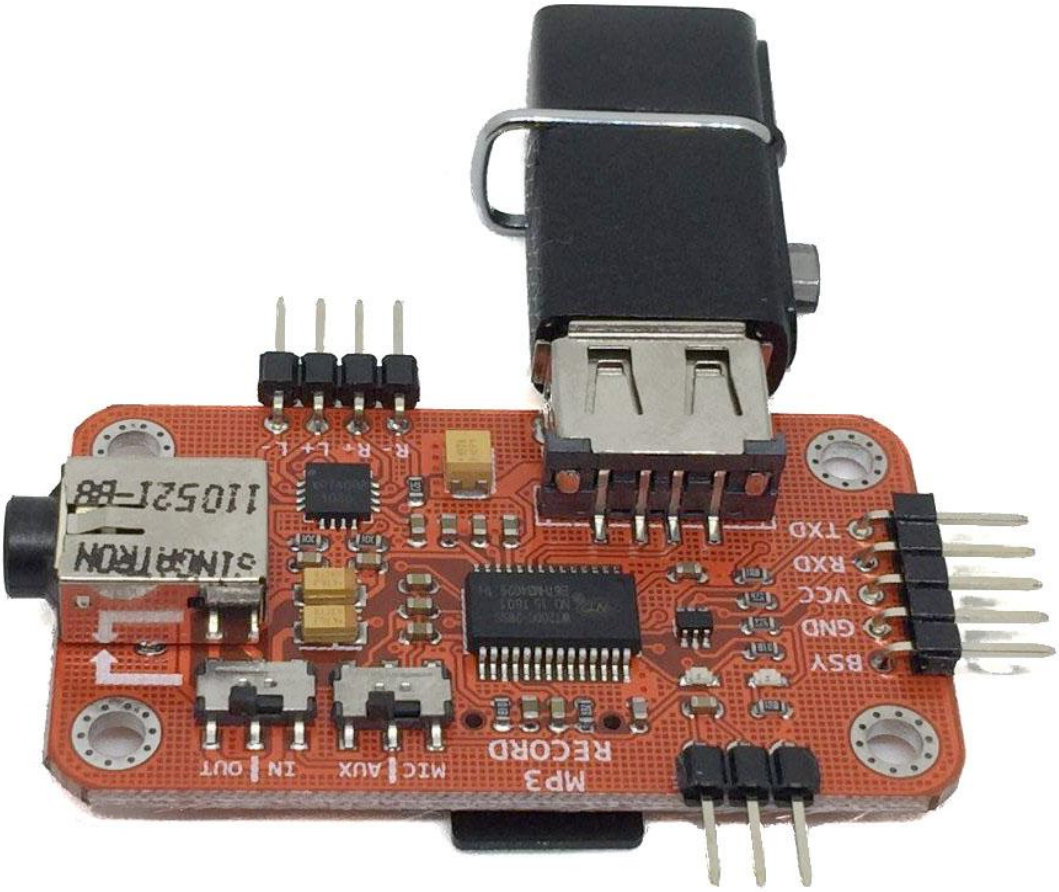
MP3 Mini User Guide
Operating Manual



Version: 1.0

Public Release Date: July. 2016

Overview

MP3 Mini is a new high-quality MP3 playing/recording module. It could play audio files in several ways. It could also record MP3 file. Recording audio file could be stored in the specified folder.
It could also delete files in the specified folder. By reading status and capacity of SD card, it could let you know the storage status at any time.
The onboard XPT4088 amplifier could drive max 8ohm&1.7W or 4ohm&2.7W speaker.

