SYN6288 Chinese Speech synthesis chip Data Sheet

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1. Outline

SYN6288 Chinese speech synthesis chip is a Beijing-tone world Technology Co., Ltd. 2010 In early launch of a / bid higher, the effect
A high-end more natural speech synthesis chip. SYN6288 By asynchronous serial (UART) communication, receiving text data to be synthesized
For text-to-speech (or TTS Speech) conversion.

Yu sound in the world 2002 In the first developed country's first speech synthesis chip OSYN06188. 's New SYN6288 Speech synthesis
Into chips, inherited OSYN06188 Outstanding features voice chip: Min SSOP28L SMD package, the hardware interface is simple, low power consumption, sound
Clear and mellow colors, high price / performance ratio; addition, SYN6288 In recognition of text / numeric / string smarter, more accurate speech synthesis
Naturalness better, higher intelligibility. SYN6288 Speech synthesis effects and intelligence are been greatly improved, is a truly high-Oriented
End industrial applications in the field of
Chinese speech synthesis chip.
SYN6288 Birth speech synthesis chip, will drive TTS Applications to speech synthesis technology deeper and more extensive!

1.1 Product Applications

- Vehicle information terminal voice broadcast, vehicle dispatch, vehicle navigation
- Bus-stop , Attendance
- Mobile phones, fixed phones
- Queuing machines, cash registers charging machine
- Vending machines, information machines, POS Machine
- Smart instrumentation , Meteorological early warning aircraft, smart transformers
- Smart toys, smart watches
- Electric Bicycle
- Audio books, color story books, voice electronic dictionaries, electronic voice guides
- Short Message Play , Press Play
- Map

1.2 Features

Support GB2312, GBK, BIG5 and UNICODE text format within the code;
Clear, natural, accurate Chinese speech synthesis effects; can synthesize any Chinese text, supporting the English alphabet synthesis;
Text with intelligent analysis and processing algorithms can identify value, number, time, date and correct common weights and measures;
Multi-tone with a strong word-processing capabilities and Chinese surnames;
Text Control supports a variety of markers to improve the accuracy of text processing;
Every synthesis up to the amount of text 200 Byte;
Support multiple control commands, comprising: a synthetic, stop, pause synthesis, synthesis continues, change the baud rate, etc.;

Support the hibernation feature, in the sleep state to reduce power consumption; variety of ways to support the work of the state of the chip;
Support for serial data communication interface, supports three communication baud rate: 9600bps, 19200bps, 38400bps;
Support 16 Level volume adjustment; background playback volume text foreground and background music volume can be controlled separately;
Speed regulation can be marked words by sending control, support 6 Speed adjustment level words;
How curing chip polyphonic music, sound effects and a common voice prompts alert tone for certain industry sectors;
Internal integrated 19 voice tone, 23 tone polyphonic, 15 background music;
Final product provides SSOP SMD package; volume industry's smallest;
Chip indicators are applied to meet the harsh outdoor environments;

1.3 Product Description

Text synthesis

Chip synthesis support any Chinese text, you can use GB2312, GBK, BIG5 And Unicode Four kinds of encoding. Chip supports English Letters synthesis, in alphabetical way to pronounce English words encountered. Each time the amount of text up to 200 bytes synthesis.

Text intelligent analysis and processing

Chip with intelligent analysis of text processing functions, the common value of the text, phone number, time and date, weights and measures, such as the format of the symbol, the core Pieces can be correctly identified and processed according to the built-in text-matching rules.

For example: "2008-12-21" read as "21 December 2008", "10:36:28" is read as "Twenty ten thirty-six Eight seconds "," 28 ℃ "read" twenty-eight degrees Celsius, "etc.

Chinese surnames word processing and multi-tone processing capabilities

The existence of more than one pronunciation of the text, for example: "The current top priority is to ensure that key projects in Chongqing in difficulties in the smooth progress OK, resolutely refused repeated construction ", the chip can automatically text analysis, discriminant polyphonic text word pronunciation and synthesize the correct pronunciation.

Digital volume control and six 16 words Speed Control

Chip can achieve 16 digital volume control, greater volume and wider. Background playback volume text foreground and background music volume can be divided Open control, more freedom.

Optional text broadcasting background music

Chip integrates 15 Background music, in any broadcast can select the background music.

Beep

Chip integrates 19 The first voice tone, the information can be used for different occasions reminder alarm.
Chip integrates 23 Polyphonic music, used as a text message alert tone or chord polyphonic ringtones.

Supports a variety of control commands

Control commands include: synthetic text, stopping synthesis, synthesis pause, resume synthesis, status inquiries into Power Down mode, change communication

Baud rate control commands. Controller via the communication interface to send control commands to achieve the chip control.

Text Control supports a variety of markers

Chip supports a variety of text control tag. By sending a "synthetic command" send a text control mark, adjust the volume, set the digital readout method, Speed setting words, whether read out punctuation and other settings.

Job status inquiry chips

Supports a variety of ways to work status inquiry chips, including: query status pin level, by reading the chip automatically returns the return, send a query Command to get the chip to work state return.

Low power consumption

Chip supports Power Down Mode. Use the control command to make the chip into Power Down Mode. Reset chip can make chips from Power Down Mode to return to normal operating mode.

Supports three communication baud rate

Chip supports communication baud rate: 9600bps, 19200bps, 38400bps .

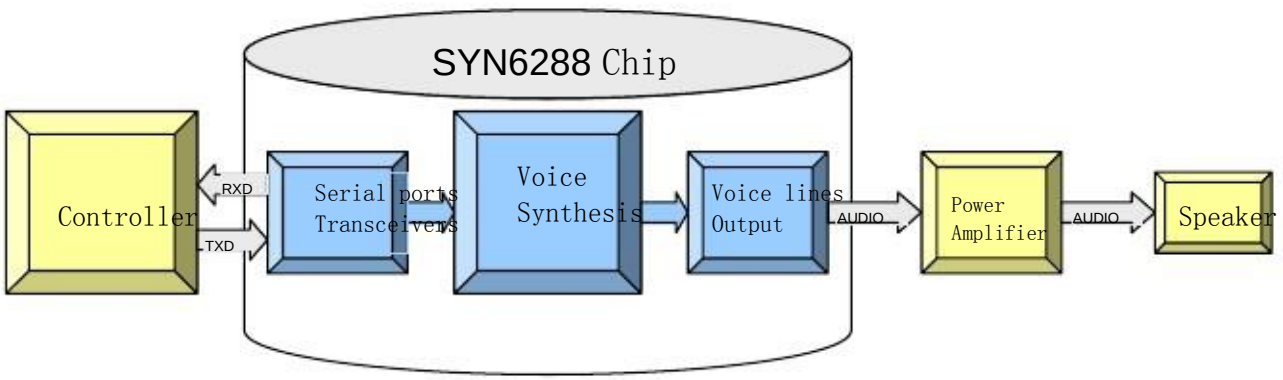
1.4 Synthetic effects

Naturalness	Definition	Correct rate	Intelligibility
3.5	98%	96%	99%

1.5 Constitute a block diagram of the system

Minimum system comprising: a controller module, SYN6288 speech synthesis chip, power amplifier module and speakers.

