SYN6658 Chinese Speech Synthesis Chip

user manual

Beijing Yuyin Tianxia Technology Co., Ltd.

010-62986600 010-62969399 www.voicetx.com

Yuyin Tianxia Official Subscription Number

Yuyin Tianxia pre-sale consultation

SYN6658 Speech Synthesis Chip User Manual Correction Record		
Version	release date	content description
1.0	2012/4/27 First release version	
1.1	New on 5/11/2012: Chapter 13: Special Applications: Text Cache Commands	
1.2	2012/6/8	1. The limit value increases the operating voltage and increases the audio DAC characteristics 2. Entering Standby mode supports two command words: 0x22, 0x88 3. Unicode encoding supports two storage methods: small head storage, big head storage
1.3	2012/8/23	1. Added 2 customer prompts: sound601, sound602 2. Newly added: Section 11.3.3: Addition and deletion of user prompts
1.4	2013/8/26 Modify the limit parameters and recommended voltage working range to make the document more standardized	
1.41	2016/12/30 Change of company address and fax	
1.50	2021/07/01	Added chapter "11.3.1 Quick Prompt Sounds for Number Keys", and added sound701 to sound719 A total of 19 digital keys quick prompt tone
1.51	2022/04/15 Modify the company website	
1.52	2022/04/22 Modify some pin descriptions	
1.53	2022/06/01 Instructions for adding and deleting tools for deleting prompts	

important statement

Copyright statement

Trademark

Statement The products of Beijing Yuyin Tianxia Technology Co., Ltd. are proprietary to Beijing Yuyin Tianxia Technology Co., Ltd. in mentioning Other companies and their products may use trademarks owned by their respective companies for the sole purpose of citation.

This document may involve patents (or pending patents), trademarks,

Copyright or other intellectual property rights, unless express written permission agreement from Beijing Yuyintianxia Technology Co., Ltd.,

No license is granted by this document to the use of these patents (or patents pending), trademarks, copyrights, or other intellectual property any license agreements.

Statement of No Warranty

Beijing Yuyin Tianxia Technology Co., Ltd. does not make any express or implied representations for any content in this document representation or warranty, and disclaims any indirect, special or consequential damages of merchantability and fitness for a particular purpose assume no responsibility. The contents of this manual are subject to change without prior notice. The companies used in the examples in this brochure, Unless otherwise stated, names and data are fictitious. The book that has not been cleared by Beijing Yuyin Tianxia Technology Co., Ltd.

This manual may not be reproduced or transmitted for any purpose in any form or by any means (electronic or mechanical) any part of .

Confidentiality

Statement The information contained in this document (including any attachments) is confidential. Recipients understand that this document they receive is confidential and shall not be used for any purpose other than that specified, nor shall this document be disclosed to any third party

Three parties.

This software product is subject to the terms and conditions stated in the End User License Agreement (EULA), which is

Use of this product in the product documentation and/or online documentation for the software product indicates that you have read and accept the EULA Terms.

Table of contents

1 Overview

SYN6658 Chinese speech synthesis chip is the latest product launched by Beijing Yuyin Tianxia Technology Co., Ltd. in 2012. It has higher cost performance and better effect. Naturally a high-end speech synthesis chip. SYN6658 receives the text data to be synthesized through UART interface or SPI interface communication mode to realize Text-to-speech (or TTS speech) conversion.

The company's latest SYN6658 speech synthesis chip inherits the excellent features of OSYNO6188 and SYN6288 speech chips: small size stickers Chip package, simple hardware interface, low power consumption, clear and mellow sound, high performance/price ratio; in addition, SYN6658 can recognize text/number/word Strings are smarter and more accurate, and the naturalness of speech synthesis has risen to a big level. SYN6658 voice synthesis effect and intelligent level have reached the quality Feiyue is a Chinese speech synthesis chip for high-end industry applications.

The birth of SYN6658 speech synthesis chip will promote the industry application of TTS speech synthesis technology to go deeper and wider!

2 main application areas

- Vehicle GPS dispatching terminal
- Fixed telephone
- Information machine
- Tax control machine
- attendance machine
- Bus voice announcer
- queuing machine
- Vending machines
- weather early warning machine
- POS machine
- intelligent instrument
- Smart meters
- Intelligent toys
- Audio guide

3 Product Function Description

ÿText synthesis function

Clear, natural and accurate Chinese speech synthesis effect. The chip supports the synthesis of any Chinese text, and can use GB2312, GBK, BIG5 and Unicode four encoding methods. The chip supports the synthesis of English letters, and when encountering English words, it will be pronounced in alphabetical form. The amount of text synthesized each time can be Up to 4K bytes.

ÿText intelligent analysis and processing

The chip has the function of intelligent analysis and processing of text.

Fragments can be correctly identified and processed according to the built-in text matching rules.

For example: "2012-05-01 10:36:28" is read as "10:36:28 on May 1, 2012", "the speed of the train

The degree is 622km/h" is read as "the speed of the train is 622 kilometers per hour", "-12°C" is read as "minus twelve degrees Celsius", and so on.

ÿ**Ability** to process polyphonic characters and Chinese surnames

For texts with polyphonic characters, for example: "The president of the bank walked across the sidewalk to the bank clerk who was riding a bicycle", the chip can automatically

Dynamically analyze the text, identify the pronunciation of polyphonic characters in the text and synthesize the correct pronunciation.

When some Chinese characters are used as surnames, there will be some unconventional pronunciations, which can be processed automatically by the chip. For example: "He is a man surnamed Park

A simple Korean entertainer. ", the first of the two "ÿ" characters in the sentence is read as "piao2", and the latter one is read as "pu3".

ÿ**Support** 10-level volume adjustment, 10-level speech rate adjustment and 10-level intonation adjustment

The chip can realize 10-level digital volume control, the volume is louder and wider. Support the adjustment of speech rate and intonation to meet various application requirements.

ÿ**Prompt** tone

The chip integrates a large number of sound prompts, which can be used for information reminders and alarms in different industries and occasions.

The chip integrates 14 polyphonic music, which can be used as polyphonic SMS prompt tone or polyphonic ringtone.

The chip also supports customers to add their own prompts to meet customers' needs for specific text synthesis or specific prompts. Customers can delete

Delete and increase the beep.

ÿ Support multiple speakers

There are 6 Chinese speakers, two men, two women, one effector and one girl, and the chip can be switched by using the special mark [m?]

speaker. [m3]: female voice "Xiaoling"; [m51]: male voice "Yin Xiaojian"; [m52]: male voice "Yi Xiaoqiang"; [m53]: female voice "Tian Bei"

Bei"; [m54]: Effector "Donald Duck"; [m55]: Girl's voice "Little Swallow".

ÿ**Support** multiple text control tags

The chip supports a variety of text control tags. Text control marks can be sent by sending "synthetic commands" to adjust speech rate, intonation, and volume.

You can also use control tags to improve the accuracy of text processing, such as: setting the rhythm of sentences, setting the pronunciation of numbers, setting the pronunciation strategy of surnames,

Set the reading method of "1" in the number, etc.

ÿ**Support** multiple control commands

Control commands include: synthesize text, stop synthesis, pause synthesis, resume synthesis, status query, and enter Power Down mode. controller

Control the chip by sending control commands through the communication interface.

ÿ**Query** the working status of the chip

Support multiple ways to query the working status of the chip, including: query the status pin level, return automatically by reading the chip, send query

command to get the return of the working status of the chip.

ÿ Communication mode

Two communication modes: the chip supports two communication modes of UART and SPI. When the user UART serial port resource has been occupied, you can choose to use the SPI interface

mouth.

ÿSupport low power consumption

mode The chip supports Standby mode. Use the control command to make the chip enter the Standby mode.

ÿSupport 4 communication baud rates The

communication baud rates supported by the chip: 4800bps, 9600bps, 57600bps, 115200bps.

