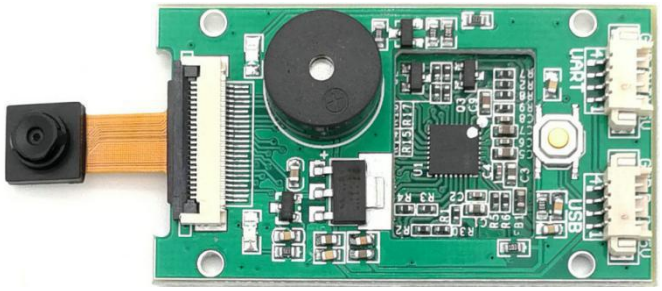
GM63 Bar Code Reader Module
User Manual



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Catalog

1 Introduction of Module

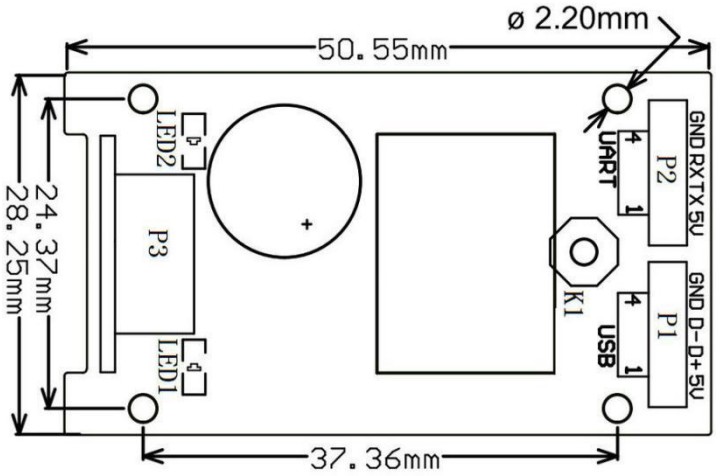
1.1 Introduction

GM63 Bar code reader module is a high integration and high performance scanner, mainly used to read payment codes. The bar code and QR code formats that can be recognized are **Code128, Code39 and QR code.**

1.2 Operating parameter

Parameter	Performance
Interface	TTL-232/USB
Voltage	DC+5V±5%
Operating Current	<170mA
Light	Red light / Blue light
Readable code	**QR code Code128 Code39**
Scan Angle	Roll: 360°, Yaw: 40°, Pitch: 45°
Resolution	640（Inclination）x 480（Elevation）
Scanning angle	57°（Inclination）, 57°（Elevation）
Weight	About 15g
Operating Temperature	-20°C - 60°C
Relative Humidity	5%- 95% (Non-Condensing)

1.3 Circuit board Interface



1.4 Interface definition

UART P2 interface definition:

Pin	Name	Definition	Description
1	5V	Power Input	Power Input
2	TX	Data Output	TTL3.3V logical level
3	RX	Data Input	TTL 3.3V logical level
4	GND	Power Input	Signal ground. Connected to power ground

Interface note:

a) Baud rate 9600bps; 8 bit data; 1 bit stop bit; No check.

b) If the upper computer is MCU (3.3v), it is directly connected to TX and RX. If the upper computer is PC, the RS232 level conversion chip needs to be hooked up.

USB P1 interface definition:

Pin	Name	Definition	Description
1	5V	Power Input	Power Input DC5V
2	D+	Data Output	USB
3	D-	Data Input	USB
4	GND	Power Input	Signal ground. Connected to power ground

2 Set Up GM63

2.1 Serial Port Instruction

Users can settle the module by sending instruction from mainframe.

Please make sure communicate parameter complete matching between module and mainframe.

Module default serial communicate parameter: **Baud rate 9600bps; No check; 8 bit data; 1 bit stop bit; No flow control.**

2.1.1 Read Zone Bit

Max 256 bytes/time for zone bit reading.