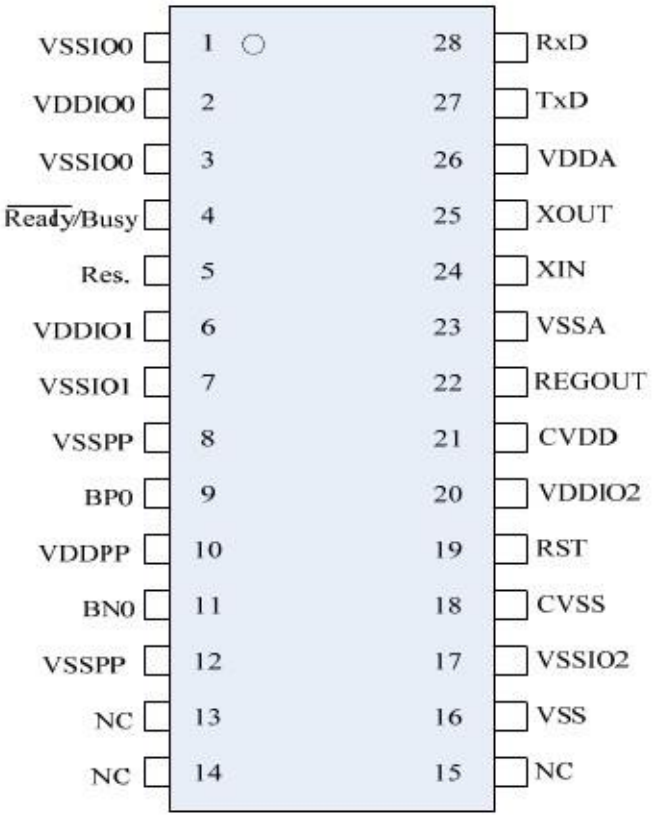
Between the main controller and SYN6288 through speech synthesis chip UART Interface, the controller via the communication interface to speech synthesis core SYN6288 Transmitting control commands and text sheet, SYN6288 speech synthesis chip to the received signal output text speech synthesis, the output signal is amplified by the power After the device is connected to the amplifying horn for playback.



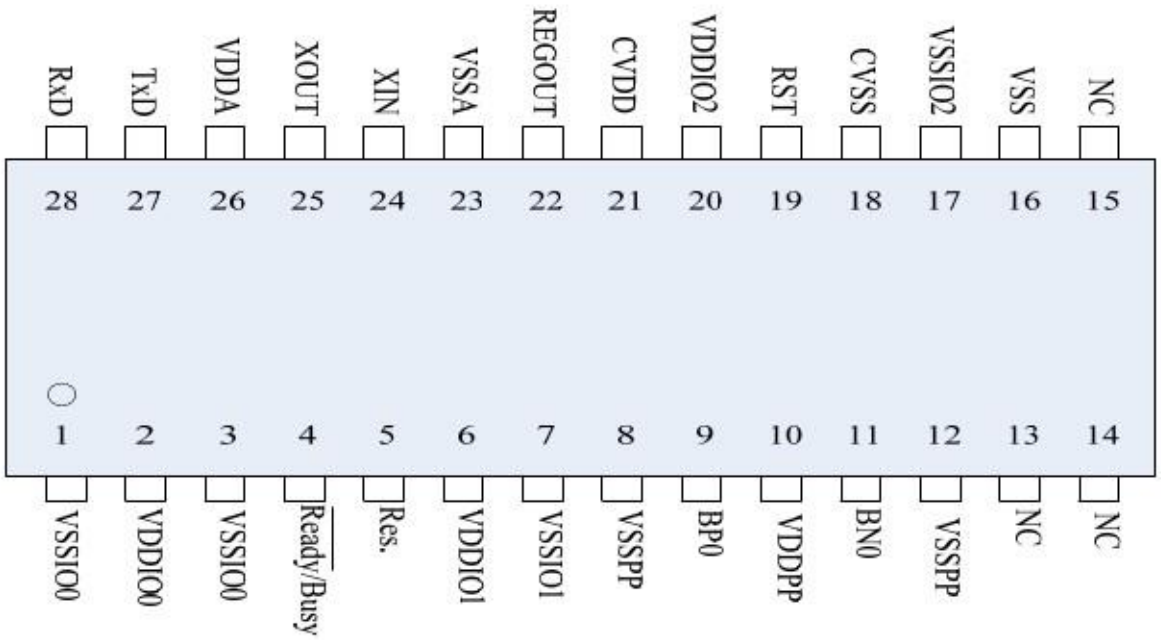
1.6 Package Information

1.7 IC Pin structure

1.7.1 Vertical pin view



1.7.2 Transverse pin view



1.7.3 Pin Definitions

Pin Number	Pin Name	I / O	Say Clear
1,3	VSSIO0	I	Bus module 0Negative power
2	VDDIO0	I	Bus module 0Positive power supply
4	$\overline{\text{Ready}}$/Busy-STATUS Pin	0	Low representation CHIP Idle, Can receive commands sent by the host computer and Data High indicates CHIP Busy, ongoing speech synthesis and broadcasting
5	Res.	-	Internal reserves
6	VDDIO1	I	Bus module 1Positive power supply
7	VSSIO1	I	Bus module 1Negative power
8,12	VSSPP	I	Voice output module power negative
10	VDDPP	I	Voice output module positive power supply
9	BP0	0	Push DAC Voice output 1
11	BN0	0	Push DAC Voice output 2

28	RxD	I	Serial data is received, the initial baud rate 9600bps
27	TxD	0	Serial data transmission, the initial baud rate 9600bps
26	VDDA	I	Internal power supply positive
23	VSSA	I	Internal negative power supply
25	XOUT	0	High-speed oscillator output
24	XIN	I	High-speed crystal input
22	REGOUT	0	Automatically adjusts the output voltage
21	CVDD	I	Processor power supply positive
18	CVSS	I	Processor power negative
20	VDDIO2	I	Bus module 2Positive power supply
17	VSSIO2	I	Bus module 2Negative power
19	RST	I	Chip reset, low trigger effective
16	VSS	I	Negative power - with integrated speech synthesis chip substrate, must be PCB The ground wire (GND) or a negative plate (VSS) linked.

2. Chip Control

2.1 Control Command

Format command to the host computer to the frame SYN6288 Chip sends commands. SYN6288 Chip frames corresponding operation on command, returned to the host computer Back to the command operation results.

SYN6288 chip provides a variety of control commands, listed below:

Command Function	Explanation
Speech synthesis play command	The sending of text synthesis
Communication baud rate change command	Communication baud rate after the change
Stop synthesis command	Synthesis of action to stop the current
Synthetic pause command	Suspend the ongoing synthesis

Recovery synthesis command	The synthesis continues to be suspended in the text
Chip status query command	Query the current operating state of the chip: the host computer through the "chip status check Inquiry Command" To determine the TTS Module is working properly, as well as access to phase Should be parameters, return 0x4E Show that the chip is still in the synthesis, the return 0x4F Table Next chip is in idle state.
Enter Power Down Mode commands	From the chip into the normal operating mode Power Down Mode after reset Restoration

2.2 Chip Returns

Receiving the control command frame, the chip will send a crew up Return status byte, the PC may be coming back to judge based on this chip is currently Working condition.

SYN6288 When the chip is initialized successfully sends a byte "Initialize success" return.

SYN6288 Chip will judge this command after receiving the command frame frame correctly or not, if the command frame correctly returns "successfully received" return, if ordered So framing error is returned "Receive failed" Return.

SYN6288 When the chip receives a status query command, if the chip is in a working state broadcasting of return "is being broadcast" return, if the core Film is idle return "chip free" return. After a frame of data synthesis is completed, the chip will automatically return to a "chip free" back Biography.

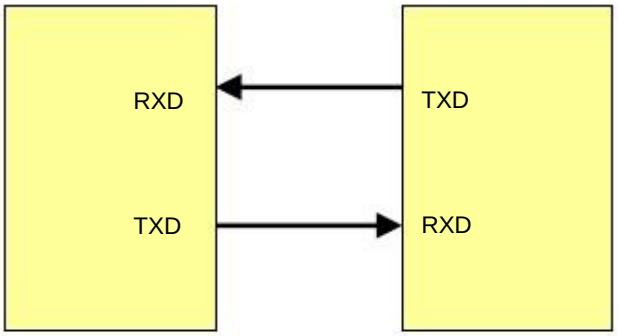
Returns type name	Returns data	Triggering conditions
Initialization successful return	0x4A	Chip initialization success
Receives the correct command frame returns	0x41	Receive success
Received command frame does not recognize the return	0x45	Receive failure
Chip broadcasting state return	0x4E	Receive a "status inquiry command frame", the chip is being broadcast in the state
Chip idle return	0x4F	When the synthesis of a complete frame of data, the chip enters an idle state return 0x4F; or Who receive a "status inquiry command frame", the chip is idle return 0x4F

3. ThroughMeans of communication

3.1 Asynchronous Serial communications (UART) interfaces

SYN 6288 Provides a set of full-duplex asynchronous serial communication (UART) interface, and a microprocessor or PC Data transfer. SYN 6288 Use TxD And RxD And GND Serial communication. Among GND As a signal ground. SYN 6288 Chip Support UART Interface communication,

By UART Interface to receive commands and data sent by the host computer, the maximum length allowed for sending data 206 Bytes.