Features

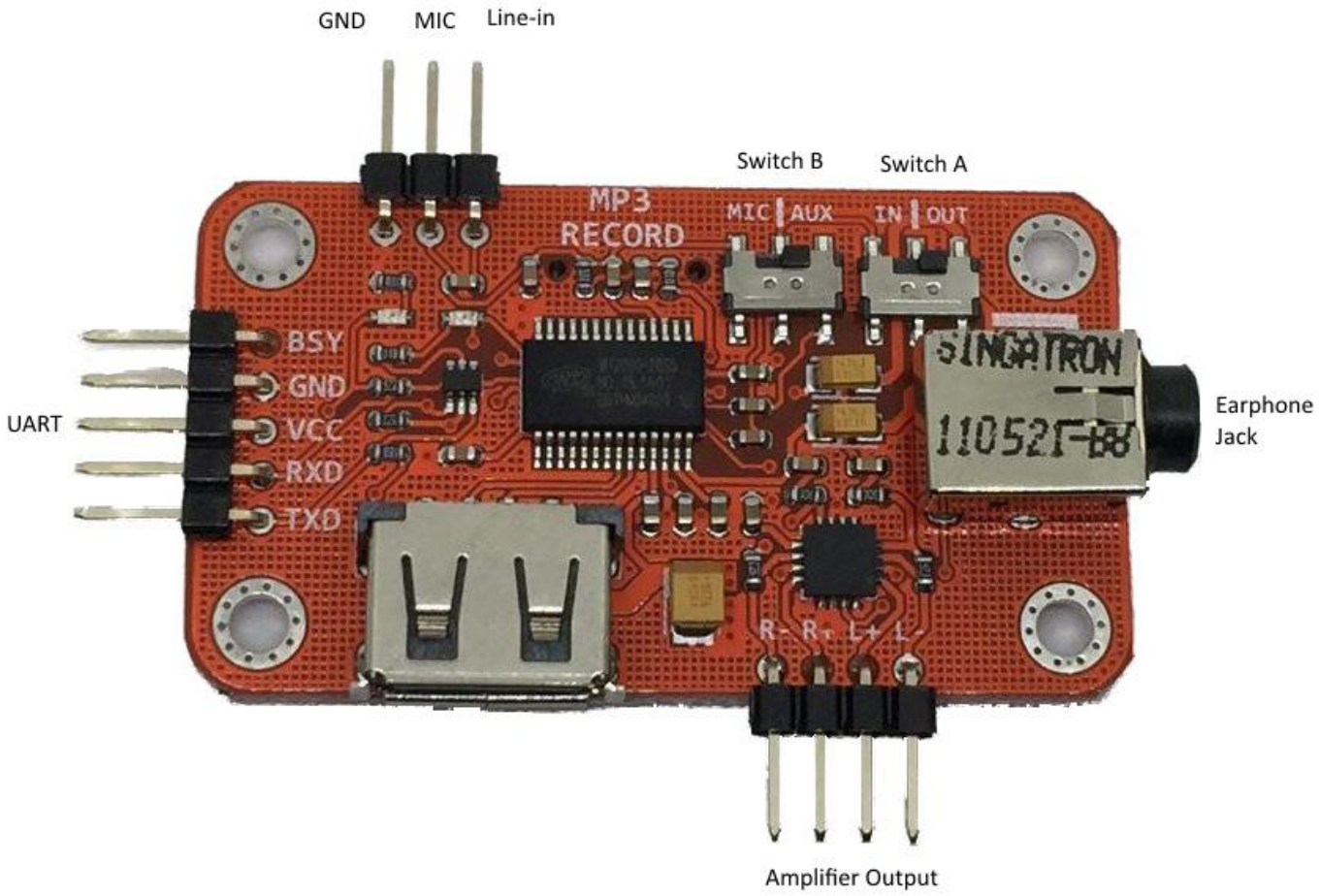
- Support WAV, WMA, MP3 audio format
- Support 48KHz sample rate, 32-128Kbps bit rate
- Use TF card and U disk as storage, maximum support 32G TF card (FAT32) and 32G U disk(FAT32)
- Support FAT and FAT32 file system
- Support UART interface communication.
- Support 8ohm&1.7W or 4ohm&2.7W speakers.
- Support 32-level volume adjust
- DC 5V power supply