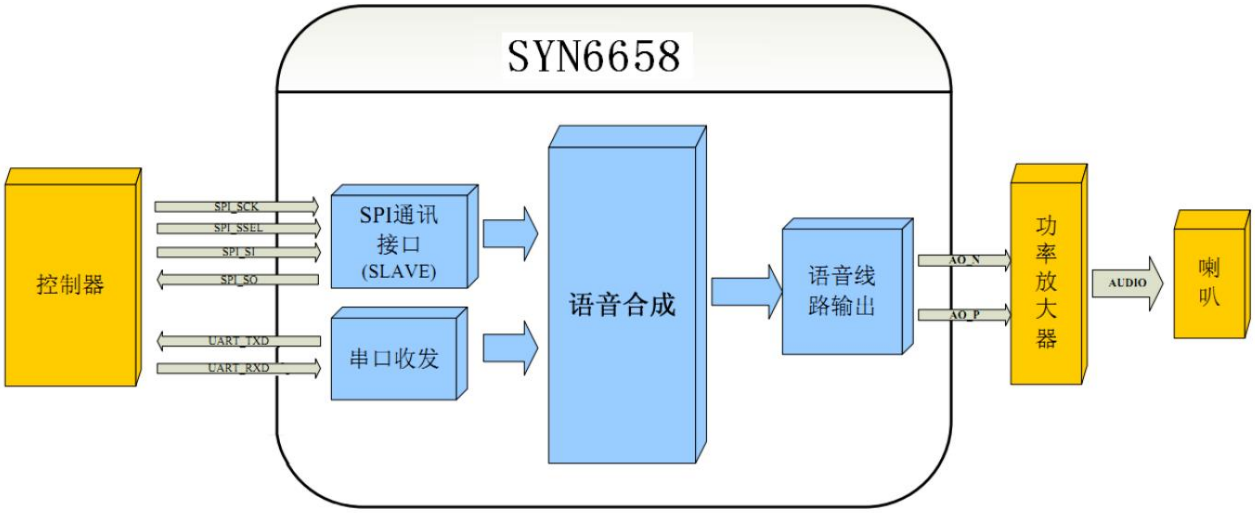
4 Ordering Information

Chip model	Package information		
SYN6658	chip name	package name	Package Description
	SYN6658	LQFP64	64 pins, chip size 10mm×10mm×1.4mm

5 System structure block diagram

The minimum system includes: controller module, SYN6658 speech synthesis chip, power amplifier module and speakers.

The main controller and the SYN6658 speech synthesis chip are connected through the UART interface or the SPI interface, and the controller can communicate with the SYN6658 speech synthesis chip sends control commands and text, SYN6658 speech synthesis chip synthesizes the received text into speech signal output, The output signal is amplified by the power amplifier and then connected to the speaker for playback.



6 pin definition

numbered	pins	illustrate	numbered	pins	illustrate
1	VDD1	1.2V digital power input 33		NC	
2	UVDD	3.3V analog power input 34			Undefined
3	RREF	Reference voltage, 10K pull-down resistor 35			Undefined
4	UVSS	digitally	36	SVDD	3.3V digital power input
5	NC		37	VSSIO2	Digitally
6	NC		38	NC	
7	HPVDD	3.3V Analog Power Input 39		RXD/WakeUP2	Serial port receiving/WakeUP2 external 10k pull-up resistor when not in use
8	AO_P	Audio Out - Positive	40	$\overline{R}$/B	Chip busy status indicator, low level means empty idle
9	AO_N	Audio Out - Negative	41	TXD/WakeUP3 serial port send/WakeUP3	
10	HPVSS	Simulated	42	SCLK#	SPI_SCLK
11	VCM2	External 10uF filter capacitor 43		SSEL#	SPI_SSEL
12	VCM3	External 10uF filter capacitor 44		SDI#	SPI_MOSI
13	NC		45	SDO#	SPI_MISO
14	AVSS	Simulated	46	VDDIO2	3.3V digital power input
15		Undefined	47	WakeUp1	wakeup pin 1
16	DAT7#	digital signal line	48	WakeUp0	wakeup pin 0
17	AVDD	3.3V analog power input 49 reference voltage,		DAT1#	digital signal line
18	VREF	100nF filter voltage Allow	50	DAT2#	digital signal line
19	NC		51	DAT3#	digital signal line
20	VDD_I2	Chip power supply, POWER_IN	52	VSSIO3	digitally
twenty one	DAT0#	Digital signal line	53	SOP2#	External 100K pull-up resistor
twenty two	VDDIO1_O	3.3V output, maximum drive current 100mA (for AVDD of PIN17 and VDDIO2 power supply of PIN46)	54		Undefined
twenty three	VDD2_O	1.2V output for PIN1 VDD1 power supply	55	BAUD1	Baud Rate Configuration Port 1

twenty four	PLL_V12 External filter capacitor 0.1~1uF		56	BAUD0	Baud Rate Configuration Port 0
25	VSSIO1	digitally	57	DAT4#	digital signal line
26	XTAL12MI	12M crystal oscillator input	58		Undefined
27	XTAL12MO	12M crystal oscillator output	59	DAT5#	digital signal line
28	#RST	Reset (active low) 60		DAT6#	digital signal line
29	SOP1#	External 100K pull-up resistor 61			Undefined
30	NC		62	TEST	External 10K pull-up resistor
31	NC		63		Undefined
32		Undefined	64	SVSS	digitally

7 chip control mode

7.1 Control commands

The host computer sends commands to the SYN6658 chip in the format of command frames. The SYN6658 chip performs corresponding operations according to the command frame, and returns Return the result of the command operation.

The SYN6658 chip provides a variety of control commands, the list is as follows:

command function	illustrate
Speech synthesis play command	Synthesize and play the text sent this time
stop compositing command	Stop the current compositing action
Pause compositing command	Pause an ongoing composition
restore compositing command	Continue compositing paused text
Chip status query command	Query the working status of the current chip
The command to enter the Standby mode causes the chip to enter the Standby mode from the normal working mode, and resumes after receiving any command	
wake up command	Make the chip enter normal working mode from Standby mode

7.2 Chip Backhaul

After receiving the control command frame, the chip will send a 1-byte status feedback to the host computer, and the host computer can judge the current state of the chip according to the feedback. working status.

When the SYN6658 chip initializes successfully, it will send a one-byte "initialization successful" return.

After receiving the command frame, the SYN6658 chip will judge whether the command frame is correct or not. If the command frame is correct, it will return a "successfully received" return; such as If the command frame is wrong, it will return a "receive failure" return.

When the SYN6658 chip receives the status query command, if the chip is in the working state of broadcasting, it will return "is broadcasting" back, if the chip If the chip is in an idle state, a "chip idle" return is returned. After a frame of data is synthesized, the chip will automatically return a "chip idle" response. pass.

Return type name	return data	Triggering conditions
Init successful return	0x4A	The chip is initialized successfully
Received the correct command frame back	0x41	The reception is successful and the correct command frame is received
0x45 is returned when an unrecognized command frame is received		Receive failed, received wrong command frame
chip broadcast status return	0x4E	After receiving the "Status Query Command Frame", the chip is in the broadcasting state
Chip idle state feedback	0x4F	When a frame of data is synthesized, the chip enters the idle state and returns 0x4F; or After receiving the "Status Query Command Frame", the chip returns 0x4F when it is idle

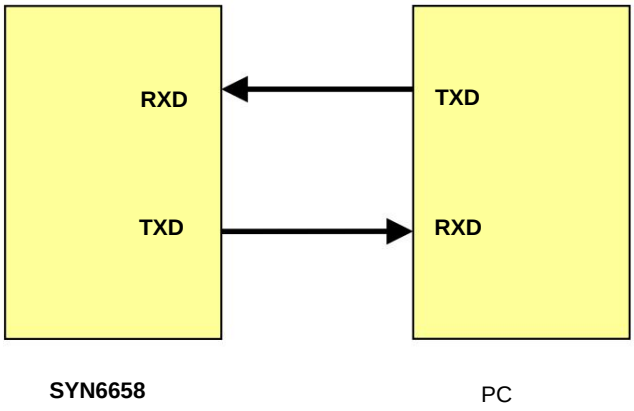
8 Communication methods

The SYN6658 chip supports two communication modes of UART interface and SPI interface, and can receive the host computer through the UART interface or SPI interface. The maximum length of data sent is 4k bytes.

8.1 Asynchronous serial communication mode (UART)

8.1.1 Hardware connection

SYN6658 provides a set of full-duplex asynchronous serial communication (UART) interface to realize data transmission with microprocessor or PC. SYN6658 Use TxD, RxD and GND to realize serial communication. Among them, GND is used as signal ground. SYN6658 chip supports UART interface communication mode, Receive commands and data sent by the host computer through the UART interface.



8.1.2 Communication transmission byte format

1. Communication standard: UART
2. Baud rate: 4800bps, 9600bps, 57600bps, 115200bps
3. Start bit: 1bit
4. Data bits: 8bits
5. Stop bit: 1bit
6. Calibration: None

8.1.3 Baud rate configuration method

The UART communication interface of the SYN6658 chip supports 4 communication baud rates: 4800 bps, 9600 bps, 57600 bps, 115200 bps,

The hardware configuration can be performed through the level on the two pins BAUD0 and BAUD1 on the chip.

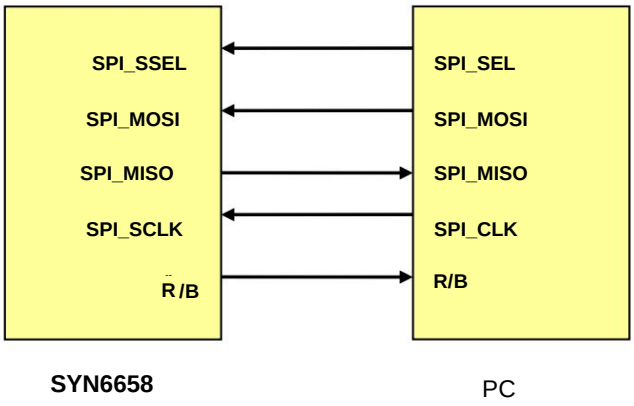
baud rate	BAUD0	BAUD1
4800bps	0	0
9600 bps	0	1
57600 bps	1	0
115200 bps	1	1

8.2 SPI communication mode

The following is only the most basic description of the SPI communication mode. If the customer needs to use the SPI communication mode, please follow the "SYN6658 Chinese Voice Synthesis Chip_Additional Manual (SPI Communication).pdf" for development.