Command Format:

Input: {Head1} {Types} {Lens} {Address} {Datas} {CRC}

PS: Head1: 0x7E 0x00（2 bytes）

Types: 0x07（1 byte）

Lens: 0x01（1 byte）

Address : 0x0000~0x00FF（2 bytes）, address to start reading zone bit

Datas: 0x00~0xFF（1 byte）, Numbers of zone bit for Sequential read, 0x00= 256byets

CRC: CRC_CCITT check value (2 bytes). Suitable for Types、Lens、Address、Datas;

Characteristic polynomial : X16+X12+X5+1, multinomial coefficient: 0x1021, original value:0 ;

For single byte, the highest bit will be calculated at first, output will be without negation.

The reference code of C is as follows:

```
unsigned int crc_cal_by_bit(unsigned char* ptr, unsigned int len)
{
unsigned int crc = 0;
while(len-- != 0)
{
for(unsigned char i = 0x80; i != 0; i /= 2)
{
crc *= 2;
if((crc&0x10000) !=0) //Last CRC * 2 ， if the first one is 1， so divide 0x11021
crc ^= 0x11021;
if((*ptr&i) != 0) //If the standard is 1， so CRC = last CRC + standard CRC_CCITT
crc ^= 0x1021;
```

```
}
ptr++;
}
return crc;
}
```

Note: users can fill 0xAB 0xCD at CRC byte when CRC validation is not required.

Output: {Head2} {Types} {Lens} {Datas} {CRC}

1) Read successfully and return data

PS: Head2: 0x02 0x00

Types: 0x00（read succeed）

Lens: numbers of upload bytes; 0x00= 256bytes

Datas: 0x00~0xFF means read data.

CRC: CRC_CCITT check value. Suitable for Types、Lens、Datas;

Characteristic polynomial : X16+X12+X5+1, multinomial coefficient: 0x1021, original value:0 ;

For single byte, the highest bit will be calculated at first, output will be without negation.

(The reference code is the same as above)

2) CRC failed

No response command

3) Unknown command response

No response command

E.G.:

Read address 0x000A of Zone bit

1) Read successfully and return data is 0x3E.

Input: 0x7E 0x00 0x07 0x01 0x00 0x0A 0x01 0xEE 0x8A

Output: 0x02 0x00 0x00 0x01 0x3E 0xE4 0xAC

2) CRC wrong

Input: 0x7E 0x00 0x07 0x01 0x00 0x0A 0x01 0x11 0x22

Output : None

3) When length of command to short or more than 400ms after 0x7e 0x00, treat as unknown command.

Input: 0x7E 0x00 0x07 0x01 0x00 0x0A 0x01

Output: None

2.1.2 Write Zone Bit

Max 256 bytes/time for zone bit reading.

The modified content of the zone bit will be lost after power failure. If the modified content is needed after power loss,You need to save the zone bit to internal Flash(2.1.3).

Command Format:

Input: {Head1} {Types} {Lens} {Address} {Datas} {CRC}

PS: Head1: 0x7E 0x00（2 bytes）

Types: 0x08（1 byte）

Lens: 0x00~0xFF（1 byte）, means numbers of bytes of this datas, times of continuous writing. 0x00 means 256bytes

Address: 0x0000~0xFFFF（2 bytes）, start location of write

Datas: 0x00~0xFF （1~256 bytes）, dates wrote in zone bit. When configuring multiple zone bit,must follow the order of address from low to high to fill the data domains.

CRC: CRC_CCITT check value (2 bytes). Suitable for Types、Lens、Address、Datas;

Characteristic polynomial : X16+X12+X5+1, multinomial coefficient: 0x1021, original value:0 ;

For single byte, the highest bit will be calculated at first, output will be without negation.

The reference code of C is as follows:

```
unsigned int crc  cal  by  bit(unsigned char* ptr, unsigned int len)
{
unsigned int crc = 0;
while(len-- != 0)
{
for(unsigned char i = 0x80; i != 0; i /= 2)
{
crc *= 2;
if((crc&0x10000) !=0) //Last CRC *  2 ，if the first one is 1，so divide  0x11021
crc ^= 0x11021;
if((*ptr&i) != 0) //If the standard is 1，so CRC =    last CRC + standard CRC_CCITT
crc ^= 0x1021;
}
ptr++;
}
return crc;
}
```

Note: users can fill 0xAB 0xCD at CRC byte when CRC validation is not required.