Specific circuit shall see 10.7-"String Reference Circuit "port communication instructions

3.2 Communication transmission byte format

1, Initial Baud Rate: 9600 bps

2, Start bit: 1

3, Data bits: 8

4, Parity: None

5, Stop bits: 1

6, Flow Control: None

Start bit	D0	D1	D2	D3	D4	D5	D6	D7	Stop bits

4. CommunicateFrame definition and communication control

4.1 Command frame format

Chip supports the following command frame format: "header FD + Data area length + data field "format (maximum 206 bytes)

Sent to the host computer SYN6288 All commands and data required for the chip are encapsulated transmission "frame" mode.

Frame structure	Header (1 byte)	The length of the data area (2 bytes)	Data Area (203 bytes or less)			
			Command word (1 byte)	Command parameters (1 byte)	Text to be sent (Less than 200 bytes)	XOR checksum (1 byte)
Data	0xFD	0xXX 0xXX	0xXX	0xXX	0xXX . . .	0xXX

Explanation	Defined as sixteen Ary "0xFD"	Endian After the low byte	Length must be in front of "the data area length" consistency

Note: The data area (including the command word, command parameters to be transmitted text, XOR parity) actual length of the data area must be defined length of the header Strictly consistent, otherwise the chip will be reported receiving fail.

4.2 Chip supports control commands

Data Area (Less than or equal 203 Byte)							
Life Order Word 1 Byte		Command parameters 1 Byte				Text to be sent <= 200 Byte	XOR checksum 1 Byte
Value	Corresponding function	Byte High five	Corresponding function	Byte Low 3	Corresponding function		
0x01	Speech synthesis play command	Value: 0 Value: 1 Value: 2 : 3 ... Value: 14 Value: 15	1 value 0: Said without Background music (2) Other values: Indicates that the selected Background music The number	0	Set text: GB2312 Encoding format	The two texts to be synthesized Ary content	Before all of the words Section (including the frame Head, Data mayor Degree bytes) do XOR parity was A byte
				1	Set text: GBK Encoding format		
				2	Set text: BIG5 Encoding format		
				3	Set text: UNICODE Encoding format		
0x31	Set the baud rate command (Initial baud rate 9600bps)	0	No function	0	Set the baud rate: 9600bps	No text	
				1	Set the baud rate: 19200bps		
				2	Set the baud rate: 38400bps		
0x02	Stop synthesis command	No parameters					
0x03	Synthetic pause command						
0x04	Recovery synthesis command						
0x21	Chip status query command						
0x88	Chip enters Power Down Mode command						

PC data area can use the command word and command parameters to achieve a variety of functions speech synthesis chip.

4.3 Special note associated command frame

4.3.1 Sleep and Wake-up instructions

Chip will not take the initiative to sleep, to sleep only after receiving the host computer sends a command frame will sleep.
After the chip enters sleep, the PC first need to wake up the chip and then to the chip sends a command frame data; (Note: After wakeup interval of 16 Milliseconds before sending command data)
If you wake up after being dormant (such as hardware or software wake wake), 10 Within seconds (standby time) did not receive a valid command frame sent by the host computer Data (speech synthesis play command, set the baud rate command to stop the synthesis of command, pause synthesis command to restore the synthesis of commands, status inquiry Command), then the chip will re-enter sleep (not to be considered as interference wake ignore) (Note: only after the chip has entered dormancy. Will have 10 Seconds to wake up dormant standby again)

4.3.2 Help set the baud rate

The initial default baud rate is 9600bps; Host To change the baud rate, the baud rate is set after sending the command frame interval of 16 Ms recurrence Send other command frame.
To change the baud rate, reset each time the system had to change the baud rate of retransmission command frame.
After sending the command to change the baud rate frame, to pause a few hundred milliseconds, and then change the baud rate of the host.
9600bps, 19200bps Two kinds of baud communication transmission are very stable (regardless of the chip in the synthesis of broadcast or idle) Transmission due to system time slice time slices close reasons: 38400bps Baud communication transmission chip idle idle very stable; But in chips The synthesis of broadcast transmitting data again when the PC is not very stable, receiving probability of success and failure of each receiver 50%. Remind users: Chip is the synthesis of broadcast, if used 38400bps Baud send new data again (to interrupt the current player) Can be sent repeatedly, "stop Stop" command, ensure that you receive" After successfully received "signal, and then sends the new data.

4.3.3 Other special instructions

The same data frame, the transmission interval between each byte can not exceed 8ms; transmission interval between frames must exceed 8ms.
When SYN6288 Chips are synthesized text, if it receives a valid command frame synthesis, the chip will immediately stop the currently Synthesis of text, instead synthesize new text received.
Send Text length must be less than or equal to 200 bytes. The actual length is greater than 200 bytes sent, the chip will be reported receiving fail.

4.4 Example command frame

4.4.1 Speech synthesis play command

Frame structure	Header	Data Area Length	Data Area			
			Command word	Command parameters	Text to be sent	XOR checksum
Data	0xFD	0x00 0x0B	0x01	0x00	YUIN world 0xD3 0xEE 0xD2 0xF4 0xCC 0xEC 0xCF 0xC2	0xC1
Data Frame	0xFD 0x00 0x0B 0x01 0x00 0xD3 0xEE 0xD2 0xF4 0xCC 0xEC 0xCF 0xC2 0xC1					
Explanation	Play text encoding format is "GB2312" text "Yu sound world", with no background music					

Frame structure	Header	Data Area Length	Data Area			
			Command word	Command parameters	Text to be sent	XOR checksum
Data	0xFD	0x00 0x0B	0x01	0x01	YUIN world 0xD3 0xEE 0xD2 0xF4 0xCC 0xEC 0xCF 0xC2	0xC0
Data Frame	0xFD 0x00 0x0B 0x01 0x01 0xD3 0xEE 0xD2 0xF4 0xCC 0xEC 0xCF 0xC2 0xC0					
Explanation	Play text encoding format is "GBK" text "Yu sound world." Without background music					

Frame structure	Header	Data Area Length	Data Area			
			Command word	Command parameters	Text to be sent	XOR checksum
Data	0xFD	0x00 0x0B	0x01	0x02	YUIN world 0xD3 0xEE 0xD2 0xF4 0xCC 0xEC 0xCF 0xC2	0xC3
Data Frame	0xFD 0x00 0x0B 0x01 0x02 0xD3 0xEE 0xD2 0xF4 0xCC 0xEC 0xCF 0xC2 0xC3					
Explanation	Play text encoding format is "BIG5" text "Yu sound world." Without background music					

Frame structure	Header	Data Area Length	Data Area			
			Command word	Command parameters	Text to be sent	XOR checksum
Data	0xFD	0x00 0x0B	0x01	0x03	YUIN world 0xD3 0xEE 0xD2 0xF4 0xCC 0xEC 0xCF 0xC2	0xC2
Data Frame	0xFD 0x00 0x0B 0x01 0x03 0xD3 0xEE 0xD2 0xF4 0xCC 0xEC 0xCF 0xC2 0xC2					
Explanation	Play text encoding format is "Unicode" text "Yu sound world." Without background music					

Frame structure	Header	Data Area Length	Data Area			
			Command word	Command parameters	Text to be sent	XOR checksum
Data	0xFD	0x00 0x0B	0x01	0x09	YUIN world 0xD3 0xEE 0xD2 0xF4 0xCC 0xEC 0xCF 0xC2	0xC8
Data Frame	0xFD 0x00 0x0B 0x01 0x09 0xD3 0xEE 0xD2 0xF4 0xCC 0xEC 0xCF 0xC2 0xC8					