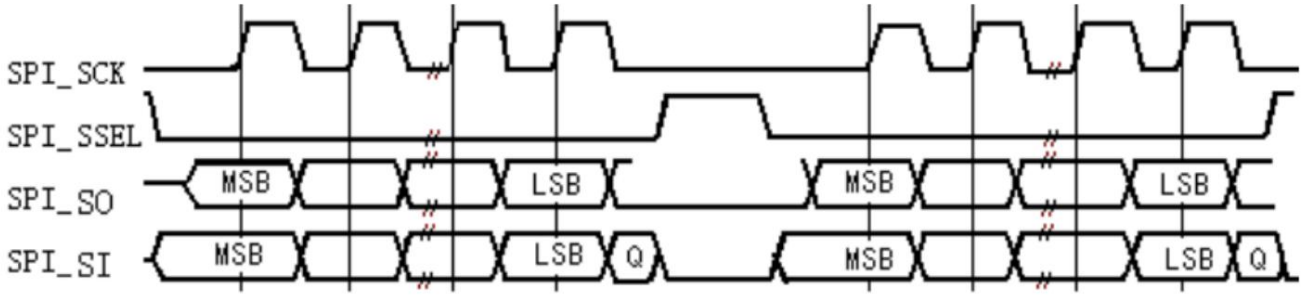
8.2.1 Hardware connection

The SPI interface of the SYN6658 chip is a 4-wire full-duplex synchronous serial communication interface. The upper computer is used as the Master status in the SPI communication. The SYN6658 chip is set as the Slave status in the SPI communication. The clock signal required for the SPI communication is provided by the upper computer.



8.2.2 Communication transmission byte format

SPI communication belongs to synchronous serial communication. When the upper computer communicates with SYN6658, the upper computer provides a synchronous clock signal. Rising edge SYN6658 latches 1bit data, every 8bits of data is transmitted to complete the transmission of a byte of data.



SPI 通讯时序图

9 Communication frame definition and communication control

9.1 Command frame format

The chip supports the following command frame format: "frame header FD + data area length + data area" format.

All commands and data sent by the host computer to the SYN6658 chip need to be encapsulated and transmitted in the form of "frame".

frame structure	Frame header (1 byte)	Data area length (2 bytes)	Data area (less than or equal to 4K+2 bytes)		
			Command word 1 byte	Command parameter 1 byte	text to be sent <= 4k bytes
Data 0xFD		0xXX 0xXX	0xXX	0xXX	0xXX……
illustrate	defined as sixteen Hexadecimal "0xFD"	high byte first low byte after	The total number of bytes must be consistent with the previous "data area length"		

Note: The actual number of bytes in the data area (including command words, command parameters, and text to be sent) must be strictly consistent with the length of the data area defined after the frame header.

Otherwise, the chip will report receiving failure.

9.2 Control commands supported by the chip

The host computer can use the command words and command parameters in the data area to realize various functions of the speech synthesis chip.

Data area (less than or equal to 4K bytes)				
Command word 1 byte		command parameters 1 byte		text to send <= 4K bytes
The value corresponds to the function value			corresponding function	
0x01	Speech synthesis playback command	0x00	Set the text to: GB2312 encoding format	text to be synthesized binary content
		0x01	Set the text to: GBK encoding format	
		0x02	Set the text to: BIG5 encoding format	
		0x03	Set the text to: UNICODE encoding format (small header storage)	
		0x04	Set the text to: UNICODE encoding format (bulk storage)	
0x02	stop synthesis command	no parameters		no text
0x03	Pause synthesis command			

0x04 restore synthesis command			
0x21 Chip status query command			
0x22 The chip enters Standby mode			
0x88 chip enters Standby mode			
0xFF chip wake-up command			

9.3 Special instructions related to command frames

9.3.1 Sleep and wake-up instructions

ÿ**The** chip will not sleep actively, it will sleep only after receiving the sleep command frame sent by the host computer. ÿ**After** the chip enters sleep mode, the host computer first needs to wake up the chip (it can be woken up by sending a wake-up command, or by sending other commands Wake up), and then send command frame data to the chip; (Note: After waking up, send command data at an interval of 1 millisecond)

9.3.2 Other special instructions

ÿ 1. In the same frame of data, the sending interval between each byte cannot exceed 15ms; the sending interval between frames must exceed 15ms (to ensure To ensure the communication quality, it is recommended to leave a margin of at least 2ms, that is: greater than 17ms).

ÿ 2. When the SYN6658 chip is synthesizing text, if it receives another valid synthesis command frame, the chip will immediately stop the current The text being synthesized is then synthesized to the newly received text.

ÿ 3. The length of the text to be sent must be less than or equal to 4096 bytes. When the actual sent length is greater than 4096, the chip will report receiving failure. ÿ 4. When the user is playing text content continuously, after receiving the "chip idle" byte (that is, 0x4F) after the previous frame of data After about 1ms, the next frame of data is sent.

9.4 Example of command frame

9.4.1 Speech synthesis play command

frame structure	header	data area length	data area		
			command word	command parameter	text to send
Data 0xFD	0x00 0x0A		0x01	0x00	Yuyin Tianxia 0xD3 0xEE 0xD2 0xF4 0xCC 0xEC 0xCF 0xC2
Data frame	0xFD 0x00 0x0A 0x01 0x00 0xD3 0xEE 0xD2 0xF4 0xCC 0xEC 0xCF 0xC2				
Instructions	to play the text "Yuyin Tianxia" whose text encoding format is "GB2312"				

frame structure	header	data area length	data area		
			command word	command parameter	text to send
Data 0xFD	0x00 0x0A		0x01	0x01	Yuyin Tianxia 0xD3 0xEE 0xD2 0xF4 0xCC 0xEC 0xCF 0xC2
Data frame	0xFD 0x00 0x0A 0x01 0x01 0xD3 0xEE 0xD2 0xF4 0xCC 0xEC 0xCF 0xC2				
Instructions	to play the text "Yuyin Tianxia" whose text encoding format is "GBK"				

frame structure	header	data area length	data area		
			command word	command parameter	text to send
Data 0xFD	0x00 0x0A		0x01	0x02	Yuyin Tianxia 0xA6 0x74 0xAD 0xB5 0xA4 0xD1 0xA4 0x55
Data frame	0xFD 0x00 0x0A 0x01 0x02 0xA6 0x74 0xAD 0xB5 0xA4 0xD1 0xA4 0x55				
Instructions	to play the text "Yuyin Tianxia" whose text encoding format is "BIG5"				

frame structure	header	data area length	data area		
			command word	command parameter	text to send
Data 0xFD	0x00 0x0A		0x01	0x03	Yuyin Tianxia 0x87 0x5B 0xF3 0x97 0x29 0x59 0x0B 0x4E
Data frame	0xFD 0x00 0x0A 0x01 0x03 0x87 0x5B 0xF3 0x97 0x29 0x59 0x0B 0x4E				
Instructions	to play the text "Yuyin Tianxia" whose text encoding format is "Unicode" (small header storage method)				

frame structure	header	data area length	data area		
			command word	command parameter	text to send
Data 0xFD	0x00 0x0A		0x01	0x04	Yuyin Tianxia 0x5B 0x87 0x97 0xF3 0x59 0x29 0x4E 0x0B
Data frame 0xFD 0x00 0x0A 0x01 0x04 0x5B 0x87 0x97 0xF3 0x59 0x29 0x4E 0x0B					
Instructions to play the text "Yuyin Tianxia" whose text encoding format is "Unicode" (big head storage method)					

frame structure	header	data area length	data area		
			command word	command parameter	text to send
Data 0xFD	0x00 0x06		0x01	0x01	[v8] 0x5B 0x76 0x38 0x5D
Data frame 0xFD 0x00 0x06 0x01 0x01 0x5B 0x76 0x38 0x5D					
Instructions Play the text “[v8]”, the chip will recognize it as: set the volume to level 8					

9.4.2 Stop synthesis command

Frame structure	frame header	data area length	data area		
			command word	command parameter	text to send
Data 0xFD		0x00 0x01	0x02		
Data frame 0xFD 0x00 0x01 0x02					
illustrate	stop compositing command				

9.4.3 Pause Synthesis Command

Frame structure	frame header	data area length	data area		
			command word	command parameter	text to send
Data 0xFD		0x00 0x01	0x03		
Data frame 0xFD 0x00 0x01 0x03					
illustrate	Pause compositing command				

9.4.4 Restoring Composition Commands

Frame structure	frame header	data area length	data area		
			command word	command parameter	text to send
Data 0xFD		0x00 0x01	0x04		
Data frame	0xFD 0x00 0x01 0x04				
illustrate	restore compositing command				