Technology Specification

Name	Function
Audio Format	Support 8K-44.1K sample rate, 8-224Kbps bit rate Support 8K-44.1K sample rate WAV audio file Support 8K-44.1K sample rate WMA audio file
Store Volume	Max support 32GB TF card Max support 32GB U disk
USB Interface	Full speed 2.0
Power Supply	DC 5V
Rated Current	20~250mA(related with load)
IO Port Level	3.3V~5.5V TTL Level
Size	30mm*53mm*10.5mm(H)
Working Temperature	-40~85 degree
Humidity	5%~95%

Hardware

Interface



Pin/Interface		Connect to/with	Note
BSY		Input pin	BUSY pin, Low while playing mp3
UART Interface	VCC	DC 5V	
	GND	GND	
	RXD	TX/TXD	
	TXD	RX/RXD	
Earphone Jack	Play	Earphone	Refer to Switch A and B
	Recording	Micphone	
Amplifier Output	R-	Speaker R	No line order
	R+		
	L+	Speaker L	No line order
	L-		
USB Port		USB pen	Max 32G
SD Slot		TF card	Max 32G
Switch A			Refer to below
Switch B			

Switch A and Switch B

Switch A	Switch B	Mode
OUT		Play
IN	MIC	Recording with MIC (one line input)
	AUX	Recording with Stereo input

UART Setting

Baud rate	9600 bps
Start bit	0
Stop bit	1 bit
Data bit	8 bit
Data transmission is 8 bytes, low digit first.	

Command

There are 2 kinds of command: Setting Command or Checking Command
Setting Command: command used to change the status of the module, such as play, stop, change volume, etc.
Checking Command: command used to check the status of the module, such as current volume value, current play-track index, etc.

Setting Command

CMD Detail Annotate	Function	Input Parameter
A2	Specified file index play command	File Index
A3	Specified file name play	File Name
A4	File index play command in the specified folder	Folder name, file index
A5	Music file name play command in specified folder	Folder name, file name
AA	Play/pause command	N/C
AB	Stop command	N/C
AC	Next command	N/C
AD	Last command	N/C
AE	Volume control command	Volume level
AF	Specified play mode	Option mode

D0	Fast forward command	N/C
D1	Fast backward command	N/C
D2	External storage chooses command code	U disk or SD card
D3	Specified audio input channel and gain	Channel mode
D4	Setting record quality command	Code rate option
D5	Specified file index record command	File index
D6	Specified file name record command	File name
D7	Index record command in specified folder	Folder, index
D8	File name record command in specified folder	File name, folder
D9	Stop record command	N/C
DA	Delete specified index command	Index
DB	Delete specified file name command	File name
DC	Delete index command in specified folder	Folder, index
DD	Delete corresponding file command of file name in specified folder	Folder, file name
DE	Delete all commands	N/C

Checking Command

CMD detail annotate	Function	Return Parameter
C1	Query current setting volume	0XC1，volume value
C2	Look up current working status	0XC2，working mode
C5	Read the total number of music file in root directory of storage	0XC5，hexadecimal
C6	Read the total number of music file in specified folder of storage	0XC6，hexadecimal
C9	Look up current play file song	0XC9 hexadecimal
CA	Read status of SD card and U disk	0XCA connect status

CB	Look up certain file weather in root directory	0XCB 0x00 exist /0x01 not exist
CC	Look up certain file weather in file folder	0XCC 0x00 exist/0x01 not exist
CE	Read free space of storage	0XCE size

Control Protocol

Protocol Command Format

0X7E	See below	See below	See below	See below	0XEF

Note:
"Length": length + operation code + check code
"Operation Code": the code explained roughly above. You could get more information below.
"Check code" : Low byte of (length & operation code & parameter value). You could get more information below.

Play Audio file (File Index Number)

This command can play the audio file by the file index number.

Start bit	Length	Command	File Index (high-low)		Check Code	End Code
7E	05	A2	00	01	A8	EF

Return Code
00: OK, start playing
01: EMP, no file found

Play Audio file (File Name)

//需要做试验测试下
If the file name < 8 bytes, the code should be sent as below:

Start bit	Length	Command	File Name(High-Low)				Check Code	End Code
7E	07	A3	54 ('T')	30 ('0')	30 ('0')	32 ('2')	90	EF

54,30,30,32 is ASCLL code of "T002". The command above is to stand for specified root directory file name as "T002XXX.MP3" to play.

