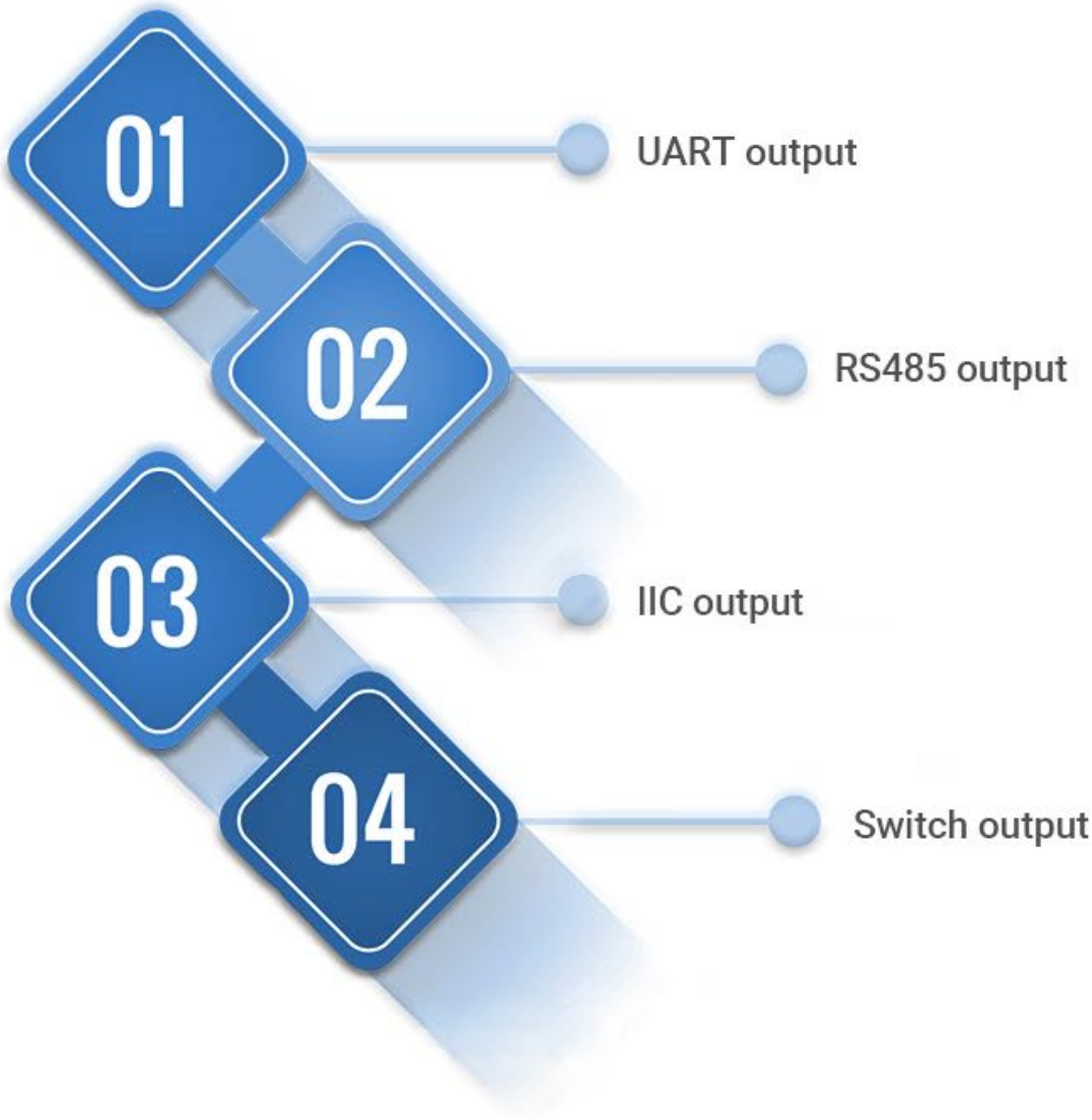
E08 Module Output Interface



1. UART Output

UART output has two output modes: UART automatic output and UART controlled output. Each output mode has three working modes, namely simultaneous working mode, cross working mode and polling working mode. The default timeout time is 200ms.