Output: {Head2} {Types} {Lens} {Datas} {CRC}

1) Read successfully

PS: Head2：0x02 0x00

Types：0x00（read succeed）

Lens：0x01

Datas：0x00

CRC：CRC_CCITT check value（0x33 0x31）

2) CRC failed

No response command

3) Unknown command response

No response command

E.G.:

Write 0x3E in 0x000A of zone bit

1) Successfully set

Input ：0x7E 0x00 0x08 0x01 0x00 0x0A 0x3E 0x4C 0xCF

Output：0x02 0x00 0x00 0x01 0x00 0x33 0x31

2) CRC wrong

Input：0x7E 0x00 0x08 0x01 0x00 0x0A 0x3E 0x11 0x22

Output：None

3) When length of command to short or more than 400ms after 0x7e 0x00, treat as unknown command.

Input: 0x7E 0x00 0x08 0x01 0x00 0x0A 0x3E

Output: None

2.1.3 Save Zone Bit To Internal Flash Instruction

To save the device of the zone bit list to internal Flash,you need to send a save command.

Note: the device cannot save a single zone bit configuration separately, and must keep the entire list at the same time.

Command Format:

Input: {Head1} {Types} {Lens} {Address} {Datas} {CRC}

PS: Head1: 0x7E 0x00

Types: 0x09

Lens: 0x01

Address: 0x0000

Datas: 0x00

CRC: CRC_CCITT check value（0xDE 0xC8）

Output: {Head2} {Types} {Lens} {Datas} {CRC}

1) Saved successful

PS: Head2：0x02 0x00

Types：0x00（read succeed）

Lens：0x01

Datas：0x00

CRC：CRC_CCITT check value（0x33 0x31）

2) CRC failed

No response command

3) Unknown command response

No response command

2.1.4 Zone Bit Reset To Defaults

Command Format:

Input: {Head1} {Types} {Lens} {Address} {Datas} {CRC}

PS: Head1: 0x7E 0x00

Types: 0x09

Lens: 0x01

Address: 0x0000

Datas: 0xFF

CRC: CRC_CCITT check value

Output: {Head2} {Types} {Lens} {Datas} {CRC}

1) Saved successful

PS: Head2：0x02 0x00

Types：0x00（read succeed）

Lens：0x01

Datas：0x00

CRC：CRC_CCITT check value（0x33 0x31）

2) CRC failed

No response command

3) Unknown command response

No response command

2.1.5 Program Erasure Operation

Command Format:

Input: {Head1} {Types} {Lens} { NotUse } {Datas} {CRC}

PS: Head1: 0x7E 0x00（2 bytes）

Types: 0x05（1 byte）

Lens: 0x01（1 byte）Numbers of Datas for Sequential read, 0x00= 256byets

NotUse: 0x0000（2 bytes）, 2 bytes 0x00

Datas: 0x22（1 bytes）, represents the data to be written; 0x22:erase the user program,when the user upgrades the code, use 0x22.

CRC: CRC_CCITT check value (2 bytes). Suitable for Types、Lens、NotUse、Datas;

Characteristic polynomial : X16+X12+X5+1, multinomial coefficient: 0x1021, original value:0 ;

For single byte, the highest bit will be calculated at first, output will be without negation.

The reference code of C is as follows:

```
unsigned int crc_cal_by_bit(unsigned char* ptr, unsigned int len)
{
unsigned int crc = 0;
while(len-- != 0)
{
for(unsigned char i = 0x80; i != 0; i /= 2)
{
crc *= 2;
if((crc&0x10000) !=0) //Last CRC * 2 ， if the first one is 1，so divide 0x11021
crc ^= 0x11021;
if((*ptr&i) != 0) //If the standard is 1，so CRC = last CRC + standard CRC_CCITT
crc ^= 0x1021;
}
ptr++;
}
return crc;
}
```

Note: users can fill 0xAB 0xCD at CRC byte when CRC validation is not required.