If file name larger than 8 bytes, like file name as "T0000000000002", the code send as below:

Start	Length	Command	File Name (High-Low)	Check	End

Code											Code	Code
7E	11	A3	54 ('T')	30 ('0')	30 ('0')	30 ('0')	30 ('0')	30 ('0')	7E	31	A7	EF

The file name consists of the top six bytes with Hex number 7E 31.
Note: if there are 2 files with the first 6 characters in their names are the same, this command could not work. Please use the file index number to play.

Return Code
00: OK, start playing
01: EMP, no file found

Play Audio File in Specific Folder

There are 2 ways to play the audio file in the folder:
1. Folder Name + File Index Number
2. Folder Name + File Name

Folder Name + File Index Number

Start Code	Length	Command	Folder Name (high-low)					File Index (high-low)		Check Code	End Code
7E	0A	A4	'M' (4D)	'U' (55)	'S' (53)	'I' (49)	'C' (43)	00	01	30	EF

Folder Name is in the form of ASCLL code. The folder should be 5 characters and be in root director. The module doesn't support multi-level folders. In the example above, the command is to play the file with index number "**0001**" in folder "**MUSIC**".

Return Code
00: OK, start playing
01: EMP, no file found

Folder Name + File Name

If the audio file name is no more than 8 bytes, the command should be in the following command:

Start Code	Length	Command	Folder Name (high-low)					File Index (high-low)				Check Code	End Code
7E	0C	A5	4D 'M'	55 'U'	53 'S'	49 'I'	43 'C'	54 'T'	30 '0'	30 '0'	32 '2'	18	EF

Audio file name and folder name are in HEX ASCLL code. The command above is to play audio file"./MUSIC/T002.mp3".

If the audio file name is larger than 8 bytes, such as T0000000000002, the code should be sent as below:

Start Code	Length	Command	File Folder Name (High-Low)				
7E	10	A5	4D ('M')	55 ('U')	53 ('S')	49 ('I')	43 ('C')

File Folder Name (High-Low)								Check Code	End Code
54 ('T')	30 ('0')	30 ('0')	30 ('0')	30 ('0')	30 ('0')	7E	31	29	EF

Audio file name: first 6 characters + "7E 31"

The command above is to play audio file"./MUSIC/T00000xxxxxxx.mp3".

Note: if there are 2 files with the first 6 characters in their names are the same, this command could not work. Please use the file index number to play.

Return Code

00: OK, start playing

01: EMP, no file found

Pause/Play Command

Start Code	Length	Command	Check Code	End Code
7E	03	AA	AD	EF

This command is used to pause/continue the audio play.

Return Code

00: OK, executed

01: Error

Stop Playing Command

Start Code	Length	Command	Check Code	End Code
7E	03	AB	AE	EF

This command is used to stop playing audio track.

Return Code

00: OK, executed

01: Error

Play Next Track

Start Code	Length	Command	Check Code	End Code
7E	03	AC	AF	EF

This command is used to play next track.

Return Code
00: OK, executed
01: Error

Play Previous Track

Start Code	Length	Command	Check Code	End Code
7E	03	AD	BO	EF

This command is used to play last track.
Return Code
00: OK, executed
01: Error

Volume Control Command

The volume is from 00 to 31 (in Hex 00~1F). 00 is mute and 31 is the loudest. (default volume is 16)

Start Code	Length	Command	Volume Level	Check Code	End Code
7E	04	AE	1F	D1	EF

The command above is to set the volume to the highest. Volume setting will be stored in EEPROM.
Return Code
00: OK, executed
01: Error