The output mode, working mode, timeout time, and real-time value and processing value output selection of the UART automatic output can be modified through the modbus protocol. For details, please refer to the modbus communication example section.

(1) UART Auto Output

TX lead of main interface output corresponding interface ranging module data after module converter completes a detection, and then immediately perform the second detection, and then cycle.

The working cycle is determined by the ranging module connected to the interface. The shorter the response time of the ranging module connected to the interface, the shorter the working cycle of the switching module.

The data output by the main interface can be set to real-time value output or processed value output. The real-time value response speed is fast, the response time is 1 working cycle, the processed value output data is more stable, and the response time is greater than or equal to 5 working cycles.

Working cycle:

Simultaneous work: (15ms + response time of the ranging module connected to the interface) ~ (5ms + set timeout)

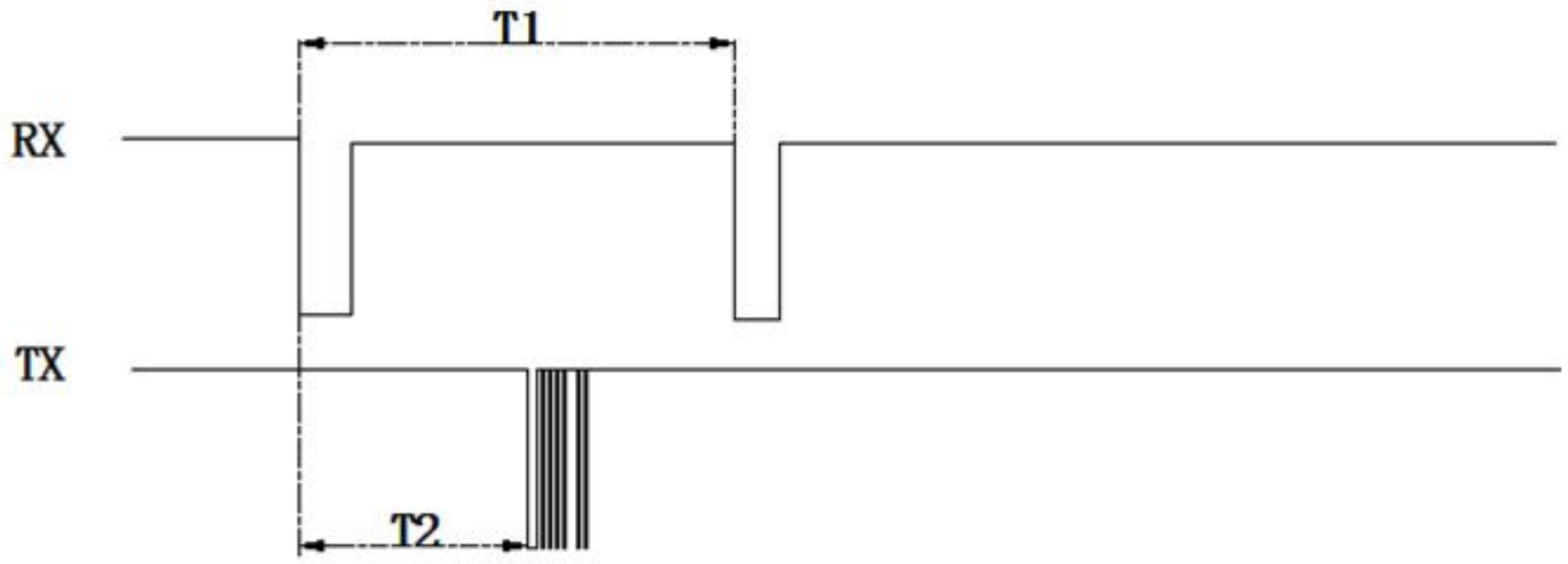
Cross working: (26ms+2*response time of the ranging module connected to the interface)~(6ms+2*set timeout)

Polling work: (49ms+4*response time of the ranging module connected to the interface)~(9ms+4*timeout set).