Output: {Head2} {Types} {Lens} {Datas} {CRC}

1) Erased successful

PS: Head2：0x02 0x00

Types：0x00（read succeed）

Lens：0x01

Datas：0x00

CRC：CRC_CCITT check value（0x33 0x31）

2) CRC failed

No response command

3) Unknown command response

No response command

E.G.:

After erasure the user program, the device will automatically enter the boot program and wait for the download of the new user program

4) Erased successful

Input ：0x7E 0x00 0x05 0x01 0x00 0x00 0x22 xx xx

Output：0x02 0x00 0x00 0x01 0x00 0x33 0x31

5) CRC wrong

Input：0x7E 0x00 0x05 0x01 0x00 0x00 0x22 xx xx

Output：None

6) When length of command to short or more than 400ms after 0x7e 0x00, treat as unknown command.

Input: 0x7E 0x00 0x05 0x01 0x00 0x00 0x22

Output: None

2.1.6 List of zone bit

Zone Bit	0x0000
Data Bit	Function
Bit 7	1：Open LED when successfully read 0：Close
Bit 6	1：Mute off 0：Mute on

Bit 5-4	00：No aim 01：Standard 10/11：always on
Bit 3-2	00：No light 01：Standard 10/11：Always on
Bit 1-0	01：Continuous mode
Zone Bit	0x0002
Data Bit	Function
Bit 7-1	Keep
Bit 0	Keep
Zone Bit	0x0003
Data Bit	Function
Bit 7-2	Keep
Bit 1	1：Close Settlement Code 0：Open
Bit0	1：Output content of settlement code 0：Not output
Zone Bit	0x0005
Data Bit	Function
Bit 7-0	Read interval 0x00：No interval 0x01-0xFF：0.0-25.5s
Zone Bit	0x0006
Data Bit	Function
Bit 7-0	Time for single read 0x00：Infinite 0x01-0xFF：0.0-25.5s
Zone Bit	0x0007
Data Bit	Function
Bit 7-0	Keep
Zone Bit	0x0008
Data Bit	Function
Bit 7-0	Keep
Zone Bit	0x0009
Data Bit	Function
Bit7-0	Keep
Zone Bit	0x000B
Data Bit	Function
Bit 7-0	Time duration for successfully read sound 0x00-0xFF；0-255ms
Zone Bit	0x000C
Data Bit	Function
Bit 7-1	Keep
Bit0	Piezo Buzzer 0：high level when free, low level when busy 1：low level when free, high level when busy
Zone Bit	0x000D
Bit7-2	Keep

Bit1-0	00：serial port output 01：USB PC Keyboard 10：Keep 11：Keep
Zone Bit	0x000E
Data Bit	Function
Bit 7-4	Keep
Bit3	Keep
Bit2	1：Decode successfully sound on 0：Decode successfully sound off
Bit1	1：Turn off start-up tone 0：Turn on start-up tone
Bit0	Keep
Zone Bit	0x0011
Data Bit	Function
Bit 7-0	Exposure Settings - high bytes 0x00-0xFF
Zone Bit	0x0012
Data Bit	Function
Bit 7-0	Exposure Settings - low bytes 0x00-0xFF
Zone Bit	0x0013
Data Bit	Function
Bit 7	Same barcode reading delay setting 0：Turn off 1：Turn on
Bit 6-0	Same barcode reading delay time（Unit：100ms） 0x00：Infinite length 0x01-0x7F：0.1-12.7s；
Zone Bit	0x0014
Data Bit	Function
Bit 7-0	Keep
Zone Bit	0x002B，0x002A
Data Bit	Function
Bit 15	Keep
Bit 14-13	Parity Mode： 0：None 1：Odd 2：Even
Bit 12-0	0x09C4：Series rate 1200 bps 0x0271：Series rate 4800 bps 0x0139：Series rate 9600 bps 0x00D0：Series rate14400 bps 0x009C：Series rate19200 bps 0x004E：Series rate 38400 bps 0x0034：Series rate 57600 bps 0x001A：Series rate 115200bps E.G.：9600 Baud rate：0x002A = 0x39 ， 0x002B = 0x01
Zone Bit	0x002C
Data Bit	Function
Bit 7-4	Keep