Explanation	When the text "YUIN world" play text encoding format is "GBK" while playing background music 1					
Frame structure	Header	Data Area Length	Data Area			
			Command word	Command parameters	Text to be sent	XOR checksum
Data	0xFD	0x00 0x0B	0x01	0x79	YUIN world 0xD3 0xEE 0xD2 0xF4 0xCC 0xEC 0xCF 0xC2	0xB8
Data Frame	0xFD 0x00 0x0B 0x01 0x79 0xD3 0xEE 0xD2 0xF4 0xCC 0xEC 0xCF 0xC2 0xB8					
Explanation	When the text "YUIN world" play text encoding format is "GBK" while playing background music 15					
Frame structure	Header	Data Area Length	Data Area			
			Command word	Command parameters	Text to be sent	XOR checksum
Data	0xFD	0x00 0x08	0x01	0x01	[V11] 0x5B 0x76 0x31 0x31 0x5D	0x85
Data Frame	0xFD 0x00 0x08 0x01 0x01 0x5B 0x76 0x31 0x31 0x5D 0x85					
Explanation	Play the text "[v11]", the chip will be identified as: set the volume to 11					

4.4.2 Set the baud rate command

Frame structure	Header	The length of the data area	Data Area			
			Command word	Command parameters	Text to be sent	XOR checksum
Data	0xFD	0x00 0x03	0x31	0x00		0xCF
Data Frame	0xFD 0x00 0x03 0x31 0x00 0xCF					
Explanation	Set baud rate: 9600bps					
Frame structure	Header	The length of the data area	Data Area			
			Command word	Command parameters	Text to be sent	XOR checksum
Data	0xFD	0x00 0x03	0x31	0x01		0xCE
Data Frame	0xFD 0x00 0x03 0x31 0x01 0xCE					
Explanation	Set baud rate: 19200bps					
Frame structure	Header	The length of the data area	Data Area			
			Command word	Command parameters	Text to be sent	XOR checksum
Data	0xFD	0x00 0x03	0x31	0x02		0xCD
Data Frame	0xFD 0x00 0x03 0x31 0x02 0xCD					
Explanation	Set baud rate: 38400bps					

4.4.3 Stop synthesis command

Frame structure	Header	The length of the data area	Data Area			
			Command word	Command parameters	Text to be sent	XOR checksum
Data	0xFD	0x00 0x02	0x02			0xFD
Data Frame	0xFD 0x00 0x02 0x02 0xFD					
Explanation	Stop synthesis command					

4.4.4 Synthetic pause command

Frame structure	Header	The length of the data area	Data Area			
			Command word	Command parameters	Text to be sent	XOR checksum
Data	0xFD	0x00 0x02	0x03			0xFC
Data Frame	0xFD 0x00 0x02 0x03 0xFC					
Explanation	Synthetic pause command					

4.4.5 Recovery synthesis command

Frame structure	Header	The length of the data area	Data Area			
			Command word	Command parameters	Text to be sent	XOR checksum
Data	0xFD	0x00 0x02	0x04			0xFB
Data Frame	0xFD 0x00 0x02 0x04 0xFB					
Explanation	Recovery synthesis command					

4.4.6 Chip status query command

Frame structure	Header	The length of the data area	Data Area			
			Command word	Command parameters	Text to be sent	XOR checksum
Data	0xFD	0x00 0x02	0x21			0xDE
Data Frame	0xFD 0x00 0x02 0x21 0xDE					
Explanation	With this command to determine the TTS Module is working properly, as well as to obtain the corresponding return parameters, return 0x4E Show that the chip is still in the synthesis Broadcasting, the return 0x4F Show that the chip is in idle state					

4.4.7 Chip enters Power Down Mode command

Frame structure	Header	The length of the data area	Data Area			
			Command word	Command parameters	Text to be sent	XOR checksum
Data	0xFD	0x00 0x02	0x88			0x77
Data Frame	0xFD 0x00 0x02 0x88 0x77					
Explanation	Into the POWER DOWN Status command, the reset recovery					

5. Text control tags

5.1 Text control tags list

Action	Mark Type	Control Mark	Details	Chip Default
Set the foreground text playback volume (including mention Shows sound)	Overall situation	[V?]	? Value for the volume, value: 0 to 16 (Where 0 is mute) ? When other unsigned integer, the maximum volume value will be treated as 16 processing	[V10]
Set the background music volume	Overall situation	[M?]	? Value for the volume, value: 0 to 16 (Where 0 is mute) ? When other unsigned integer, the maximum volume value will be treated as 16 processing	[M4]
Speed setting words (For natural reading mode)	Overall situation	[T?]	? Speed values for the words, Value: 0-5 ? Other unsigned integer when the value of 5 as the highest word rate of speech processing 0 is the slowest rate of speech words, five words for the fastest speeds. Note: For Word-by-Word Reading Speed adjust the way the words are not supported	[T4]
Set digital processing strategy	Overall situation	[N?]	? 0, automatically determine ? 1, as the number of digital processing ? 2, figures for numerical processing ? When other unsigned integer, will be treated as an integer from 0 treatment	[N0]
Set the number "1" in the reading of	Overall situation	[Y?]	? 0, the synthesis of number "1" is read as "unitary" ? 1, the synthesis of the number "1" is read as "one" ? When other unsigned integer, will be treated as an integer from 0 treatment	[Y0]
Set the tone processing strategy	Overall situation	[X?]	? 0, do not use tone ? 1, the default tone ? When other unsigned integer, will be treated as an integer from 0 treatment	[X1]

Is set to read out punctuation	Overall situation	[B?]	? 0, do not read punctuation ? is 1, R punctuation ? When other unsigned integer, will be treated as an integer from 0 treatment	[B0]
Set text to speech mode	Overall situation	[O?]	? To 0, set reading mode is a natural ? 1, is set to Word-By-Word mode ? When other unsigned integer, will be treated as an integer from 0 treatment	[O0]
Restore the default global synthesis parameters		[D]	All of the following global identity back to the default value	
Forced by last name pronunciation of Chinese characters after a	Temporary	[R]	A mark of this control characters after reading a mandatory surname (mainly for multi-tone Word processing surname), if not followed by a kanji, this control is not	
Composed of two characters after the mandatory two terms	Temporary	[2]	This control two characters labeled mandatory read as "two words," if there is no Followed by two characters, this control is not	
After the mandatory three Chinese characters composed of three words	Temporary	[3]	Three characters of this control labeled mandatory read as "three words," if there is no Followed by three characters, this control is not	

Note:

1) All control logo are half-width characters.
2) Identifies the need to control the speech synthesis in accordance with the format command to send special control tags as text synthesis, namely synthetic command is "header + Number According zone length + Synthetic command word + Text encoding format + Special control tag text format "of.
3) Control identified as global control identity, that is, as long as the first, in the right conditions for a chip reset or power, and subsequently sent to the chip All texts will be under its control, except with the corresponding [D] to restore the default settings.
4) When the chip is powered down or reset, the chip will be restored to all of the default values, the identity of the original set too lost a role, you need to re-set.
5) Does not meet the above identified control logo or the wrong format, all as ordinary characters and digital processing

Note:

[D] [V?] [M?] These three markers can not arbitrarily control appears (prone to understand ambiguity) in the play text, only the following applications (other controls Mark made no constraint)

As a single frame of data transmitted, the data for the next frame starts at this time play a role in

The first one: [V5] Good change alone Explanation: Set the volume to five prospects

The first one: Welcome Explanation: The volume by five prospects playing "Welcome"

As with other marks and control data transmission frame, then the start of the next frame of data play a role. Note: After the control standard.

Mind control priority over the earlier mark

The first one: [D] [v5] [m2] [d3] Suitable for PC initialization call Explanation: The first restore the default global variable, and then set the volume to five prospects, background sound Volume 2, according to the natural way of reading

Section 2: Welcome Explanation: The outlook for the volume by 5 Volume 2 Background Play "Welcome"

Play on the text at the beginning and play text sent with the data at this time to play a role in the beginning of the frame. - Text a fit and play

Sending and change from

The first one: [V6] [m2] Welcome speech synthesis chip Explanation: The frame data from the beginning of Volume 2 by 6 prospects. Background playback volume level: ie six prospects volume two of background noise play "Welcome to the speech synthesis chip."

5.2 Text control tags use examples

5.2.1 [V?] Mark ------- Set the foreground text playback volume (including tips sound)

Sample text	Chip explained
[V6] Welcome speech synthesis chip	Start playback volume by six prospects from the frame data: ie six sound prospects The amount of play "Welcome to the speech synthesis chip", after the data frame is also By six prospects volume playback.