(2) UART Controlled

When the RX lead of the main interface of module converter receives a trigger pulse with a falling edge, the transfer module will perform a detection. After the work is completed, the corresponding interface ranging module will be output on the TX lead of the main interface.

(3) Timing Diagram



T2:

Simultaneous work: (15ms + response time of the ranging module connected to the interface) ~ (5ms + set timeout);

Cross working: (26ms+2*response time of the ranging module connected to the interface)~(6ms+2*set timeout);

Polling work: (49ms+4*response time of the ranging module connected to the interface)~(9ms+4*timeout set).

T1:

T1 = T2 + 20ms.

Remarks: (1) The response time of the ranging module connected to the interface is determined according to the response time of the actual connected ranging module;

The set timeout is 200ms by default.

(4) Instruction

1. Simultaneous working mode:

After RX lead of main interface receives trigger signal,4 ranging modules work at the same time. The transfer module works in this mode with a fast response time, but ranging module may receive signals from other ranging modules;

2.Cross working mode:

After RX lead of main interface receives trigger signal, ranging modules of interface 1 and 3 start to work at the same time, the ranging modules of interfaces 2 and 4 start to work after 1 and 3 module complete detection. The response time of module converter is faster when working in this mode.

3.Polling working mode:

After RX lead of main interface receives trigger signal, it triggers work from interfaces 1 to 4 in order. When the ranging module of one interface is completed, the next interface will be triggered. The ranging module works until all 4 interface ranging modules are finished. The response time of the switching module in this mode is slow, but the ranging module on the same switching module will not receive Signals of other ranging modules.

Communication specification

UART	Data Bit	Stop Bit	Parity Check	Baud Rate
TTL level	8	1	N/A	9600bps

(5) UART output format

Frame data	Description	Byte
Start Bit	0XFF	1Byte
Data1_H	High 8 bit data of interface 1	1Byte
Data1_L	Low 8 bit data of interface 1	1Byte
Data2_H	High 8 bit data of interface 2	1Byte
Data2_L	Low 8 bit data of interface 2	1Byte
Data3_H	High 8 bit data of interface 3	1Byte
Data3_L	Low 8 bit data of interface 3	1Byte
Data4_H	High 8 bit data of interface 4	1Byte
Data4_L	Low 8 bit data of interface 4	1Byte
SUM	Checksum	1Byte

(6) Example

Start bit	Data1_H	Data1_L	Data2_H	Data2_L	Data3_H	Data3_L	Data4_H	Data4_L	SUM
FF	07	A1	00	5F	00	D5	0F	0F	F9

Remark: checksum only remain low 8 value

SUM =(Start bit+ Data1_H+ Data1_L+ Data2_H+ Data2_L+ Data3_H+ Data3_L+ Data4_H+ Data4_L)&0x00FF

=(0XFF + 0X07 + 0XA1 + 0X00 + 0X5F + 0X00 + 0XD5 + 0X0F + 0X0F)&0x00FF

=0XF9

The data of interface 1 is 0X07A1, converts to decimal value is 1953, that is, 1953mm;

The data of interface 2 is 0X005F, converts to decimal value is 95, that is, 95mm;

The data of interface 3 is 0X00D5, converts to decimal value is 213, which is 213mm;

The data of interface 4 is 0X0F0F, converts to decimal value is 3855, which is 3855mm.