Play Mode Command

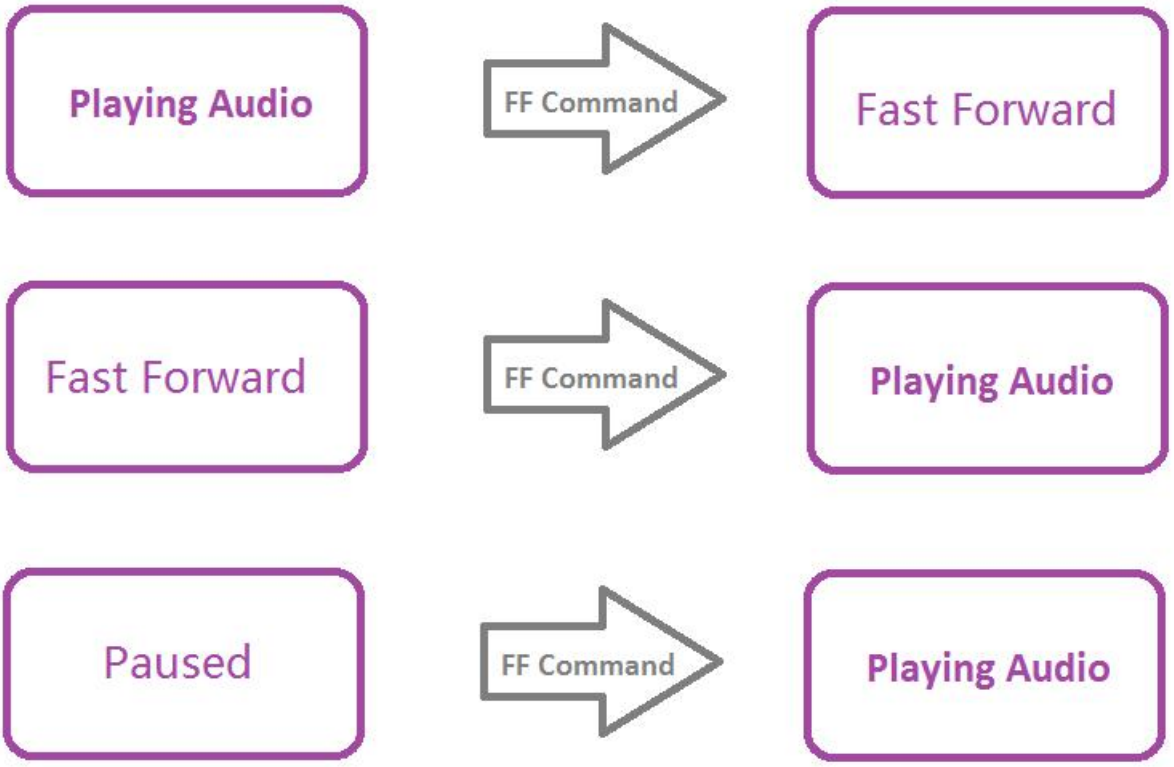
Start Code	Length	Command	Parameter	Check Code	End Code
7E	04	AF	00 ： single non-cycle play mode (default)	B3	EF
			01：single cycle play	B4	
			02：all the song cycle play	B5	
			03：random play mode	B6	

Note: this setting will be stored when powered off. Each time it restarts, it will recover to default status.
Return Code
00: OK, executed
01: Error

Fast Forward (FF) Command

Start Code	Length	Command	Check Code	End Code
7E	03	D0	D3	EF

This command starts FF if the module is in normal play status. And Sending it again will bring it back to normal play status. If the audio play is paused. Sending this command will make it play first.



