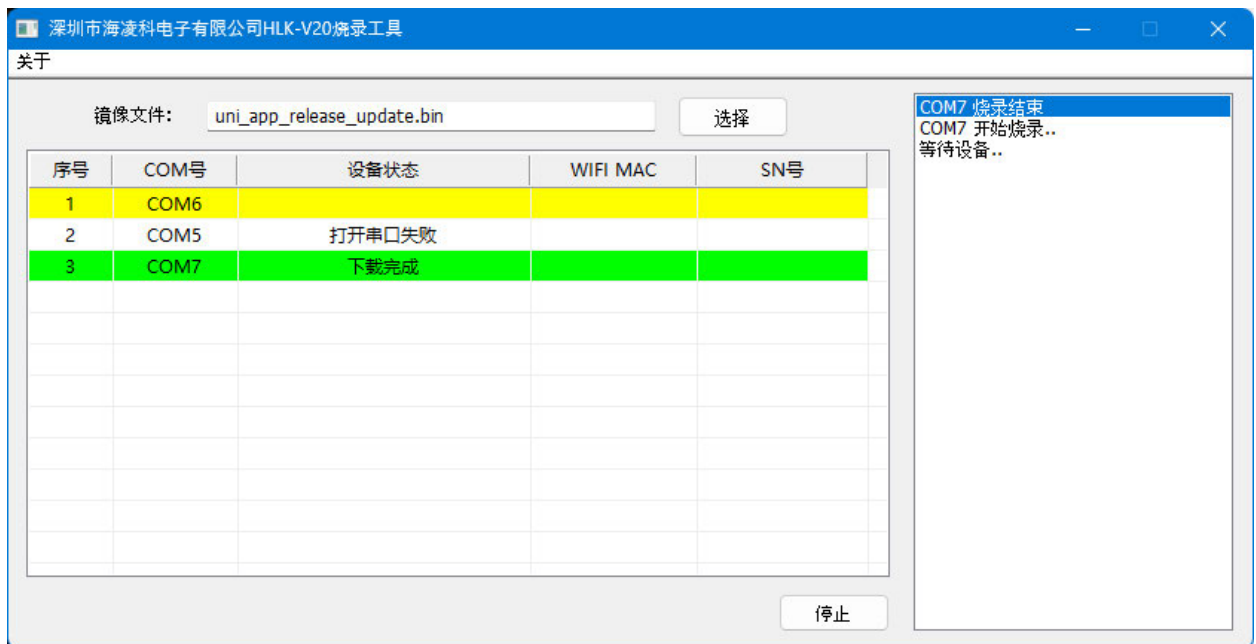
If you have the development module with the on/off switch, make sure that it is set to **off**.



Step 4. Select the SDK firmware bin file **uni_app_release_update.bin** that you downloaded. The default file is uni_app_release_update.bin in the same folder as the HLK-V20 BurnTool.exe program



When the upload is completed successfully, you'll see a green bar.



Step 7. Disconnect and reconnect power. You should hear the startup announcement (whatever you have customized it to be). Test the module by saying your wakeup word followed by a command word. The module should respond with the words that you wrote.

See V20_USB_Update_Tool_User_Guide in ENGLISH!!!.pdf for detail instructions.

9. Connecting to the Arduino to Receive the Serial Codes

Step 1. Make the following connections depending on which version of the voice module you have.

Arduino	Development Module	Bare Voice Module
Pin 2 (for RX)	RX	TX
Pin 3 (for TX)	TX	RX
GND	GND	GND
+5V	VCC	VCC