9.4.5 Chip status query command

Frame structure	frame header	data area length	data area		
			command word	command parameter	text to send
Data 0xFD		0x00 0x01	0x21		
Data frame	0xFD 0x00 0x01 0x21				
illustrate	Use this command to judge whether the TTS module is working normally, and obtain the corresponding return parameters. Returning 0x4E indicates that the chip is still being synthesized During broadcasting, return 0x4F to indicate that the chip is in an idle state				

9.4.6 The chip enters the **Standby** mode command

Note: The following two commands are to enter the Standby mode

Frame structure	frame header	data area length	data area		
			command word	command parameter	text to send
Data 0xFD		0x00 0x01	0x22		
Data frame	0xFD 0x00 0x01 0x22				
illustrate	Enter Standby mode state command, resume after receiving any command				

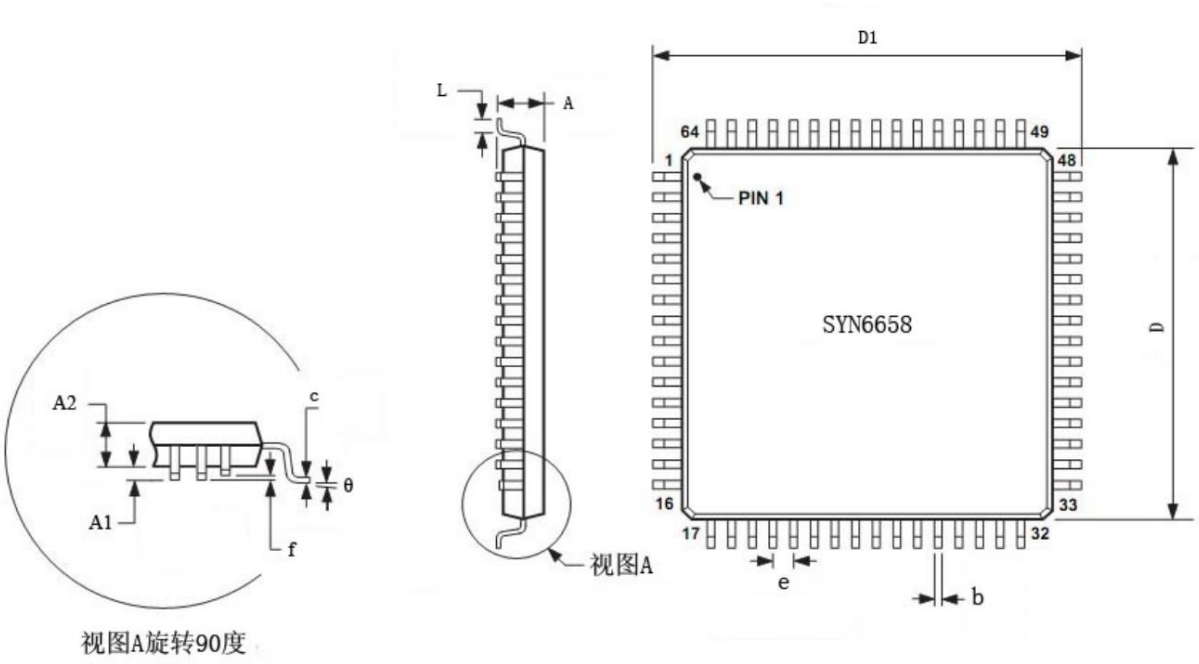
Frame structure	frame header	data area length	data area		
			command word	command parameter	text to send
Data 0xFD		0x00 0x01	0x88		
Data frame	0xFD 0x00 0x01 0x88				
illustrate	Enter Standby mode state command, resume after receiving any command				

9.4.7 Chip wake-up command

Frame structure	frame header	data area length	data area		
			command word	command parameter	text to send
Data 0xFD		0x00 0x01	0xFF		
Data frame	0xFD 0x00 0x01 0xFF				
illustrate	Chip wake-up command				

10 Product Specifications

10.1 Packaging



SYN6658 appearance form and size:

ruler / inch / label	Minimum (mm)	Maximum (mm)	ruler / inch / label	Minimum (mm)	Maximum (mm)
A		1.6	D1	11.80	12.20
A1	0.05	0.15	e	0.50(BSC)	
A2	1.35	1.45	L	0.45	0.75
b	0.17	0.27	ÿ	0°	7°
c	0.09	0.20	f	0.08	
D.	9.80	10.20			

10.2 Characteristic parameters

10.2.1 Limit values

parameter	symbol	min max		unit
Operating Voltage	VDD_I1/VDD_I2	-0.3	4.5	V
Digital supply voltage	VDD1	-0.3	1.32	V
Digital input and output voltage	VDDIO2	-0.3	3.63	V
	SVDD	-0.5	4.00	V
Analog supply voltage	UVDD	-0.3	3.63	V
	AVDD	-0.3	3.63	V
	HPVDD	-0.3	3.40	V
Maximum operating temperature range	To	-40	85	ÿ
storage temperature	Ts	-55	125	ÿ

10.2.2 Recommended Voltage Operating Range

parameter	symbol	Min Typ Max	Unit		
Operating Voltage	VDD_I1/VDD_I2	3.1	3.6	4.5	V
Digital supply voltage	VDD1	1.08	1.20	1.32	V
Digital input and output voltage	VDDIO2	2.97	3.30	3.63	V
	SVDD	3.00	3.30	3.63	V

Analog supply voltage	UVDD	3.00	3.30	3.63	V
	AVDD	3.15	3.30	3.63	V
	HPVDD	3.15	3.30	3.63	V

10.2.3 DC electrical characteristics

parameter	Symbol	Min	Typ	Max	unit
input high voltage	VIH	2.0	-	VDDIO+0.3	V
input low voltage	VIL	-0.3	-	0.8	V
output high voltage	VOH	2.4	-	-	V
output low voltage	VOL	-	-	0.4	V
input leakage current	IL	-	-	±1	uA
Three-state output leakage current	IOZ	-	-	±1	uA
input capacitance	CI	-	-	TBD	pF
output capacitance	CO	-	-	TBD	pF
Stereo output load resistance	Rlineout	10	-	-	Kohm
Headphone output load resistance	RHP	-	32	-	ohm

10.2.4 Audio **DAC** Characteristics

parameter	Min	Typ	Max	unit
Operating Voltage	3.0	3.3	3.6	V
HP minimum load resistance ÿ		32		ÿ
Maximum output voltage V		0.8		Vrms
Maximum output power		20		mW

10.2.5 Power consumption parameters in each state of the chip

normal working condition		Standby
Composite Text Status	idle	

53mA	15mA	3mA

10.2.6 Interval time between receiving synthesis command and starting broadcasting

received text size	minimum value	maximum value
4096 bytes of text	137ms	700ms

10.3 Welding process requirements

10.3.1 Baking temperature and time

The moisture sensitivity level of SYN6658 is level 3, and under the environmental conditions of ÿ30ÿ/60%RH, the landing life is 168 hours.

Product Name	Moisture Sensitivity Grade	Landing Life (After unpacking, under the humidity condition of ÿ 30ÿ/60%RH)
SYN6658	3	168H

Moisture sensitivity classification level and landing life

When it is found that the disassembled chip exceeds the landing life during use, it needs to be baked according to the regulations in the table below, and then enter the reflow soldering process.

Baking times are specified as follows:

The chip exceeds the landing life time	> 72 H ÿ 72 H	> 72 H ÿ 72 H	> 72 H ÿ 72 H			
baking temperature	125°C		90ÿÿ5%RH		40ÿÿ5%RH	
Baking Time Requirements	9 h	7H	33H	23 h	312H	216H

Reference conditions for chip baking

Notice:

1) In the above table: RH means relative humidity; H means hour;

2) The temperature resistance of the tray during baking should meet the requirements.

10.3.2 Peak temperature of reflow soldering

Product number	encapsulation	Minimum peak temperature	Maximum peak temperature
baking temperature	LQFP64	240°C	260°C

Reference conditions for chip baking

Note: Depending on the melting point of the solder, a higher temperature may be required. The typical temperature of the solder paste: 220±5°C for lead solder paste;

The ointment temperature is 245 ± 5°C, according to the manufacturer's specifications.

11 Appendix

Due to the extensive and profound cultural background of Chinese characters and the limitations of current technological development, speech synthesis cannot be 100% accurate. to satisfy To meet the individual needs of customers in various complex environments, the following text control tags are specially introduced to flexibly control the changes in the pronunciation of Chinese characters.

Special Note: For some users with display screens, when a piece of text is used for both synthetic broadcast and screen display, in order to prevent The control mark is displayed on the screen, and can be processed in the following two ways: 1. The text field used for broadcasting and the text field used for display are stored separately storage and management. **2.** The text field used for broadcasting deletes the control mark and then displays it on the display screen.