Return Code

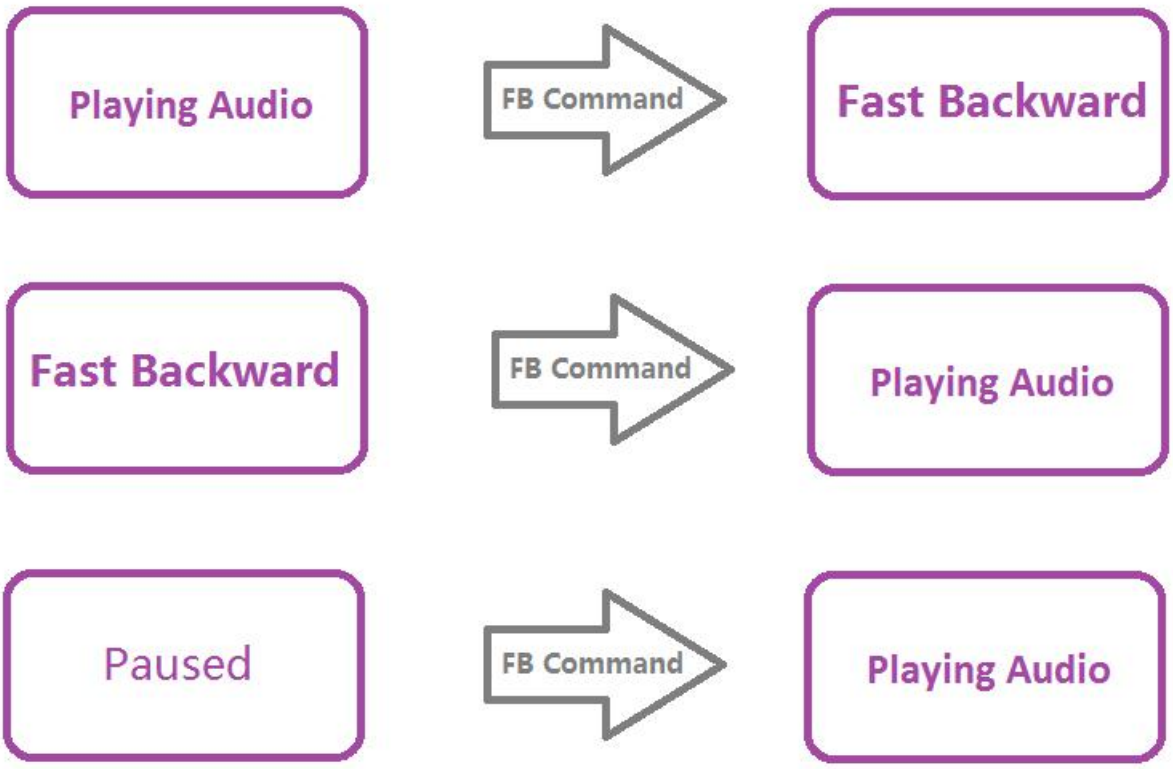
00: OK, executed

01: Error

Fast Backward (FB) Command

Start Code	Length	Command	Check Code	End Code
7E	03	D1	D4	EF

This command starts FB if the module is in normal play status. And Sending it again will bring it back to normal play status. If the audio play is paused. Sending this command will make it play



first.

Return Code

00: OK, executed

01: Error

Choose Media Command

As this module supports SD card and U disk, we need to specify the storage media to operate. If SD card and USB disk are both plugged in, by default SD card is effective. If only one storage media was plugged in, current storage media is available.

Start Code	Length	Command	Parameter	Check Code	End Code
7E	04	D2	00：SD Card (default)	D6	EF
			01：U Disk	D7	

If you send this command to change the effective media, it is better to check current media information to make sure the changing works.

Return Code

00: OK, executed

01: Error

Record Operation Command

Recording source and gain setting

There are 2 options for the recording source: MIC or AUX. This command also sets inner gain value.

Start Code	Length	Command	Parameter	Check Code	End Code
7E	04	D3	00: MIC recording with gain 10DB (default)	D7	EF
			01: External LINE-IN signal input with gain 3DB	D8	
			02: External Dual-channel AUX (AUX_L and AUX_R) signal input with gain 3DB (stereo input)	D9	

Return Code
00: OK, executed
01: Error

Setting Record Quality Command

This command could set different record MP3 code rate.