5.2.2 [M?] Mark ------- set the background music volume

Sample text	Chip explained
[M2] Welcome speech synthesis chip	Start playback volume by two background data from the frame: the background sound by 2 The amount of play "Welcome to the speech synthesis chip", after the data frame is also Played by two background noise.

5.2.3 [T?] Set word mark ------- Speed

Sample text	Chip explained
Welcome to [t0] Beijing YUIN world [t5] speech synthesis chip	By default 4 Speed Playback normal word "Welcome", then press 0 Speed Play slowest words "Beijing YUIN world", and then five fastest word Language Speed Play "speech synthesis chip"

5.2.4 [N?] Mark ------- set the digital processing strategy

Sample text	Chip explained
[N0] 234343545	Chip automatic judgment Read: 234,343,545
[N1] 234343545	Force the number of chips synthesized string of numbers Read: 234,343,545
[N2] 234343545	Chip Synthesis forced manner numeric string value Read: 234,343,545

5.2.5 [Y?] Mark ------- set number "1" in the reading of

Sample text	Chip explained
[Y0] 010-62986600	Chip accordance with the "unitary" read the text of the synthesis of the number "1" Read: Zero Zero unitary, 62986600
[Y1] 010-62986600	Chip accordance with the "a" to read the text in the synthesis of the number "1." Read: 2010, 62,986,600

Note: This tag must be in the synthesis of a number type text when it is effective.

5.2.6 [X?] Set the tone mark ------- handling policy

Sample text	Chip explained
[X0] ringa sounda	Not to tone treatment, directly read into English letters: r-i-n-g-a s-o-u-n-d-a
[X1] ringa sounda	Processing by the tone: Play a chord ringa, then play message alert tone sounda

5.2.7 [B?] ------- Set punctuation marks are read out

Sample text	Chip explained
[B0] Welcome, Come!	Punctuation is not read, read as: "Welcome Come "
[B1] Welcome, Come!	Read out punctuation, Read as: "Welcome Comma Come Sigh No. "

5.2.8 [O?] Mark ------- way to set the text read aloud

Sample text	Chip explained
[O0] Welcome to the world YUIN speech synthesis chip developed by Chinese	More natural way by reading
[O1] Welcome to the world YUIN speech synthesis chip developed by Chinese	Press Word By Word Way to read

5.2.9 [D] the synthesis of labeled --------- restore the default parameters

Sample text	Chip explained
[V11] [n1] 123, [Y1] 010-62986600, [R1] Qu Tian Fang	Volume by 11 read as: one two three, 2010, 6,298,660 Zero, Qu (qu3) Tian Fang

[D] 123, 010-62986600, Qu Tian Fang	All global control Mark all restored to default! Volume 8 by default read as: One hundred twenty-three, zero unitary zero, six thousand two hundred ninety-eight Six thousand six hundred, song (qu1) Tian Fang

5.2.10 [R] mark ------- pronunciation of Chinese characters by last name after a mandatory

Sample text	Chip explained
Single units came to the Tigers	Single Tigers: Read as: dan1 xiao2 hu3
Units [r] single Tigers came up	Single Tigers: Read as: shan4 xiao2 hu3

5.2.11 [2] and [3] Mark --- forced into two words or three words

Note: This chip can achieve the correct phrase segmentation More than 98%, due to the complexity of Chinese semantic, any product not do 100% correct. Should
With this function, manual intervention segmentation phrase, to a certain extent,
to make synthetic naturalness better.
Here is our special screening of the uncut good sentence.

Sample text	Chip explained
Beijing Dongzhimen station to	The chip will cut into: / Beijing | East | straight | Door | station | to / (Sounds a little bit unnatural)
Beijing [3] to Dongzhimen station	Human intervention, cut into: / Beijing | Dongzhimen | stop | to / (Sounds more natural)
North Street has entered guangshun	The chip will cut into: / Has entered | wide | Shun | North Avenue / (Sounds a little bit unnatural)
Has entered [2] guangshun North Street	Human intervention, cut into: / Has entered | guangshun | North Avenue / (Sounds more natural)

5.2.12 Initialize the control flag comprehensive example

Sample text	Chip explained
The first one data: [D] [v8] [m2] [t5] [y0] [x1] [o0]	First restore the default global variable, set the volume to eight prospects, set the background volume of 2, set phrases Speed is 5, when setting synthetic number "1" Read as "unitary", set using the tone, set the natural way of reading
The first two data: Welcome speech synthesis chip	Set on a good variable data press play "Welcome to the voice synthesis of the core Film

6. Tip Sound

6.1 Voice tone list

Chip provided 25 Beep sound segments, the choice can be based on using the occasion as a message alert tone. The following is a list of chip
Built-tone sound of the name and type:

Beep sound (Total 19)							
No.	Name	Type of sound	Broadcast Time	No.	Name	Type of sound	Broadcast Time
1	sounda	Error sound	1s	14	soundn	Alert	2s
2	soundb	Swipe success	1s	15	soundo	Alert	1s
3	soundc	Swipe success	1s	16	soundp	Alert	3s
4	soundd	Swipe success	1s	17	soundq	Emergency Alert	1s
5	sounde	Swipe success	1s	18	soundr	Emergency Alert	1s
6	soundf	Laser Sound	1s	19	sounds	Cuckoo sound	1s
7	soundg	Doorbell	1s	20	soundt	Beep	1s
8	Soundh	Doorbell	1s	21	soundu	Beep	1s
9	soundi	Buzz	2s	22	soundv	Beep	1s
10	soundj	Buzz	1s	23	soundw	Beep	1s
11	soundk	Broadcast tone	2s	24	soundx	Beep	1s
12	soundl	Beep	1s	25	soundy	Beep	1s
13	soundm	Beep	1s				

6.2 Polyphonic tones list

Chip provided 23 As a tone polyphonic music segment can be widely used in public information broadcast occasion, the following list is
The name and length of the built-in tone
playing chips.

Polyphonic tones (Of 8)					
No.	Name	Play Time	No.	Name	Play Time
1	msga	1s	5	msge	2s
2	msgb	1s	6	msgf	3s
3	msgc	1s	7	msgg	4s
4	msgd	1s	8	msgh	5s

Polyphonic ringtones (Total 15)					
No.	Name	Play Time	No.	Name	Play Time
1	ringa	60s	9	ringi	35s
2	ringb	70s	10	ringj	25s
3	ringc	27s	11	ringk	18s
4	ringd	65s	12	ringl	38s
5	ringe	60s	13	ringm	60s
6	ringf	57s	14	ringn	23s
7	ringg	60s	15	ringo	5s
8	ringh	53s			

Polyphonic ringtones polyphonic ringtones not only for, but also the background music material

Note: No beep in the use of special, with synthetic plain text command phase synthesis Same. However, note that: Beep name
Front or back followed by letters of the alphabet, you need to use punctuation, spaces, carriage returns, and so separated from the other letters, it can automatically identify chip.
For example: Send text "sounda, hello!", Sounda Can be synthesized corresponding SMS tone, but if you send a text
The "soundahello!", Sounda It can not be synthesized tone, but directly read into the letter "SOUNDA".

7. PC chip invocation on SYN6288

7.1 Simple invocation

Simple call for applications is relatively simple situation. Users do not care SYN6288 Working condition, only need to send text, SYN6288 Can
The received text to speech synthesis output.

In simple call, the host computer as long as SYN6288 Establish a connection between the serial communication, you can send commands to achieve the synthesis of text
Synthesis, the PC does not need to ignore SYN6288 Feedback and status output, SYN6288 Outputs synthesized speech.

Tip: As a synthesis of the text has not yet finished, and then send the text to SYN6288 It will break the previous synthesis, and implementation of the new synthesis.

7.2 Standard invocation

For the general case, the PC needs to determine SYN6288 Working conditions, more precise control SYN6288 Chip work: such as the need
Ensure complete synthesis after the last text is then synthesized under a piece of text.

Application examples: Suppose you want to synthesize text 300 Byte chip exceeds the maximum length of the text of a command frame can hold (200
Byte), then twice to the chip to send text messages. Process as follows:

1, the PC sends a text synthesis chip give command frame, carrying less than 200 Text bytes;

2, PC waiting SYN6288 Chip returned finished playing backhaul information until you receive chip return "0x4F", in front of the text has been described Synthesis is completed; or use query the status of the chip pin, send a query command to query information on a confirmation text synthesis is completed.