11.1 Text control tags

effect	Control ID	default set up	Detailed description
Set to recognize Chinese pinyin [i*] [i0]			(*=0/1) 0 - does not recognize Hanyu Pinyin 1 - Recognize Chinese Pinyin illustrate: 1) The pinyin mode is: 1 to 6 letters + 1 number 2) Tones are represented by 1 digit (1: Yinping 2: Yangping 3: Upper tone 4: Qu tone 5: Soft tone)
select speaker	[m*] [m3]		(*= 3, 51, 52, 53, 54, 55) 3 - Xiao Ling (female voice) 51 - Yin Xiaojian (male voice) 52 - Yi Xiaoqiang (male voice) 53 - Tian Beibei (female voice) 54 - Donald Duck (FX) 55 - Little Swallow (Girl Voice)
set number processing strategy [n*] [n0]			(*=0/1/2) 0 - automatic judgment 1 - digits for number processing

			2 - Numerical processing of numbers
silence for a while	[p*]		(*=unsigned integer) * - The length of time to insert silence, in milliseconds (ms)
Set name pronunciation strategy [r*] [r0]			(*=0/1/2) 0 - automatically judge the pronunciation of the name 1 - Force each subsequent sentence to start with the last name 2 - Force the first word of the following sentence to be pronounced by the last name
set speech rate	[s*] [s5]		(*=0~10) * - speech rate value (0 to 10) Note: The smaller the speech rate value, the slower the speech rate
set tone	[t*] [t5]		(*=0~10) * - Intonation value (0 to 10) Note: The smaller the intonation value, the lower the fundamental frequency value
set volume	[v*] [v5]		(*=0~10) * - volume value (0 to 10) Note: The volume can be adjusted from mute to the maximum value supported by the audio device
Set the tone processing strategy [x*] [x1]			(*=0/1) 0 - don't use beep 1 - Use beep automatically
Set the pronunciation of "1" in the number [y*] [y0]			(*=0/1) 0 - "1" is read as "unit" when combining numbers 1 - "1" is read as "one" when combining
Set prosodic annotation processing strategy [z*] [z0]			numbers (*=0/1) 0 - Prosodic notation is not processed 1 - Processing Prosodic Labeling Instructions: Prosodic Labeling Use "#" to mark the prosodic phrase division position. Use "*" to mark the division position of prosodic words.
Force Pinyin for individual Chinese characters[=*]			(*=Pinyin) * - Pinyin mandatory for the previous Chinese character illustrate: 1) The pinyin mode is: 1 to 6 letters + 1 number 2) Tones are represented by 1 digit (1: Yinping 2: Yangping 3: Upper tone 4: Qu tone 5: Soft tone) 3) When it appears consecutively, the first one shall prevail.
Set pronunciation style	[f*] [f1]		(*=0/1) 0 - every word 1 - Straightforward
Set punctuation to read aloud [b*] [b0]			(*=0/1) 0 – do not read punctuation 1 – Read punctuation
restore default compositing parameters [d]			All settings (except speaker settings) revert to default

Remarks:

ÿAll control marks are half-width characters.

ÿThe control flag needs to be sent in the format of the speech synthesis command, and the special control mark is synthesized as text.

ÿThose that do not conform to the above recognizable "control logo" or the format is wrong, shall be treated as ordinary characters and numbers

ÿThe control flag is a global control flag, that is, as long as it is used once, it will not reset the chip, or power off, or use [d] to restore the default

Under the conditions set, all text sent to the chip will be under its control. Note: Selecting the speaker [m*] is not controlled by [d],

To restore the default speaker, it must be restored with [m3].

ÿWhen the chip is powered off or reset, the original set logo will lose its effect, and the chip will restore to all default values.

ÿ If the number in the control tag exceeds the range, it will be processed according to the default value

ÿ [r001] is an effective control command, equivalent to [r1]; others are similar.

11.2 Example of using text control tags

11.2.1 Token [i*] – Recognition of Chinese Pinyin

sample text	synthetic interpretation
[i0] Welcome shi3yong4 my gong1si1de5 system [d]	Do not recognize Chinese Pinyin, pronounce Chinese characters and letters and numbers one by one Read as: welcome shi three yong four my gong one si one de five system
[i1] welcome shi3yong4 my gong1si1de5 system [d]	Recognize Chinese Pinyin, read as: welcome to use our company's system

11.2.2 Marker [m*] – speaker selection

sample text	synthetic interpretation
[m3]I am Xiaoling[m3]	Synthesize with the voice of the speaker "Xiaoling": "I am Xiaoling"
[m51] I am Yin Xiaojian[m3]	Synthesized with the voice of the speaker "Yin Xiaojian": "I am Yin Xiaojian"
[m52] I am Yi Xiaoqiang [m3]	Synthesized with the voice of the speaker "Yi Xiaoqiang": "I am Yi Xiaoqiang"
[m53] I am Tian Beibei [m3]	Synthesized with the voice of the speaker "Tian Beibei": "I am Tian Beibei"
[m54] I am Donald Duck [m3]	Synthesized with the voice of the speaker "Donald Duck": "I am Donald Duck"
[m55] I'm Little Swallow[m3]	Synthesized with the voice of the speaker "Little Swallow": "I am Little Swallow"

Note: Marking [d] will not restore the speaker to the default, to restore the default speaker, you must use [m3] to restore.

11.2.3 Token[n*] – number processing strategy

sample text	synthetic interpretation
[n0] Dial 62986600. It weighs 123 kilograms. [d]	Automatic judgment. Read as: Dial 62986600. weighs one hundred and twenty-three kilograms
[n1] Dial 62986600. It weighs 123 kilograms. [d]	Compulsorily compose a string of digits as a number. Read as: Dial 62986600. one to two three kilograms
[n2] Dial 62986600. It weighs 123 kilograms. [d]	Forces the number string to be composed numerically. Read as: Dial 62,986,600. There are one hundred and twenty three kilograms

11.2.4 mark[p*] – silence for a period of time

sample text	synthetic interpretation
Welcome to the embedded [p2000] voice developed by Yuyintianxia [p1000] synthesis system	Play "Welcome to Yuyin Tianxia", mute for 1 second, and then play "R&D "Embedded", mute for 2 seconds, and then play "Speech Synthesis System"

11.2.5 Marking [r*] – Surname Pronunciation Strategy

sample text	synthetic interpretation
[r0] Jiefang Tao's younger sister is here, and so is Shan Xiaohu from the unit [d]	Automatically judge the pronunciation of names Read as: Xie (jie3) Fangtao's younger sister is here, single (dan1) (shan4) Xiaohu is here too
[r1] Jiefang Tao's younger sister is here, and so is Shan Xiaohu from the unit [d]	Force the beginning of each sentence to be pronounced according to the last name Read as: Xie (xie4) Fangtao's younger sister is here, Shan (shan4) (shan4) Xiaohu is here too
[r2] Jiefang Tao's younger sister is here, and so is Shan Xiaohu from the unit [d]	Only the following Chinese characters force the pronunciation of the last name Read as: Xie (xie4) Fangtao's younger sister is here, single (dan1) single (shan4) Xiaohu is here too

11.2.6 Flag[s*] – Speech Rate Regulation

sample text	synthetic interpretation
[s5]Welcome to use[s8]The [s2]embedded audio system developed by Yuyin Tianxia will play "Welcome" at a speed of level 5, and "Yuyin" at a speed of level 8.	

into a system[d]	Developed by Tianxia", play the "Embedded Speech Synthesis System" at a level 2 speech speed

11.2.7 Token[t*] – intonation regulation

sample text	synthetic interpretation
[t5] Welcome to [t2] Embedded Voice Synthesis developed by [t8] Yuyintianxia into a system[d]	"Welcome to use" is played according to the 5th grade tone, and "Yuyin" is played according to the 8th grade intonation Developed by Tianxia", play "Embedded Speech Synthesis System" in level 2 intonation

11.2.8 Flags [v*] – volume adjustment

sample text	synthetic interpretation
[v5] Welcome to [v2] Embedded Voice Synthesis developed by [v8] Yuyintianxia into a system[d]	Play "Welcome" at volume level 5 and "Yuyin" at volume level 8 Developed by Tianxia", play "Embedded Speech Synthesis System" at 2 levels of volume

11.2.9 Mark [x*] – Beep Policy

sample text	synthetic interpretation
[x0]sounda msga sound101[d]	Do not follow the prompt tone. Read directly into English letters: sounda msga sound-1-0-1
[x1] sounda msga sound101[d]	Process according to the prompt tone. Play the information prompt sounda, then play the chord prompt msga, and play Play the message sound sound101.

11.2.10 Mark [y*] – reading of number **1**

sample text	synthetic interpretation
[y0]010-62986600[d]	The chip synthesizes "1" in the number text according to the reading method of "unit". Read as: zero one zero, six two nine eight six six zero zero
[y1]010-62986600[d]	The chip synthesizes "1" in the text of the number according to the reading method of "one". Read as: zero one zero, six two nine eight six six zero zero

Note: This flag is valid only when synthesizing number type text.