2. RS485 Output

The RS485 output is compatible with the Modbus protocol, and supports the modification of the module converter address, baud rate and setting of the trigger timeout time.
Through instructions, the ranging module of a single interface can be triggered to work, or the ranging module of 1 to 4 interfaces can be triggered to work at the same time.
For specific usage, please refer to the Modbus communication example section

Communication Specification

RS485	Data Bit	Stop Bit	Parity Check	Baud Rate
RS485	8	1	N/A	9600bps

(1) Modbus protocol specification

Mode	Check	Sensor address	Read function code	Write function code
Modbus-RTU	CRC-16/MODBUS	Default 0x01, settable	0x03	0x06

(2) Modbus protocol format

Master request(Read)

Name	Device Address	Function code 0x03	Register address	Registers qty	CRC16 Parity
(Byte) Length(Byte)	1	1	2	2	2

Slave response(Read):

Name	Address	Function code 0x03	Response byte	Data zone	CRC16 Parity
(Byte) Length(Byte)	1	1	1	N	2

Master request(write):

Name	Address	Function code 0x06	Register address	Data zone	CRC16 Parity
(Byte) Length(Byte)	1	1	2	2	2

Slave response(write):

Name	Address	Function code 0x06	Register address	Data zone	CRC16 Parity
(Byte) Length(Byte)	1	1	2	2	2

(3) Modbus Register

Status	Register Address	Register Function	Type of Data	Description
Read-only	0x0000	Software version	Unsigned, 16bit	Software version number, hexadecimal value
Read-Write	0x0106	Interface 1 data	Unsigned, 16bit	The data type and unit are determined by the ranging module connected to the interface
Read-Write	0x0107	Interface 2 data	Unsigned, 16bit	The data type and unit are determined by the ranging module connected to the interface
Read-Write	0x0108	Interface 3 data	Unsigned, 16bit	The data type and unit are determined by the ranging module connected to the interface
Read-write	0x0109	Interface 4 data	Unsigned, 16bit	The data type and unit are determined by the ranging module connected to the interface

Read-Write	0x0200	Slave address	Unsigned, 16bit	Range: 0x00～0xFE, default 0x01, 0xFF is the broadcast address (only respond to this command in RS485 output mode)
Read-Write	0x0201	Baud Rate	Unsigned, 16bit	Default 90x03, 9600bps; 0x01-2400, 0x02-4800, 0x03-9600, 0x04-14400, 0x05-19200, 0x06-38400, 0x07-57600, 0x08-76800 , 0x09-115200, 0x0A-128000 (UART automatic output mode: TX can be set, RX is fixed at 9600. UART controlled output mode: TX, RX can be set. Switch output: not settable.RS485 output: settable)
Read-write	0x0202	Output mode	Unsigned, 16bit	0x00-controlled output mode, 0x01-automatic output mode UART output mode default: 0X00, which is UART controlled output. switch output mode default: 0x01, which is automatic switch output (only respond to this command in switch output and serial output mode)
Read-write	0x0205	Switch output polarity	Unsigned, 16bit	Set switch output polarity 0x00-negative output, 0x01-positive output; default 0X01 (Only respond to this command in switch output mode)
Read-write	0x0206	Threshold value of switch output	Unsigned, 16bit	Set the threshold value of the switch output, unit: mm Default 0X03E8, which is 1000mm (Only respond to this command in switch output mode)

Read-Write	0x0207	Real time/ Processing value output optional	Unsigned, 16bit	0x00-processing value, 0x01 real-time value. default: 0x00 (Respond to this command only in the switch automatic output and serial port automatic output modes)
Read-Write	0x0215	Trigger timeout	Unsigned, 16bit	Set how long after the triggering of the ranging module has not received the response data packet which is considered timed out, the unit is 10ms Range: 0x08～0xC8, the default value is 0x14, decimal is 20, that is, 200ms (only valid in UART output, switch output and RS485 output modes)
Read-write	0x0216	UART output/ switch output mode	Unsigned, 16bit	0x01: The ranging modules of 4 interfaces trigger work at the same time, that is, the simultaneous work mode; 0x02: Trigger the ranging modules of interfaces 1 and 3 to work at the same time, and then trigger the ranging modules of interfaces 2 and 4 to work at the same time, that is, cross working mode; 0x03: Trigger the ranging modules of interfaces 1 to 4 in turn in order, that is, polling mode; Default: 0x03, that is, polling working mode; (Only respond to this command in UART output and switch output mode)