Bit3	Keep
Bit 2-1	Bar code switch 00：forbid reading all bar code 01：all bar code can be read; 10/11：Default
Bit 0	Keep
Zone Bit	0x002D
Data Bit	Function
Bit 7-0	Keep
Zone Bit	0x0033
Data Bit	Function
Bit 7-1	Keep
Bit0	Read Code128 0：Forbid 1：Allow
Zone Bit	0x0034
Data Bit	Function
Bit 7-0	Keep
Zone Bit	0x0035
Data Bit	Function
Bit 7-0	Keep
Zone Bit	0x0036
Data Bit	Function
Bit 7-1	Keep
Bit0	Read Code39 0：Forbid 1：Allow
Zone Bit	0x0037
Data Bit	Function
Bit 7-0	Keep
Zone Bit	0x0038
Data Bit	Function
Bit 7-0	Keep
Zone Bit	0x003F
Data Bit	Function
Bit 7-1	Keep
Bit0	Read QR 0：forbid 1：allow
Zone Bit	0x0060
Data Bit	Function
Bit 7	Serial/virtual serial output with or without protocol 0：Original data 1：With protocol
Bit6-5	Type of Tailed 00：CR(0x0D) 01：CRLF(0x0D,0x0A)

	10：TAB(0x09)　　11：None
Bit4-1	Keep
Bit0	1：Allow add tail　　0：Forbid
Zone Bit	0x0081
Data Bit	Function
Bit 7-4	Keep
Bit3-0	Keep
Zone Bit	0x0082– 0x0090
Data Bit	Function
Bit 7-0	Keep
Zone Bit	0x0091 – 0x00A4
Data Bit	Function
Bit 7-0	Keep
Zone Bit	0x00D9（Only write Zone bit）
Data Bit	Function
Bit 7-0	Function Zone bit 0x55：Reset to defaults
Zone Bit	0x00E0 （Only read Zone bit）
Data Bit	Function
Bit 7-0	Product model
Zone Bit	0x00E1（Only read Zone bit）
Data Bit	Function
Bit 7-0	Hardware Version 0x64：V1.00 0x6E：V1.10 0x78：V1.20 0x82：V1.30 0x8C：V1.40 .....
Zone Bit	0x00E2 （Only read Zone bit）
Data Bit	Function
Bit 7-0	Software Version 0x64：V1.00 0x6E：V1.10 0x78：V1.20 0x82：V1.30 0x8C：V1.40 .....
Zone Bit	0x00E3 （Only read Zone bit）
Data Bit	Function
	Year of software (Add 2000) 0x0F：2015

Bit 7-0	0x10：2016 0x11：2017 .....
Zone Bit	0x00E4（Only read Zone bit）
Data Bit	Function
Bit 7-0	Software month 0x09：9 月 0x0A：10 月 0x0B：11 月 .....
Zone Bit	0x00E5（Only read Zone bit）
Data Bit	Function
Bit 7-0	Software date 0x09：9 号 0x0A：10 号 0x0B：11 号 .....

2.2 Setup Code

Customer can set module by scan setup code.

Note: the entire list of current zone bit is saved to Flash while the configuration is modified through the setup code, that is, the configuration that is configured through the serial port but not saved will also be saved together.

Default: setup code on

Off

Output the setup code content

Default: Not output

Output

2.3 Reset

Back to Factory Setting by scan follow code.

Reset

3 Communication interface

GM63 can receive database, control module and set functional parameter by TTL - 232.

3.1 Series Communication Interface

It's default and common to connect module and mainframe(such as PC, POS) by series communication interface. Make sure communication parameter for module and mainframe are same, then it will communicate smooth and correctly.

Series Output

TTL-232 is used for series interface which suitable for most system. Required change-over circuit for RS-232.

Default Parameter as Form 3-1. Only Baud Rate can be changed.