Step 2. Upload the following code to your Arduino.

```
/* Interfacing the HLK-V20 Voice Recognition Module with the Arduino
 *
 * The SoftwareSerial pins are setup for 2=RX, 3=TX
 *
 * Connections for the HLK-V20 Development Board
 * Arduino    Development Board
 * RX pin 2    RX (already crossed)
 * TX pin 3    TX (already crossed)
 *
 * Connections for the HLK-V20 Voice Module
 * Arduino    Voice Module
 * RX pin 2    TX
 * TX pin 3    RX
 *
 * 5V          VCC
 * GND         GND
 *
 */

#include <SoftwareSerial.h>

SoftwareSerial HLK_V20_Serial(2, 3);  // RX, TX

void setup() {
  Serial.begin(115200);
  HLK_V20_Serial.begin(115200);
  Serial.println("Ready");
}

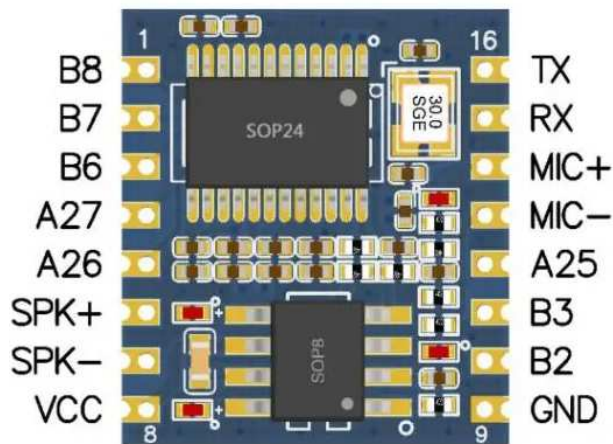
void loop() {
  char ch = "";

  while (HLK_V20_Serial.available()) {
    ch = HLK_V20_Serial.read();
    Serial.print(ch, HEX);
    switch(ch) {
      case 0x03:
        Serial.println(" Turning on the blue light");
        break;
    }
  }
}
```

```
case 0x04:
    Serial.println(" Turning off the blue light");
    break;
case 0x05:
    Serial.println(" Turning on the yellow light");
    break;
case 0x06:
    Serial.println(" Turning off the yellow light");
    break;
case 0x07:
    Serial.println(" Turning on the green light");
    break;
case 0x08:
    Serial.println(" Turning off the green light");
    break;
}
}
```

Command	Chinese Pronunciation	Led response	Serial output
Wakeup	Xiaoke Xiaoke		035A
Turn on the light	Kāi dēng	yellow led (pin B6) on	010A
Turn off the light	Guān dēng	yellow led off	011A
Turn on the air conditioner	Dǎkāi kòngtiáo	blue led (pin B7) on	07A
Turn off the air conditioner	Guānbì kòngtiáo	blue led off	08A
Turn on the switch	Dǎkāi kāiguān	green led (pin B2) on	029A
Turn off the switch	Guānbì kāiguān	green led off	02AA

10. Connection Pins for the Voice Module



- B8 (I): General purpose input/output
- B7 (I/O): General purpose input/ output
- B6 (I/O): General purpose input/ output
- A27 (I/O): General purpose input/ output
- A26 (I/O): General purpose input/output

SPK+(0): P terminal of power amplifier differential output
SPK-(0): N terminal of power amplifier differential output
VCC (PWR): power supply (3.3V-5V)
GND: GND
B2 (I/O): General purpose input/output
B3 (I/O): General purpose input/output
A25 (I/O): General purpose input/output
MIC-(I): MIC1 differential input N terminal
MIC+(I): MIC1 differential input P terminal
RX (I/O): Uart rx
TX (I/O): Uart tx

11. Connection Pins for the Development Board

VCC (PWR): power supply (3.3V-5V)
GND: GND
RX (I/O): This is connected to the TX pin on the Voice Module
TX (I/O): This is connected to the RX pin on the Voice Module
A25 (I/O): General purpose input/output
A26 (I/O): General purpose input/output
A27 (I/O): General purpose input/ output
B6 (I/O): General purpose input/ output.
B7 (I/O): General purpose input/ output.
B8 (I): General purpose input/output

Yellow led connected to B6
Blue led connected to B7
Green led connected to B2
These LEDs are active low

Note that the RX/TX pins on the Development Board are crossed connected to the RX/TX pins on the Voice Module, i.e., RX is connected to TX and TX is connected to RX.

12. Contact

info@hlktech.com