Note:

1. Register data is high byte first and low byte last;
2. Only 0X0106～0X0109 support multiple register read and write operations, and the rest of the registers can only perform single read and write operations;
3. The response time range of reading 0X0106～0X0109 registers: (25ms + response time of the ranging module connected to the interface) ~ (25ms + set timeout)

(4) Example

Example 1: Read the software version number
Host: 01 03 00 00 00 01 84 0A
Slave : 01 03 02 00 01 79 84
Note: The software version number is 00 01, which is 0X0001 (only valid in UART output, switch output and RS485 output modes)

Example 2: Read the data of interface 1
Host: 01 03 01 06 00 01 65 F7
Slave: 01 03 02 00 22 38 5D
Note: The data read to interface 1 is 0X0022, and the decimal value is 34, which is 34mm (valid only in RS485 output mode)

Example 3: Read the data of interface 2
Host: 01 03 01 07 00 01 34 37
Slave: 01 03 02 02 6B F8 CB
Note: The data read to interface 2 is 0X026B, the decimal value is 619, that is, 619mm (only valid in RS485 output mode)

Example 4: Read the data of interface 3
Host: 01 03 01 08 00 01 04 34
Slave: 01 03 02 01 26 38 0E
Note: The data read to interface 3 is 0X0126, and the decimal value is 294, which is 294mm (valid only in RS485 output mode)

Example 5: Read the data of interface 4
Host: 01 03 01 09 00 01 55 F4
Slave: 01 03 02 01 9D 78 7D
Note: The data read to interface 4 is 0X019D, the decimal value is 413, which is 413mm (only valid in RS485 output mode)

Example 6: Read data on N interfaces at the same time
Host: 01 03 01 06 00 04 A5 F4
Slave: 01 03 08 01 B2 01 3F 01 3B 01 BF E3 D5
Description: Indicates that the values of 4 registers are read continuously from address 0x0106, that is, read continuously from interface 1
The data on the 4 interfaces, the sensors on the 4 interfaces will be triggered at the same time, and the number of continuous readings is from

Example 7: Modify the slave address
Host: 01 06 02 00 00 05 48 71
Slave: 01 06 02 00 00 05 48 71
Note: The sensor address is changed from 0x01 to 0x05 (only valid in RS485 output mode)

Example 8: Modify the baud rate
Host: 05 06 02 01 00 01 19 F6
Slave: 05 06 02 01 00 01 19 F6
Note: The sensor address is 0x05, and the baud rate is modified to 0x01, which is 2400bps (UART automatic output: TX can be set, RX is analog serial port fixed 9600 UART controlled output: TX and RX can be set Switch output: RS485 output cannot be set : Can be set)

Example 9: Modify the working mode to automatic working mode
Host: 01 06 02 02 00 01 E8 72
Slave : 01 06 02 02 00 01 E8 72
Note: The working mode is changed to 0x0001, which is the automatic working mode (only valid in UART output and switch output mode)

Example 10: Modify the working mode to the controlled working mode
Host: 01 06 02 02 00 00 29 B2
Slave: 01 06 02 02 00 00 29 B2
Note: The working mode is changed to 0x0000, which is the controlled working mode (only valid in UART output and switch output mode)

Example 11: Modify the switch output as a negative output
Host: 01 06 02 05 00 00 98 73
Slave: 01 06 02 05 00 00 98 73
Note: The output is modified to 0x0000, that is, negative output (only valid in switch mode)

Example 12: Modify the switch output to be a positive output
Host: 01 06 02 05 00 01 59 B3
Slave: 01 06 02 05 00 01 59 B3
Note: The output is modified to 0x0001, that is, positive output (only valid in switch mode)