11.2.11 Tokens[z*] – prosodic annotation processing strategy

sample text	synthetic interpretation
[z0] U.S. Senate passes financial regulation by 59-39 vote Reform Act[d]	Prosodic annotations are not processed: Rhymed and pronounced: The U.S. Senate voted 59 to 39 The result was the passage of the Financial Regulatory Reform Act.
[z1] The U.S. Senate voted 59 #to 39 for #financialregulatory Management Reform Act[d]	Handle prosodic annotations: Rhymed and pronounced: The U.S. Senate voted 59 to 39 The result was the passage of the Financial Regulatory Reform Act.

11.2.12 mark [=*] – force the pinyin of a single Chinese character

sample text	synthetic interpretation
Welcome them, welcome them[=ni3], welcome them[=wo3]	Read: welcome them, welcome you, welcome us

11.2.13 Flags [f*] – pronunciation style

sample text	synthetic interpretation
[f0]Welcome to the demo of speech synthesis system[d]	Read aloud according to the "one word, one meal" pronunciation style
[f1]Welcome to the demo of speech synthesis system[d]	Read aloud in a "straightforward" pronunciation style

11.2.14 Tokens [b*] – Reading Punctuation Strategy

sample text	synthetic interpretation
[b0] Welcome, come in! [d]	The punctuation mark is not read out, it is read as: "Welcome, please come in"
[b1] Welcome, come in! [d]	Read out the punctuation marks as: "Welcome comma please enter exclamation Number"

11.2.15 Mark [d] – restore default

sample text	synthetic interpretation
[n1]123,[y1]010-62986600[d]123,010-62986600.	Read as: one two three, zero one zero, six two nine eight six six zero zero, one hundred and two Thirteen, zero one zero, six two nine eight six six zero zero,

11.3 Prompt sound

11.3.1 Quick prompt tone for number keys

When using various devices that support numeric keypads (for example: Pose machines, consumer machines, password devices, credit card machines, etc.), users expect You can hear the voice corresponding to this button immediately (don't have any sense of delay, the real-time requirements are very high), and the following "quick prompt tone for digital buttons" is specially launched, Each button has a corresponding shortcut sound.

Example 1: When the host computer receives the user's press of the number key "2", it immediately sends the text "sound702" to SYN6658 to synthesize the voice.
Example 2: When the host computer receives the user's pressing the asterisk key "#", it immediately sends the text "sound719" to SYN6658 to synthesize the voice.

Note: If the upper computer directly sends the text "2" or "two" to SYN6658 to synthesize the voice when it receives the user's pressing the number key "2", The voice heard will have a sense of delay. When the user presses the keys in rapid succession, there will be a sound of the next key before the sound of the previous key is heard. Overwriting phenomenon, so it is recommended to use the method of "number key prompt tone" to synthesize the voice of the small keyboard.

Quick prompt tone for number keys			
serial number	name	Corresponding key pronunciation text	play time
1	sound701	"1"	250 milliseconds
2	sound702	"2"	220 milliseconds
3	sound703	"3"	300 milliseconds
4	sound704	"4"	290 milliseconds
5	sound705	"5"	250 milliseconds
6	sound706	"6"	280 milliseconds
7	sound707	"7"	300 milliseconds
8	sound708	"8"	220 milliseconds
9	sound709	"9"	290 milliseconds
10	sound710	"0"	280 milliseconds
11	sound711	"point"	270 milliseconds
12	sound712	"youngest"	240 milliseconds
13	sound713	"Yuan"	270 milliseconds
14	sound714	"add"	280 milliseconds
15	sound715	"reduce"	280 milliseconds
16	sound716	"take"	320 milliseconds
17	sound717	"remove"	300 milliseconds

18	sound718	"star"	Manual 310 ms
19	sound719	"well"	270 milliseconds

11.3.2 Polyphonic prompts

The system provides the following 14 chord prompts, which can be widely used in public information broadcasting occasions. The following list is the current system

The name and playing length of the built-in prompt tone, etc.

Chord beep types (14 songs in total)						
serial number	name	play time		serial number	name	play time
1	msga	0.9 seconds		8	msgh	2.9 seconds
2	msgb	1.0 seconds		9	msgi	3.8 seconds
3	msgc	1.2 seconds		10	msgj	3.8 seconds
4	msgd	1.4 seconds		11	msgk	3.8 seconds
5	msge	2.3 seconds		12	msgl	4.0 seconds
6	msgf	2.5 seconds		13	msgm	5.0 seconds
7	msgg	2.8 seconds		14	msgn	5.1 seconds

11.3.3 Multiple sound prompts

The system provides the following sound prompts, which can be selected as information prompts according to the application occasion. The following list is the current system built-in

The name and sound type of the prompt tone, etc.:

Prompt tone type (24 in total)								
Serial Number	Name Playing	Time Compatible Name	Serial Number	Name			playtime compatible	name
1	sound101	0.38 seconds	sounda		13	sound113	0.75 seconds	soundm
2	sound102	0.41 seconds	soundb		14	sound114	0.77 seconds	sound
3	sound103	0.43 seconds	soundc		15	sound115	0.79 seconds	sound
4	sound104	0.46 seconds	soundd		16	sound116	0.82 seconds	soundp
5	sound105	0.47 seconds	sounde		17	sound117	0.84 seconds	soundq
6	sound106	0.47 seconds	soundf		18	sound118	0.89 seconds	soundr
7	sound107	0.53 seconds	soundg		19	sound119	0.99 seconds	soundt
8	sound108	0.60 seconds	soundh		20	sound120	1.00 seconds	soundu

9	sound109	0.62 seconds soundi		twenty one	sound121	1.08 seconds	soundv
10	sound110 0.64 seconds soundj			twenty two	sound122	1.20 seconds	soundw
11	sound111	0.65 seconds soundk		twenty three	sound123	1.82 seconds	soundx
12	sound112	0.67 seconds soundl		twenty four	sound124	2.27 seconds	soundy

Ringtone type (19 songs in total)			
Serial number	name	Sound type	Playing time
1	sound201	phone ringtone	0.6 seconds
2	sound202	phone ringtone	1.0 seconds
3	sound203	phone ringtone	1.0 seconds
4	sound204	phone ringing	1.2 seconds
5	sound205	phone ringtone	1.6 seconds
6	sound206	door bell	0.3 seconds
7	sound207	door bell	0.8 seconds
8	sound208	doorbell	1.2 seconds
9	sound209	door bell	1.4 seconds
10	sound210	alarm for	1.7 seconds
11	sound211	alarm for	2.1 seconds
12	sound212	alarm for	2.6 seconds
13	sound213	alarm for	2.7 seconds
14	sound214	wind chimes	1.2 seconds
15	sound215	wind chimes	1.6 seconds
16	sound216	wind chimes	1.6 seconds
17	sound217	wind chimes	2.0 seconds
18	sound218	wind chimes	2.2 seconds
19	sound219	wind chimes	2.4 seconds

Alarm type (19 songs in total)			
		Sound Type	Playing Time
1	sound301	alarm	0.6 seconds
2	sound302	alarm	0.7 seconds
3	sound303	alarm	0.8 seconds
4	sound304	alarm	0.8 seconds
5	sound305	alarm	0.9 seconds
6	sound306	alarm	1.0 seconds
7	sound307	alarm	1.0 seconds
8	sound308	alarm	1.1 seconds
9	sound309	alarm	1.2 seconds
10	sound310	alarm	1.2 seconds
11	sound311	alarm	1.2 seconds
12	sound312	alarm	1.8 seconds
13	sound313	alarm	1.9 seconds
14	sound314	alarm	2.1 seconds
15	sound315	alert-emergency	0.8 seconds
16	sound316	alert-emergency	1.1 seconds
17	sound317	alert-emergency	1.4 seconds
18	sound318	alert-emergency	2.9 seconds
19	sound319	alert-emergency	3.2 seconds

Successful card swiping type (8 songs in total)			
Serial number	name	Sound type	Playing time
1	sound401	credit card successful	0.09 seconds
2	sound402	credit card successful	0.11 seconds
3	sound403	credit card successful	0.11 seconds
4	sound404	credit card successful	0.16 seconds

Special sound type (7 songs in total)			
		Sound Type	Playing Time
1	sound501	special sound - cuckoo sound	0.4 seconds
2	sound502	special sound - error sound	0.5 seconds
3	sound503	special sound - applause	2.2 seconds
4	sound504	special sound - laser sound	0.2 seconds

5	sound405 credit card successful 0.41 seconds		
6	sound406 credit card successful 0.41 seconds		
7	sound407 credit card successful 0.46 seconds		
8	sound408 successfully swiped the card in 0.59 seconds		

5	sound505 special sound - laser sound 0.6 seconds		
6	sound506 special sound - landing sound 2.2 seconds		
7	sound507 special sound - gunshot sound 0.4 seconds		

Types of customer voices (7 songs in total)			
serial number	name	sound type	play time
1	sound601	alarm sound	10.3 seconds
2	sound602	prelude to weather forecast	10.9 seconds

ÿNote 1: There is no particularity in the use of the prompt sound, it is the same as the synthesis command for synthesizing ordinary text. However, it is important to note that the beep When the name is preceded or followed by a string of English letters and numbers, punctuation marks, spaces, carriage returns, etc. must be used to separate them from other letters. The system can automatically identify it. For example: send the text "sounda, hello!", sounda can synthesize the corresponding message prompt tone, but But if the text "soundahello!" is sent, sounda will not be able to synthesize the prompt sound, but will directly read the letter "SOUNDA".