3, the PC sends a text synthesis command frame again to SYN6288 Chip, the remaining 100 bytes to send text messages.

7.3 Method to query the chip work status

Hardware and software can be found in two ways SYN6288 Working condition.

Hardware ways: through query output pin Ready / Busy level to determine the working status of the chip. When Ready / Busy is high, Show that the chip is being synthesized play text states; When Ready / Busy low, indicating that the chip idle state.

Software: to check the working status of the chip by chip status query command frame. When the host computer sends to the chip status query command frame, Chip will immediately send up crew returns the current state of the chip. PC chips based on the return data to determine the current state of the chip is in the air Idle state or broadcast state.

8. Coding system and the scope of the chip identification

SYN6288 Supports the following 4 Kind of coding system: GB2312, GBK, BIG5, Unicode.

8.1 GB2312 Coding System

Identify the type	Identification code range	Remark
Half-width ASCII Symbols District	0x00 --- 0x7F	
Full-width symbols District	0xA1A0 --- 0xA3FE	
Character Area	0xB0A1 --- 0xF7FE	Common 6768 Characters

8.2 GBK Coding System

Identify the type	Identification code range	Remark
Half-width ASCII Symbols District	0x00 --- 0x7F	
Full-width symbols District	0xA1A0 --- 0xA3FE	
Character Area	0x8140 --- 0xA0FE 0xAA40 --- 0xFEFE	Common 21003 Characters

8.3 BIG5 Coding System

Identify the type	Identification code range	Remark

Half-width ASCII Symbols District	0x00 --- 0x7F	
Full-width symbols District	0xA140 --- 0xA3FE	
Character Area	0xA440 --- 0xF9FE	Common 13060 Characters

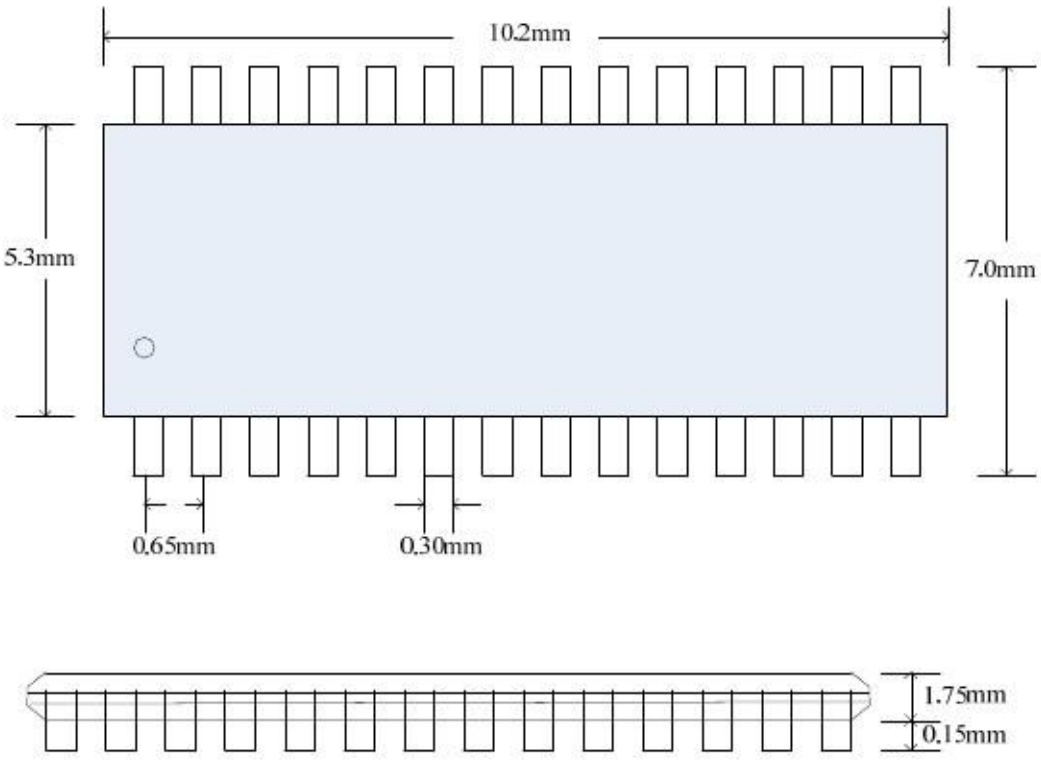
8.4 Unicode Coding System

Identify the type	Identification code range	Remark
Full-width symbols District	0x00 Area, 0x30 Area, 0xFF Area,	
Character Area	0x4E00 ---- 0x9FFF	Common 20902 Characters

Note: For the transfer does not belong to a recognized coding, muted about tens of milliseconds.

9. Product Specifications

9.1 Packaging data



9.2 Limiting values

Project	Symbols that represent	Min	Max	Unit
Supply Voltage	VDD-V	-0.3	5.1	V
Input Voltage	VIN	GND-0.3	VDD +0.3	V
Operating Temperature	TOP	-40	85	℃
Storage Temperature	TSTG	-55	125	℃

Note: beyond the limits of the parameters listed in the table will result in improper operation or damage to the device.

9.3 Electrical Characteristics

Project	Symbol	Min	Typical values	Max	Unit	Condition
Operating Voltage	VDD	2.4	-	5.1	V	
Standby current	ISBY	-	2.0	-	uA	VDD = 3V, no load
Operating Current	IOPR	-	10	-	mA	VDD = 3V, no load
Pull-Up resistor of TxD	RPU	-	800	-	KΩ	VDD = 3V, no load
Input current of RxD	IIH	-	-	5.0	uA	VDD = 3V, VIN = 3V
Drive current of TxD	IOD	-	4	-	mA	VDD = 3V, VO = 2.4V
Sink Current of Status	IOS	-	6	-	mA	VDD = 3V, VO = 0.4V
Drive current of BP0	IOD		150	-	mA	VDD = 3V, BP0 = 1.5V
Sink Current of BP0	IOS		150	-	mA	VDD = 3V, BP0 = 1.5V
Drive current of BN0	IOD		150	-	mA	VDD = 3V, BN0 = 1.5V
Sink Current of BN0	IOS		150	-	mA	VDD = 3V, BN0 = 1.5V
Crystal Oscil. Freq	FOSC	-	16.0	-	MHz	VDD = 3V

9.4 Power consumption when playing synthesized voice

Test Project	Test voltage: 3.0V		The test voltage 4.5V	
	Typical values	Max	Typical values	Max
Sleep when the current	0.2uA		1uA	
Current work but not broadcast:	3.3 mA		4 mA	
Volume 1Current level broadcast text:	50 mA		50 mA	
Volume 6Current level broadcast text:	70 mA		80 mA	
Volume 10 Current level broadcast text:	130 mA		150 mA	
Volume 16 Current level broadcast text:	190 mA		280 mA	
Volume 1Broadcast chords current level:	40 mA		40 mA	
Volume 6Broadcast chords current level:	60 mA		70 mA	
Volume 10 Broadcast chords current level:	90 mA		100 mA	
Volume 16 Broadcast chords current level:	140 mA		200 mA	