Example 13: Modify the threshold of the switch value
Host: 01 06 02 06 07 D0 6B DF
Slave: 01 06 02 06 07 D0 6B DF
Note: Change the sensor threshold to 0X07D0, the decimal value is 2000, that is, 2000mm (only valid in switch mode)

Example 14: Modify the output to processing value output
Host: 01 06 02 07 00 00 39 B3
Slave: 01 06 02 07 00 00 39 B3
Note: The output is modified to 0x0000, that is, the processed value output (only valid in switch automatic working mode and UART automatic working mode)

Example 15: Modify output to real-time value output
Host: 01 06 02 07 00 01 F8 73
Slave: 01 06 02 07 00 01 F8 73
Note: The output is modified to 0x0001, that is, the real-time value output (only valid in switch automatic working mode and serial port automatic working mode)

Example 16: Set the trigger timeout period
Host: 01 06 02 15 00 14 99 B9
Slave machine: 01 06 02 15 00 14 99 B9
Note: Set the trigger timeout duration to: 0x0014, the decimal value is 20, that is, 200ms, if it exceeds 200ms after triggering
If you fail to receive the data returned by the corresponding interface, it means that the interface triggers timeout (only valid in UART output, switch output and RS485 output modes)

Example 17: Set the working mode of the transfer module
Host: 01 06 02 16 00 03 29 B7
Slave machine: 01 06 02 16 00 03 29 B7
Description: Set the working mode to 0x0003, polling working mode (only valid in UART output and switch output mode)

3. IIC Output

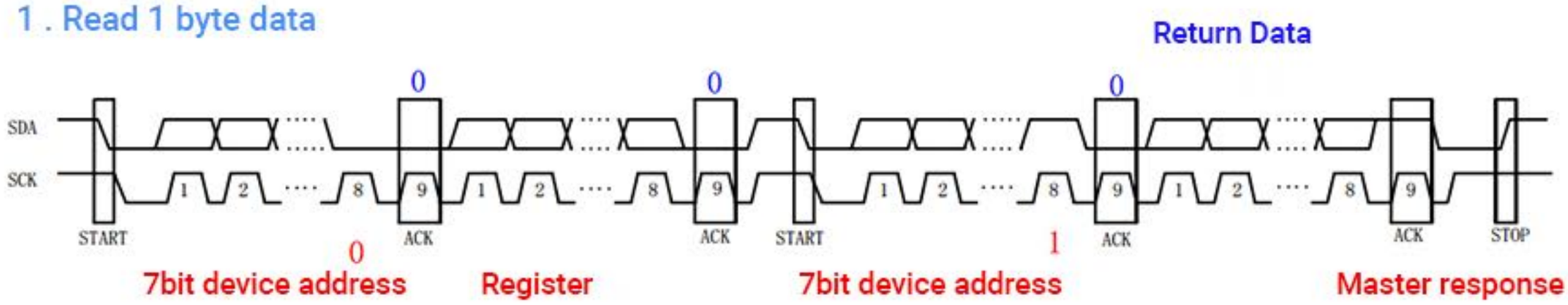
The user device as host, and module converter is the slave. The IIC pin of the module converter is connected with a 10K pull-up resistor. The recommended communication rate is ≤100KHz.