Form 3-1 Default Parameters

Parameters	Default
Series communication interface	Standard TTL-232
Baud rate	9600
Verification	N
Data bit	8
Stop bit	1
CTSRTS	N

Baud Rate Settlement

1200bps **4800bps** ***9600bps**

14400bps

19200bps

38400bps

57600bps

115200bps

3.1.1 Serial Port Check Bit Configuration

Modify the parity bit of the serial port by scanning the following configuration code.

***NONE**

ODD

EVEN

3.1.2 Serial Port and Full Code Open Shortcut Configuration

Serial Port and Full Code Open Shortcut

3.2 USB HID Interface

Scan the following code to become HID device when module connects PC by USB.

***USB HID device**

3.2.1 HID Parameter Configuration

Scan the following code to modify the PC access cycle for HID devices.

***1ms**

3ms

5ms

10ms

4 Read Mode

4.1 Continuous Mode

On this mode, reading module read code continuous and automatic.

Break after reading one code, break time is changeable.

Click the toggle key to pause. Then click to continuous cyclic read code.

***Continuous Mode**

Time settlement for single read

The longest time before first successful reading. After this time, module will be into no read time.

Single Read time: 0.1~25.5 s, step-size: 0.1s;

0 means infinite time.

Default time: Infinite.

1000ms

3000ms

5000ms

***Infinite**

Break time settlement

Time between two read. Can be settled from 0 to 25.5 s, step-size: 0.1s; default 1.0s

No break

500ms

***1000ms**

1500ms

2000ms

Same barcode reading delay

The same barcode reading delay refers to that after the module reads the same bar code, it will be compared with the last reading time,when the interval is longer than the reading delay, the same barcode is allowed to be read, otherwise the output is not allowed.

Same barcode reading delay

***Same bar code reading without delay**

Same barcode reading delay time

When the same barcode reading delay is enabled,scan the following code to set same barcode reading delay time.

Infinite delay

500ms

1000ms

3000ms

5000m

5 Lighting and Collimate

5.1 Lighting

Head lamp is used to additional lighting when read.

Normal: Head lamp will be on when read, others off.

Normally on(default): always on after boot.

OFF: head lamp is always off

Normal

***Normally on**

Off

5.2 Collimation

There will be a pointing light beam which can help user to find best distance.

Normal: pointing light beam shows when read

Normally on: pointing light beam shows after power on until power off

No Collimation(default): no pointing light beam

Normal

Normally on

***No Collimation**

6 Prompts

6.1 Prompts Tone

Read "buzzer drive frequency", the buzzer can be set to active/passive buzzer, the drive frequency of the passive buzzer can also be set.

Buzzer drive frequency-passive low frequency

***Buzzer drive frequency-passive medium frequency**

Buzzer drive frequency-passive high frequency

Buzzer drive frequency - active drive

In the active buzzer mode, scan "Buzzer working level - high" can be set to low level when free, high level when busy; scan "Buzzer working level - low" can be set to high level when free, low level when busy.

***Buzzer working level - high**

Buzzer working level - low

Scan “Open Start-up tone” can open start-up tone. Scan “Close Start-up tone” can close start-up tone.

***Open Start-up tone**

Close Start-up tone

Silence：Close all prompt tones

Silence on

***Silence off**

6.2 Read code successfully tone

***Read code successfully tone ON**

Read code successfully tone OFF

Prompts Tone Duration.Default: 60ms

30ms

***60ms**

90ms

120ms

7 Data Edition

7.1 Tail

Open this function to help system quickly distinguish current decoding results.

Scan “Add tail” to open this function, if read success, there will be tail on the end of decode data.

Close tail

***Add tail "CR"**

Add tail "TAB"

Add tail "CRLF"

7.2 Output Protocol

Scan the following code to modify the output format of the decoding results in serial/virtual serial mode.

The format output with protocol is as follows: <04><length><decoded data >< tail><CRC check >.

CRC verifies the previous data and stores it as ASC code, accounting for 4Byte.

***Pure data**

With protocol

8 Bar code type enables/disable configuration

8.1 All types of bar code can be decoded

After scan “Forbid read all bar code”, module will only support to scan setup code.

Support all

Forbid read all bar code

***Open default support types**

8.2 Sport Enhanced Mode

The reading effect of QR code on mobile phone screen will be greatly improved, but the reading ability of bar code on other media will be significantly reduced.