Start Code	Length	Command	Parameter	Check Code	End Code
7E	04	D4	00: 128KPBS(default)	D8	EF
			01: 96KPBS	D9	
			02: 64KPBS	DA	
			03: 32KPBS	DB	

Return Code
00: OK, executed
01: Error

File Index Number Recording

This command sets the file index number. And this command also automatic produces recording file name (file name is five bytes).

Start Code	Length	Command	File Index		Check Code	End Code
7E	05	D5	00	02	DC	EF

00,02 means the 2nd recording file. If this file exists (same file index number) , overwrite.
Return Code
00: OK, executed
01: No enough space
02: Error
Note: according to the file index number, by default the file name is REXXX.MP3. (XXX: 001~999)

File Name Recording

The command specifies the name of recording file in root directory of specified storage. (file name max 22 bytes)

Start Code	Length	Command	File name				Check Code	End Code
7E	07	D6	54 ('T')	30 ('0')	30 ('0')	32 ('2')	C3	EF

HEX 54, 30, 30, 32 are "T002" in ASCLL format. The command above would produce a file with name "T002.MP3" in specified root directory.

Return Code

00: OK, executed
01: No enough space
02: Error

Note: long file name only matches with the first six bytes. If the first bytes are the same, it will delete the file first and record again.

Folder Name + Index Number Recording

This command specifies the recording file index number in the specified directory (file folder name is five bytes).

Start Code	Length	Command	Folder name (high-low)					File Index (high-low)		Check Code	End Code
7E	0A	D7	4D('M')	55('U')	53('S')	49('I')	43('C')	00	02	64	EF

"02" means the 2nd audio in folder "MUSIC". The command above means producing the 2nd recording file in the folder "MUSIC". If the folder "MUSIC" doesn't exist, this command generates one.

Return Code

00: OK, executed
01: No enough space
02: Error

Note: according to the file index number, by default the file name is REXXX.MP3. (XXX: 001~999)

File Name + Folder Name Recording

This command can specify both file name and folder name (Folder is five bytes, and file name is max 22 bytes).

Start Code	Length	Command	Folder Name (high-low)					File Name (high-low)				Check Code	End Code
7E	0C	D8	4D('M')	55('U')	53('S')	49('I')	43('C')	54 ('T')	30 ('0')	30 ('0')	32 ('2')	4B	EF

HEX 54, 30, 30, 32 are "T002" in ASCLL. The command above produce file :"/MUSIC/T002.mp3" and starts

recording.

Return Code
00: OK, executed
01: No enough space
02: Error

Note: long file name only matches with the first six bytes. If the first bytes are the same, it will delete the file first and record again.

Stop Recording Command

Start Code	Length	Command	Check Code	End Code
7E	03	D9	DC	EF

This command stops recording.
Return Code
00: OK, executed
01: Error

Delete File (File Index Number)

This command deletes the file with the specified index number in root directory

Start Code	Length	Command	File Index (high-low)		Check Code	End Code
7E	05	DA	00	02	E1	EF

“00,02” means the second file. The command above deletes the second file in root directory.
Return Code
00: OK, executed
01: Error

Delete File (File Name)

This command deletes the file with specified name in root directory (file name max 8 byte)

Start Code	Length	Command	File name (high-low)				Check Code	End Code
7E	07	DB	54 (‘T’)	30 (‘0’)	30 (‘0’)	32 (‘2’)	C8	EF

HEX “54, 30, 30 and 32” are “T002” in ASCLL code. The command command above means deleting the file “T002.MP3” in root directory.
Return Code
00: OK, executed
01: Error

Delete File (File Index number + Folder Name)

This command can delete the file with corresponding index number in the specified directory (file folder name is in five bytes)

Start Code	Length	Command	Folder Name (high-low)					File Index (high-low)		Check Code	End Code
7E	0A	DC	'M'(4D)	'U'(55)	'S'(53)	'I' (49)	'C'(43)	00	02	69	EF

Folder name exists in the form of ASCLL code. The command above delete the file with index serial number "0002" in the folder "MUSIC".

Return Code

00: OK, executed

01: Error

Delete File (File Name + Folder Name)

Folder name is in fixed five bytes.