ÿNote 2: If it is not the above-mentioned effective prompt tone, it will only be pronounced according to the normal text:

ÿNote 3: We can achieve the effect of a longer prompt tone by playing the same prompt tone multiple times, adding [p?] in the middle of the prompt tone to control the pause time, for example:

ÿ sound202[p400]sound202[p400]sound202

ÿ sound303[p300]sound303[p300]sound303

ÿ sound312[p200]sound312[p200]sound312

ÿ sound317[p300]sound317[p300]sound317

11.3.4 User Prompt Sound Addition and Deletion

In order to meet customers' needs for specific text synthesis or specific prompt tones, the SYN6658 chip supports adding personalized prompt tones, please consult Yuyin for details World customer service staff.

11.4 How the upper computer calls the SYN6658 chip

11.4.1 Simple calling method

The simple call is for the case where the application is relatively simple. Users don't need to care about the working status of SYN6658, just need to send text, SYN6658 will

Synthesize received text into speech output.

In the case of a simple call, as long as one of the two communication methods of UART or SPI is established between the host computer and the SYN6658, the Synthesize command to achieve text synthesis, the host computer does not need to pay attention to the return data of SYN6658 or the output of the status pin.

Tips: If the text of the previous frame has not been synthesized, sending the text to SYN6658 will interrupt the previous synthesis and execute a new synthesis.

11.4.2 Standard calling method

For general situations, the host computer needs to determine the working status of SYN6658 to more precisely control the work of the SYN6658 chip: for example, it is necessary to confirm Make sure that the next piece of text is synthesized after the last text is completely synthesized.

The application example is as follows: Assume that the text to be synthesized is 5k bytes, which exceeds the maximum text length of 4k bytes that a command frame of the chip can hold. At this time, send text information to the chip twice. The program process is as follows:

1. The host computer first sends a text synthesis command frame to the SYN6658 chip, carrying no more than 4k bytes of text; 2. The host computer waits for the SYN6658 chip to return the playback information until it receives the chip feedback "0x4F", indicating that the previous text has been merged or use the method of querying the status pin of the chip and sending a query command to confirm whether the previous frame of text has been synthesized through the queried information. 3. The upper computer sends a text synthesis command frame to the SYN6658 chip again, and sends out the rest of the text.

11.5 How to query the working status of the chip

The working status of the SYN6658 chip can be queried through hardware and software.

ÿHardware method: by querying the output pin Ready _____ /Busy level to judge the working status of the chip. When Ready _____ /Busy is high, It indicates that the chip is synthesizing and playing text; when Ready _____ /Busy is low, it indicates that the chip is idle.

ÿSoftware mode: Query the working status of the chip through the chip status query command frame. When the host computer sends a status query command frame to the chip, The chip will immediately send the current chip status feedback to the host computer. The upper computer judges whether the current chip is empty according to the returned data of the chip status. Idle state or broadcast state.

11.6 The coding system and scope of chip identification

SYN6658 supports the following 4 encoding systems: GB2312, GBK, BIG5, Unicode.

11.6.1 GB2312 coding system

The GB2312 code is the code for the exchange of Chinese character information in the national standard of the People's Republic of China. Published by the National Bureau of Standards of the Republic, 1981

Implemented on May 1. It is customarily called the national standard code, GB code, or area code. It is a code for simplified Chinese characters, which is popular in mainland China. new Singapore and other places also use this code.

GB2312-80 includes simplified Chinese characters and general symbols, serial numbers, numbers, Latin letters, Japanese kana, Greek letters, Russian letters, Chinese Pinyin symbols, Chinese Zhuyin letters, a total of 7445 graphic characters. Among them, there are 682 graphic characters other than Chinese characters, and 6763 Chinese characters.

GB2312-80 stipulates that "any graphic character shall be represented by two bytes (Byte).

recognition type	Identify code range	Remark
Half-width ASCII symbol area 0x00	--- 0x7F	
Full-width symbol area 0xA1A0 --- 0xA3FE		
Chinese character area	0xB0A1 --- 0xF7FE A total of 6768 Chinese characters	

11.6.2 GBK coding system

GB2312-80 only accepts 6763 Chinese characters, which is much less than the existing Chinese characters. With the passage of time and the continuous extension and promotion of Chinese character culture, some original Rarely used words have now become commonly used words, which makes representation, storage, input, and processing very inconvenient.

In order to solve these problems and cooperate with the implementation of UNICODE, the National Information Technology Technology Committee issued "Chinese Character Internal Code" on December 1, 1995. Extension Specification". GBK is fully compatible with GB2312 downwards and supports ISO-10646 international standard upwards.

GBK is an extension of GB2312-80 and is upwardly compatible. It contains 20902 Chinese characters, and its coding range is 0x8140-0xfefe. its all Characters can all be mapped one-to-one to UNICODE 2.0. GBK also uses double-byte representation.

recognition type	Identify code range	Remark
Half-width ASCII symbol area 0x00	--- 0x7F	
Full-width symbol area 0xA1A0 --- 0xA3FE		
Chinese character area	0x8140 --- 0xA0FE 0xAA40 --- 0xFEFE	A total of 21003 Chinese characters

11.6.3 BIG5 coding system

BIG5 is the coded character set of Chinese characters implemented by Taiwan's computer industry. It contains 420 graphic symbols and 13070 traditional Chinese characters (excluding simplified Chinese characters). The encoding range is 0x8140-0xFE7E, 0x81A1-0xFEFE, where 0xA140-0xA17E, 0xA1A1-0xA1FE are Graphic symbol area, 0xA440-0xF97E, 0xA4A1-0xF9FE is the Chinese character area.

recognition type	Identify code range	Remark
Half-width ASCII symbol area 0x00	--- 0x7F	
Full-width symbol area 0xA140 --- 0xA3FE		
Chinese character area	0xA440 --- 0xF9FE A total of 13060 Chinese characters	

11.6.4 **Unicode** encoding system

Before UNICODE was created, there were hundreds of encoding systems. However, no single encoding can contain enough characters. reality
The problem is: use the same number for two different characters, or use different numbers for the same character. Any particular computer (specifically
(not just servers) need to support many different encodings, but whenever data passes between different encodings or platforms, that data always
There is a risk of damage.

In the UNICODE standard, 1,114,112 code points are provided, which can not only contain all languages and other symbols used in the world today
The number is also enough to accommodate most of the ancient characters and symbols of historical significance. And UNICODE provides a unique number for each character, not
No matter what platform, no matter what program, no matter what language. The UNICODE standard has been adopted by industry, many operating systems, all
New browsers and many other products support it. The emergence of the UNICODE standard and the existence of tools to support it are the most important recent developments in global software technology.
the desired development trend.

recognition type	Identify code range	Remark
Full-width symbol area	0x00 area, 0x30 area, 0xFF area,	
Chinese character area	0x4E00 ---- 0x9FFF A total of 20902 Chinese characters	

12 Example program for sending synthetic text

12.1 C language sample program

Next, take 51 single-chip microcomputer as the host computer as an example, use C51 language to realize a program example of text synthesis, assuming that the content of the text to be synthesized
The content is: "Welcome to Yuyintianxia SNY6658 Chinese Speech Synthesis Chip", the following is the program module for sending a frame of TTS text data.

```
#include <reg51.h>
#include <string.h>

void main(void) { /

**********text to be sent********** **********/
        char code text[ ] = {"Welcome to Yuyintianxia SNY6658 Chinese Speech Synthesis
        Chip"}; unsigned char headOfFrame[5];
        unsigned char length ; unsigned
        int i = 0; length = strlen(text);
                                                    //Need to send the length of the text

/**********Initialization of the serial port********** *****/ // At
        = 0xFA; TH1          11.0592MHz, set the baud rate to 9600bps, working mode 2 TL1
        = 0xFA; TMOD
        = 0x20; SCON
        = 0x50; PCON         // Serial port working mode 1, allowing to receive
        = 0x80; EA = 0;
        REN = 1 ;
        TI = 0; RI
        = 0; TR1             //Transmit interrupt flag position
        = 1;                 zero //Receive interrupt flag position
                             zero //Timer 1 is used as baud rate generation

/**********Sending process********** *********/ headOfFrame[0] = 0xFD ; //
        Construct the frame header FD //Construct the high byte of the length of
        0x00 ; //Construct the low byte                the data area headOfFrame[1] =
        2; //Construct command word: synthesis headOfFrame of the length of the data area [2] = length +
        Construct command parameter:        playback command headOfFrame[3] = 0x01; //
                                    encoding format is GBK headOfFrame[4] = 0x01;

        for(i = 0; i<5; i++) {                      //Send the constructed 5 header bytes sequentially

            SBUF = headOfFrame[i];
            while (TI== 0) {;}                      //Waiting for the send interrupt flag to
            TI = 0;                                 be set //Clear the send interrupt flag
        }

        for(i = 0; i<length; i++) {                 //Send the text data to be synthesized in sequence

            SBUF = text[i];
            while (TI== 0) {;}
            TI = 0;
        }

       // while(1);
}
```

12.2 Assembly language sample program

The following is an example of the assembly language used by the 51 single-chip microcomputer to control the upper computer, and demonstrates sending the text "Yuyin Tianxia" to the chip for synthesis.