***Forbid to enhanced**

Enhanced

8.3 Code128

***Allow reading Code128**

Forbid reading Code128

8.4 Code39

***Allow reading Code39**

Forbid reading Code39

8.5 QR

***Allow reading QR**

Forbid reading QR

9 Appendix A：Default Setting Table

Parameter	Default setting	Note
Interface	USB HID Interface	Scanning interval 1ms
Read mode	Continuous Mode	Single read: infinite Break time: 1s Same barcode reading delay: Without delay
Lighting and Collimate	Lighting:Always on Collimate:No Collimation	Collimate into success indicator light
Prompt	Open	
Read code successfully tone	Open	Duration:60ms
Tail	CR	
Output Protocol	Close	
All types of bar code can be decoded	Open	QR Code128 Code39
Sport Enhanced	Close	

10 Appendix B：Common serial port instruction

Function	Instruction
Baud rate to 9600	7E 00 08 02 00 2A 39 01 A7 EA
Save settlements to Internal Flash	7E 00 09 01 00 00 00 DE C8
Find baud rate	7E 00 07 01 00 2A 02 D8 0F

Module will return following info after mainframe send serial port instruction - find baud rate

Return information	Baud rate
02 00 00 02 C4 09 SS SS	1200
02 00 00 02 71 02 SS SS	4800
02 00 00 02 39 01 SS SS	9600
02 00 00 02 D0 00 SS SS	14400
02 00 00 02 9C 00 SS SS	19200
02 00 00 02 4E 00 SS SS	38400
02 00 00 02 34 00 SS SS	57600

PS：SS SS= check value

11 Appendix C：ASCII

Hexadecimal	Decimalism	Character
00	0	NUL
01	1	SOH
02	2	STX
03	3	ETX
04	4	EOT
05	5	ENQ
06	6	ACK
07	7	BEL
08	8	BS
09	9	HT
0a	10	LF
0b	11	VT
0c	12	FF
0d	13	CR
0e	14	SO
0f	15	SI
10	16	DLE
11	17	DC1
12	18	DC2
13	19	DC3
14	20	DC4
15	21	NAK
16	22	SYN
17	23	ETB
18	24	CAN
19	25	EM
1a	26	SUB
1b	27	ESC
1c	28	FS

Hexadecimal	Decimalism	Character
1d	29	GS
1e	30	RS
1f	31	US
20	32	SP
21	33	!
22	34	"
23	35	#
24	36	$
25	37	%
26	38	&
27	39	`
28	40	(
29	41	)
2a	42	*
2b	43	+
2c	44	,
2d	45	-
2e	46	.
2f	47	/
30	48	0
31	49	1
32	50	2
33	51	3
34	52	4
35	53	5
36	54	6
37	55	7
38	56	8
39	57	9
3a	58	:
3b	59	;
3c	60	<
3d	61	=
3e	62	>

Hexadecimal	Decimalism	Character
3f	63	?
40	64	@
41	65	A
42	66	B
43	67	C
44	68	D
45	69	E
46	70	F
47	71	G
48	72	H
49	73	I
4a	74	J
4b	75	K
4c	76	L
4d	77	M
4e	78	N
4f	79	O
50	80	P
51	81	Q
52	82	R
53	83	S
54	84	T
55	85	U
56	86	V
57	87	W
58	88	X
59	89	Y
5a	90	Z
5b	91	[
5c	92	\
5d	93	]
5e	94	^
5f	95	_
60	96	'

Hexadecimal	Decimalism	Character
61	97	a
62	98	b
63	99	c
64	100	d
65	101	e
66	102	f
67	103	g
68	104	h
69	105	i
6a	106	j
6b	107	k
6c	108	l
6d	109	m
6e	110	n
6f	111	o
70	112	p
71	113	q
72	114	r
73	115	s
74	116	t
75	117	u
76	118	v
77	119	w
78	120	x
79	121	y
7a	122	z
7b	123	{
7c	124	|
7d	125	}
7e	126	~
7f	127	DEL