Start Code	Length	Command	Folder Name (high-low)					File Name(high-low)				Check Code	End Code
7E	0C	DD	4D 'M'	55 'U'	53 'S'	49 'I'	43 'C'	54 'T'	30 '0'	30 '0'	32 '2'	50	EF

The command above means deleting the file "T002.MP3" in the folder "MUSIC" which is under the root directory.

Return Code

00: OK, executed

01: Error

Delete All Files

Start Code	Length	Command	Check Code	End Code
7E	03	DE	E1	EF

The command is to delete all audio file in storage.

Return Code

00: OK, executed

01: Error

Checking Command

Check Current Volume

Start Code	Length	Command	Check Code	End Code
7E	03	C1	C4	EF

Return Format

Operation Code	Return Value
0XC1	Volume Value(00-1F)

Check Current Working State

Start Code	Length	Command	Check Code	End Code
7E	03	C2	C5	EF

Return Format

Operation Code	Return Value
0XC2	01：Play 02 : Stop 03: Pause 04: Record 05: Fast forward/backward

Check Music File Quantity in Storage

Start Code	Length	Command	Check Code	End Code
7E	03	C5	C8	EF

Return Format

Operation Code	Return Value
0XC5	File Quantity (16bits)

//

Note: It is suggested to use A0 play command to renew cache file amount b, it will better to read the newest amount.

//

Check Music File Quantity in Specified Folder in the Storage

Start Code	Length	Command	Folder Name (high-low)					Check Code	End Code
7E	08	C6	'M' (4D)	'U' (55)	'S' (53)	'I' (49)	'C' (43)	4F	EF

Return Format

Operation Code	Return Value
0XC6	File Amount (16 bits)

//

Note: It is suggested to use A0 play command to renew cache file amount b, it will better to read the newest amount.

//

Check the Index Number of Currently Playing Audio File

Start Code	Length	Command	Check Code	End Code
7E	03	C9	CC	EF

Return Format

Operation Code	Return Value
0XC9	XX

Read SD Card and U disk Connection State (CA)

Start Code	Length	Command	Check Code	End Code
7E	03	CA	CD	EF

Operation Code	Return Value
0XCA	XX

Return Format

When SD card or U disk is inserted in or pulled out, WT2000 will return data automatically.
Return Value:

- 00: SD card and U disk in
- 01: SD card in, U disk out
- 02: SD card out, U disk in
- 03: SD card or U disk out

Check if File Exists in Root Directory

Start Code	Length	Command	File Name (high-low)	Check Code	End Code

7E	07	CB	54 ‘T’	30 (‘0’)	30 (‘0’)	32 (‘2’)	B8	EF

Return Code:

- 00: exist
- 01: no such file

Note: suggest use A0 play command to renew cache file amount, it will better to read the newest amount.

Check if File Exists in Folder

Start Code	Length	Command	Folder Name (high-low)					File Name (high-low)				Check Code	End Code
7E	0C	CC	‘M’ (4D)	‘U’ (55)	‘S’ (53)	‘I’ (49)	‘C’ (43)	54 (‘T’)	30 (‘0’)	30 (‘0’)	32 (‘2’)	3F	EF

Return Code:

- 00: exist
- 01: no such file

Note: suggest use A0 play command to renew cache file amount, it will better to read the newest amount.

Read Free Space Amount in Storage

Start Code	Length	Command	Check Code	End Code
7E	03	CE	D1	EF

Return Format

Operation Code	Return Value
0XCE	XXXX Free Volume (M)

Note: suggest use A0 play command to renew cache file amount, it will better to read the newest amount.

Note:

1. During recording, if storage is full, it will stop record automatically and return 01 00.
2. When deleting audio file, do not cut the power or pull out the media storage. Otherwise, it will damage the data.
3. Time interval of the command bytes must be larger than 100ms.
4. When recording ends, the module will return codes. Sometimes it would take long for the module to return the codes, depending on the speed of the media storage.

Product Link

USB/TF MP3 Play and Recording Mini Module