The GBK code of "Yuyin Tianxia" is: "Yu": 0xd3ee "Sound": 0xd2f4 "Sky": 0xccec "Down": 0xcfc2

```
        ;Crystal 11.0592MHz

        ORG 0030H
TABLE: DB 0xD3,0xEE,0xD2,0xF4,0xCC,0xEC,0xCF,0xC2          ; GBK code of "Yuyin Tianxia"

        ORG 0000H
        LJMP MAIN


        ORG 0200H
MAIN:
        CLR EA              ; Serial port initialization

        MOV TMOD, #20H ; Timer 1 works in mode 2
        MOV TH1, #0FAH ; load timer initial value, baud rate 9600
        MOV TL1, #00H
        SETB TR1            ;Start timer 1

        MOV SCON, #50H ;Serial port working mode 1, allowing to receive
        MOV PCON, #80H ; Baud rate doubled; send
        CLR TI ;            interrupt flag position zero
        CLR RI  Receive interrupt flag bit zero

        MOV A, #0FDh ;frame header FD ;serial
        MOV SBUF, A         port send
        JNB TI, $
        CLR TI

        MOV A,#00h          ;High byte of data area length
        MOV SBUF, A
        JNB TI, $
        CLR TI
```

```
        MOV A,#0Ah          ;Low byte of data area length
        MOV SBUF, A
        JNB TI, $
        CLR TI

        MOV A,#01h          ;command word: synthetic playback command
        MOV SBUF, A
        JNB TI, $
        CLR TI

        MOV A,#01h          ;Command parameters: encoding format is GBK
        MOV SBUF, A
        JNB TI, $
        CLR TI

        MOV R7,#8           ;The total number of bytes of the text to
        MOV R6,#0           be played;Sent byte count
        MOV DPTR,#TABLE
LOOP: MOV A,R6
        MOVC A,@A+DPTR
        MOV SBUF, A         ;Play "Yuyin Tianxia"
        JNB TI, $
        CLR TI
        INC R6
        DJNZ R7, LOOP

        SJMP$
END
```

Notice:

1. After sending, the feedback signal from the chip can be received. If it is "41" and "4F", it means that the text is received correctly and the synthesized broadcast is completed.

The chip is in an idle state; if it receives "45", it means that the text has not been received or synthesized correctly, and it needs to be resent or reset.

2. The Demo above mainly explains the protocol issues that need to be followed in the sending process; after sending the statement, it is necessary to add the judgment process of whether the sending is completed

You can judge the working status of the current chip by querying or interrupting two ways, and then send the next data.

13 Special Application: Text Cache Commands

illustrate:

This function is a special application; it can realize [normal broadcasting after out-of-order reception of text messages, etc.]; currently used in meteorological early warning, natural disaster early warning, water conservancy Early warning and other industries are widely used.

This function can cache a piece of text that has been shuffled in the order desired by the customer and then play it together.

Please use the [Text Cache Storage Command 0x31 Command] and [Text Cache Playback Command 0x32 Command] correctly according to the requirements.

13.1 General format of command frame

frame structure	frame header (1 byte)	data area length (2 bytes)	Data area (less than or equal to 4K+2 bytes)		
			Command word 1 byte	Command parameter 1 byte	Text to be sent <= 4k bytes
Data 0xFD		0xXX 0xXX	0xXX	0xXX	0xXX……
illustrate	defined as sixteen Hexadecimal "0xFD"	high byte first low byte after	The total number of bytes must be consistent with the previous "data area length"		

13.1.1 Text cache storage command

data area				
Command word 1 byte		Command parameter 1 byte		text to send
The value	corresponds to the function value		corresponding function	
0x31	Text cache storage command 0 to 15		Set the starting cache segment where the text should be stored this time =X	The binary content of the text stored this time (set text length = Y) (Yÿ(16-X)*256)

illustrate:

ÿ**The** total space of the cache is 4K, which is divided into 16 areas, and the space of each area is 256 bytes.

ÿ**Set** the initial buffer section set by this command = X (0ÿXÿ15), then the length of the text sent this time cannot be greater than (16-X)*256 byte. Excess text will be discarded.

ÿ**Before** sending [text cache play command 0x32], the user can send [text cache storage command 0x31] multiple times to arrange segments arbitrarily Content. But remember that the text sent later cannot cover part or all of the previous text, otherwise the correctness of playback will not be guaranteed.

ÿ**If** the chip is still in the composite playback state, sending this command will stop the composite playback.

13.1.2 Text cache playback command

data area

Command word 1 byte		command parameters 1 byte				to be sent Book
value	Corresponding work able	High 4-bit value	corresponding function	Low 4 bit value	corresponding function	
0x32	text cache live play command make	1 to 15	Set replay times number	0x0 Set the text to: GB2312 encoding format		no text
				0x1 Set the text to: GBK encoding format		
				0x2 Set the text to: BIG5 encoding format		
				0x3 Set the text to: UNICODE encoding format (small head mode)		
				0x4 Set the text to: UNICODE encoding format (big head mode)		

Note: [Text cache storage command 0x31] and [Text cache playback command 0x32] should be executed in sequence, do not insert other commands in between, if

By inserting other commands, the contents of the text buffer may be cleared.

13.2 Example of command frame

13.2.1 Text cache storage command

frame structure	header	data area length	data area		
			command word	command parameter	text to send
Data	0xFD 0x00 0x14		0x31	0x03	After segment buffering, play together. 0xB6 0xCE 0xBB 0xBA 0xB4 0xE6 0xBA 0xF3 0xD2 0xBB 0xC6 0xF0 0xB2 0xA5 0xB7 0xC5 0xA1 0xA3
Data Frame	0xFD 0x00 0x14 0x31 0x03 0xB6 0xCE 0xBB 0xBA 0xB4 0xE6 0xBA 0xF3 0xD2 0xBB 0xC6 0xF0 0xB2 0xA5 0xB7 0xC5 0xA1 0xA3				
Description	Store the text "Play together after segment buffering." in the third segment of the playback buffer				

frame structure	header	data area length	data area		
			command word	command parameter	text to send
Data	0xFD 0x00 0x12		0x31	0x01	A passage out of order 0xB4 0xF2 0xC2 0xD2 0xCB 0xB3 0xD0 0xF2 0xB5 0xC4 0xD2 0xBB 0xB6 0xCE 0xCE 0xC4
Data Frame	0xFD 0x00 0x12 0x31 0x01 0xB4 0xF2 0xC2 0xD2 0xCB 0xB3 0xD0 0xF2 0xB5 0xC4 0xD2 0xBB 0xB6 0xCE 0xCE 0xC4				
Instructions	to store the text "a piece of text in random order" in the first segment of the playback cache				

frame structure	header	data area length	data area		
			command word	command parameter	text to send
Data 0xFD	0x00 0x10		0x31	0x00	This function can be 0xB4 0xCB 0xB9 0xA6 0xC4 0xDC 0xBF 0xC9 0xD2 0xD4 0xBD 0xAB 0xB1 0xBB
Data Frame	0xFD 0x00 0x10 0x31 0x00 0xB4 0xCB 0xB9 0xA6 0xC4 0xDC 0xBF 0xC9 0xD2 0xD4 0xBD 0xAB 0xB1 0xBB				
Description	Store the text "This function can be" in section 0 of the playback cache				

frame structure	header	data area length	data area		
			command word	command parameter	text to send
Data 0xFD	0x00 0x16		0x31	0x02	This is divided according to the order desired by the customer 0xB1 0xBE 0xB0 0xB4 0xBF 0xCD 0xBB 0xA7 0xCF 0xA3 0xCD 0xFB 0xB5 0xC4 0xCB 0xB3 0xD0 0xF2 0xB7 0xD6
Data Frame	0xFD 0x00 0x16 0x31 0x02 0xB1 0xBE 0xB0 0xB4 0xBF 0xCD 0xBB 0xA7 0xCF 0xA3 0xCD 0xFB 0xB5 0xC4 0xCB 0xB3 0xD0 0xF2 0xB7 0xD6				
Description	Store the text "This is divided in the order that the client wants" in the second section of the playback buffer				

13.2.2 Text cache playback command

frame structure	header	data area length	data area		
			command word	command parameter	text to send
Data 0xFD	0x00 0x02		0x32	0x31	none
Data frame	0xFD 0x00 0x02 0x32 0x31				
illustrate	The content in the text cache whose encoding format is "GBK" "This function can make a piece of text that has been shuffled in the order desired by the customer After buffering the sequence and segments, play them together. " Repeatedly played 3 times.				