9.5 Normal mode

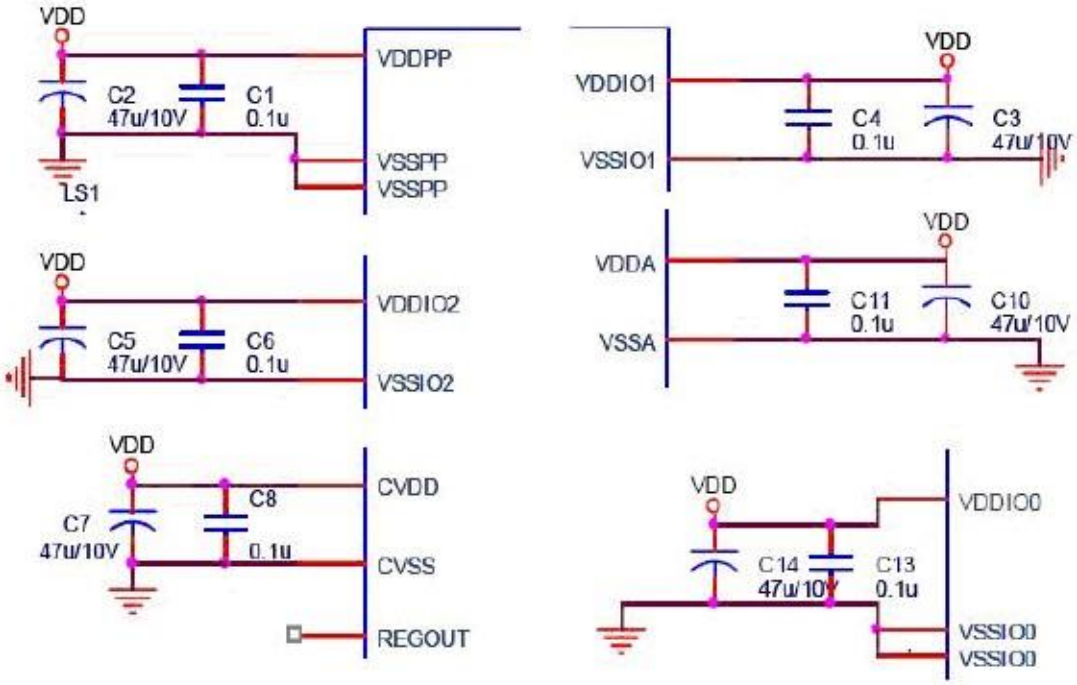
SYN 6288 In normal operation mode, Ready / Busy Indicates the chip working condition. In the synthesis process or the utterance, Ready / Busy
Output high, indicating at work; at the end of the synthesis, Ready / Busy Output low up crew (or microprocessor) issued a data transfer
Send requests until the end of the data transfer.

9.5 Sleep (low-power) mode

SYN 6288 After receiving the sleep command word master control system will go to sleep to save power; and can be RxD Port receives any
Italian command word to wake up the system.
Note: After the wake-up takes 16 Ms to enter the working state.

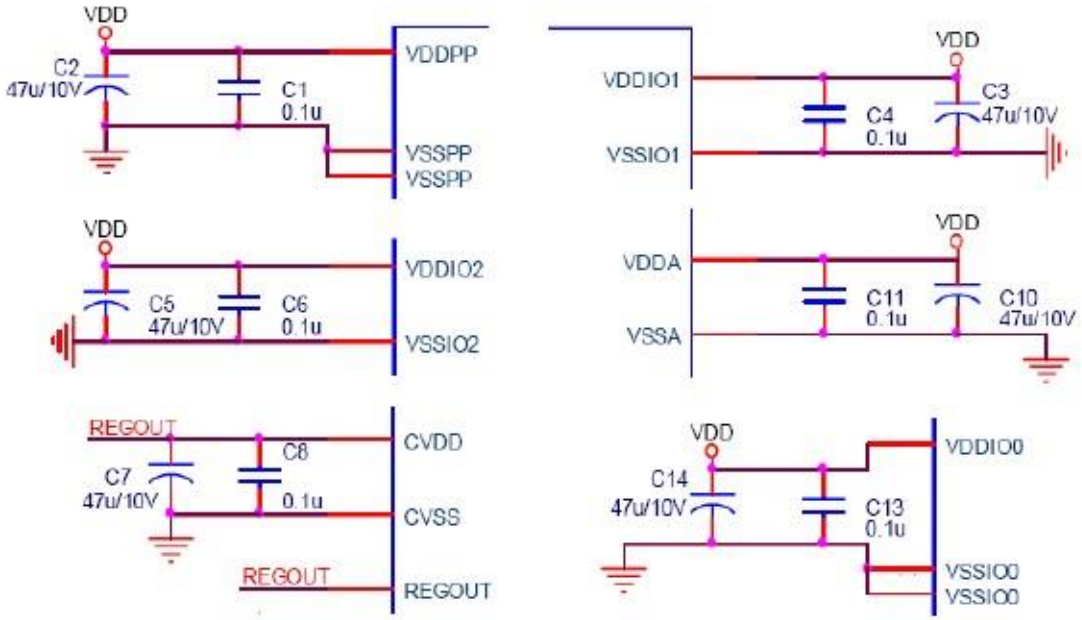
10. ReferenceCircuit

10.1 3V Power supply module reference circuit



Note 1: SYN6288 total of six sets of external power supply, each power supply are using a 47uF and a 0.1uF capacitor; If you want to save costs, with
Users can use 0.1uF capacitors on each power supply, then add 47uF capacitor on VDDPP, and VDDA.
Remark 2: External Power for the use of two batteries, or VDD =2.4V ~ ~ 3.6V

10.2 5V Power supply module reference circuit



Note 1: SYN6288 total of six sets of external power supply, each power supply are using a 47uF and a 0.1uF capacitor; If you want to save costs, with
Users can use 0.1uF capacitors on each power supply, then add 47uF capacitor on VDDPP, and VDDA.
Note 2: The external power supply for use with three batteries, or VDD =2.7V ~ ~ 5.1V
Note 3: REGOUT instructions for use

SYN6288AsCVDDInternalPower supply module provides a linear regulatorREGOUT, This linear regulatorImplementAsCVDDThe output voltage

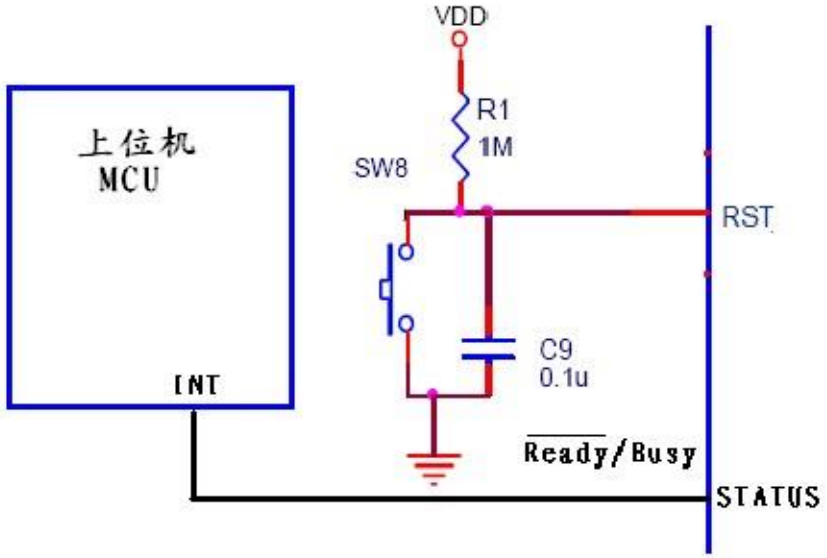
Design: 2.8V ± 0.2V. Its features are:

Enter the external supply voltage: 2.7V ~ ~ 5.1V

Output Current: 20mA

Precise output voltage: 2.6V ~ ~ 3.0V

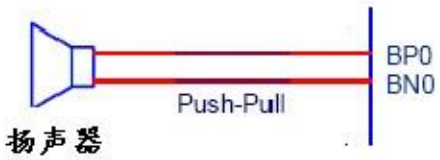
10.3 Reset circuit and circuit status indication



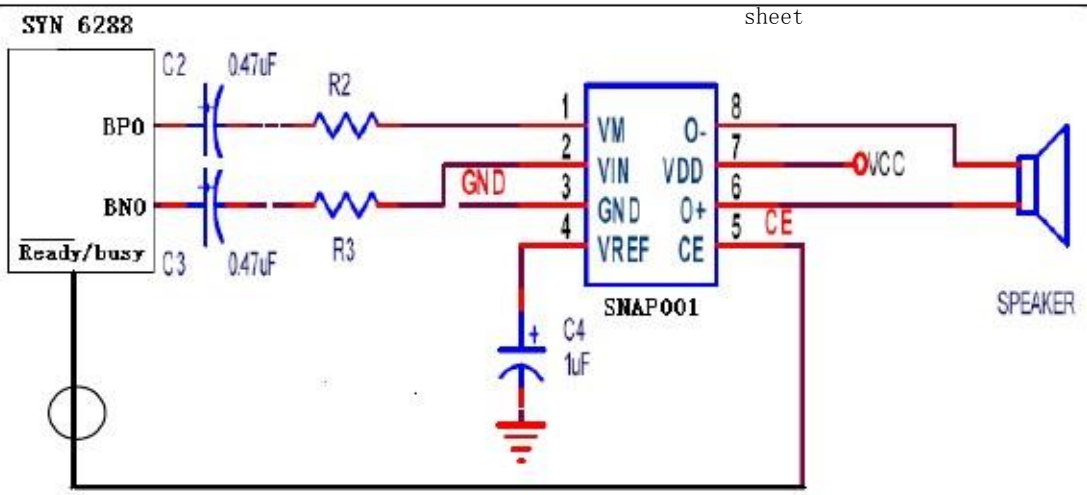
Remarks: Ready / Busy This signal is low STATUS pin description chip is waiting to receive data. In the system design can take this pin in the MCU interrupt input source to generate a falling edge interrupt request to send data to show PC MCU can send data to the speech synthesis chip.

10.4 SYN6288 Speaker output

(1) Directly connected speakers for audio output
(See left)

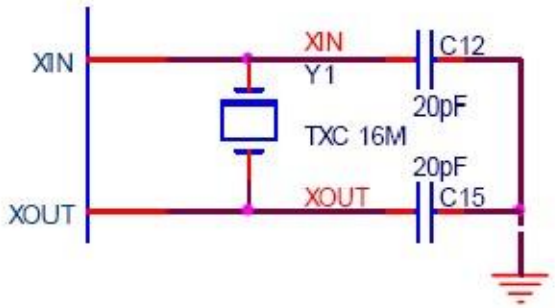


(2) adding amplifier SNAP01 Chip reference circuit
The easiest way is SYN 6288 Of STATUS Pin directly with SNAP01 Of CE Pin linked:



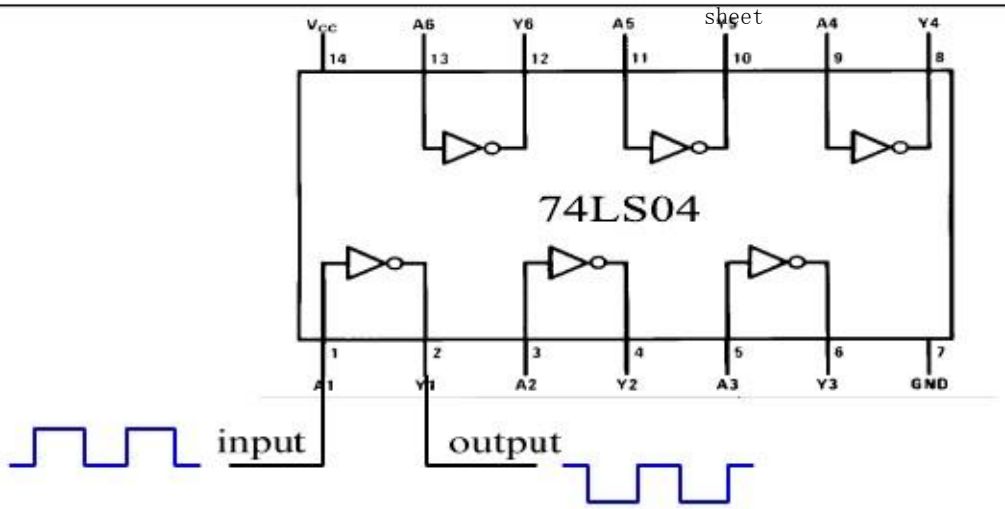
Note: In this case, each time you turn the amplifier circuit SNAP01 When, in BN0/BPO There will be some coupling capacitor connected to the discharge phenomenon, through the
Live SNAP01 After amplification will "wave" sound! Thus, SNAP01 The chip select pin, but you can save MCU PC treasure
Dear IO Mouth.
The best way linking should be:
Without considering the power consumption of the case, CE Directly with VDD Linked, so that the amplifier circuit module has been in standby mode.
In the case of the system considering power consumption, CE It can be made MCU Of IO Port for connection control, broadcasting stage in the synthesis, will be open CE
Let the power amplifier module is in standby mode; broadcasting and after the synthesis stage, closed CE Let SNAP01 Is shutdown.

10.5 SYN6288 External high-speed oscillator



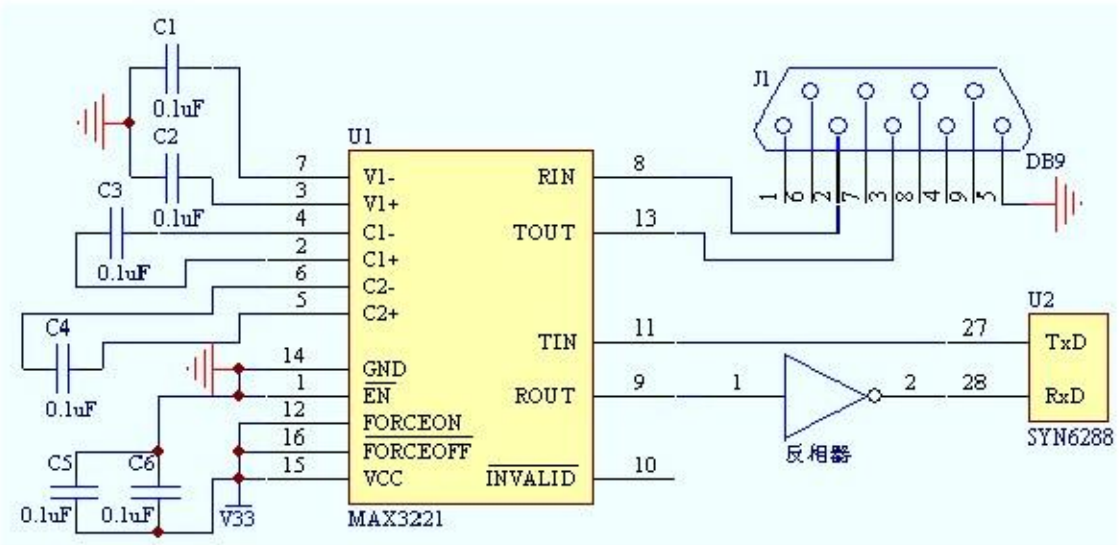
10.6 Reverse serial communication circuit

Sent to the host computer SYN6288 Serial communication data must be inverted data. PC can be selected in the following two ways an inverted:
Code inverting mode: will be sent to the host computer software programs SYN6288 Data reverse with code.
Communication circuit hardware inverted mode: send in the PC SYN6288 Before adding a hardware data inverting circuit:



10.7 Reference circuit serial communication

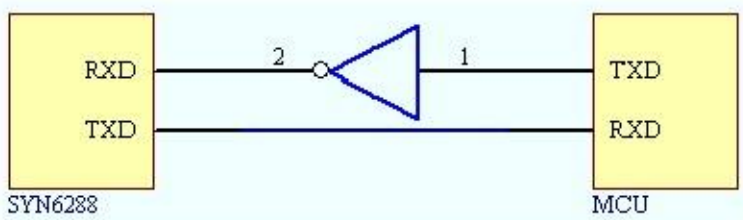
(A) PC is PC Machine reference circuit



Remark 1:SYN6288 And MAX3221 Should be added between the inverter, refer to the specific data sheet MAX3221

Remark 2: The above referenceCircuit MAX3221 Loading external power supply V33, Should 3.3V

(B) PC is 3.3V MCU Reference Circuit



Note: sending data to the host computer SYN6288 When, in the middle must have reverse, a
And shall follow the "reverse serial communication circuit" one of the instructions.

11. AttachRecord

11.1 References

"MAX3221-3-V TO 5.5-V SINGLE-CHANNEL RS-232 LINE DRIVER / RECEIVER WITH +15- kV ESD PROTECTION"
"Reverse IC" SN74LS04/D-Hex Inverter"Device User Manual"
"SNAP01-Class AB Power Amplifier Device User's Manual. "
"OSYNO 6188 Embedded speech synthesis chip - User Manual "

11.2 Version History

Version	Date	Modify records
V1.0	2010-02-22	Officially released version