(1) Slave Address

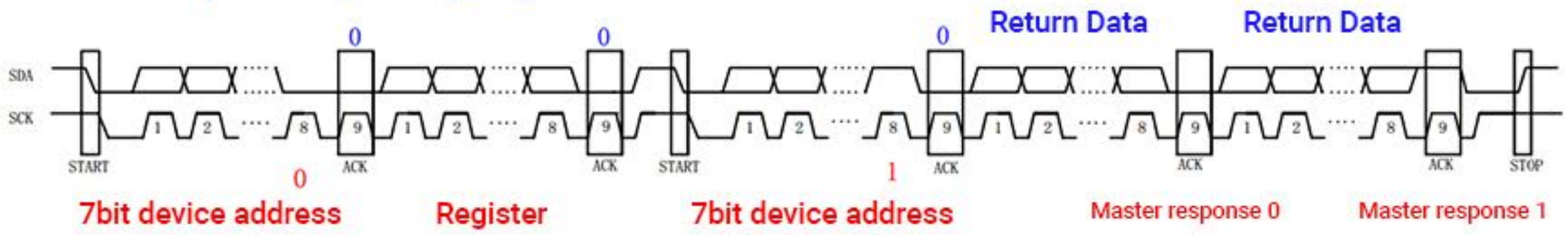
8-bit slave address, the default is 0XD0, which can be modified by instructions. The slave address is obtained by shifting one bit to the left of the 7-bit device, such as 0XD0, which is obtained by shifting 1 bit to the left of 0X68.

(2) Timing Diagram

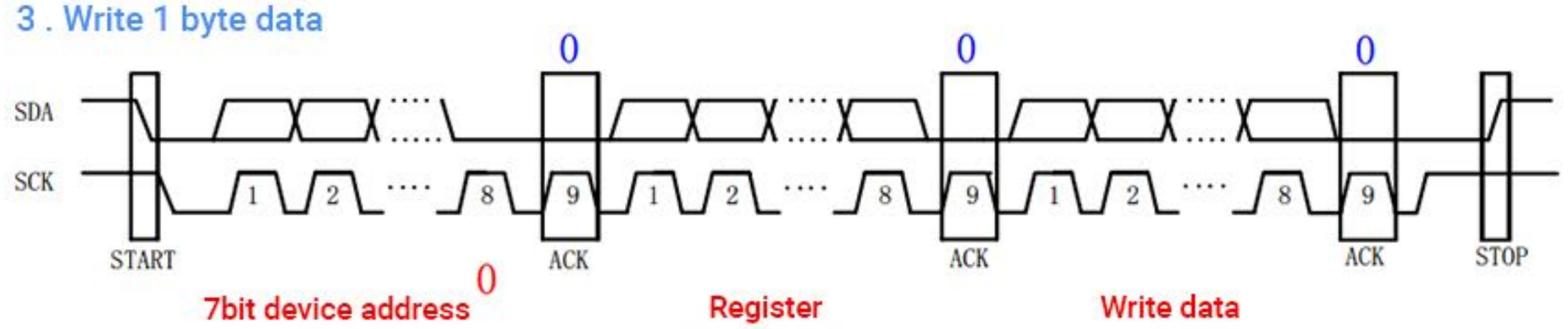
1 . Read 1 byte data



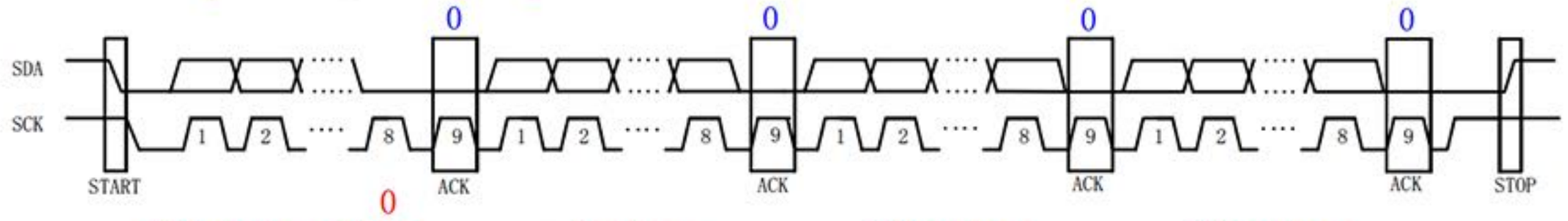
2 . Read 2 bytes data, the high eight bit in front



3 . Write 1 byte data



4 . Write 2 bytes data, the high eight bit in front



(3) Operation instruction

When the host writes 0XD1～0XD4 instructions to the 0XA1～0XA4 register of the module converter, the module will trigger the corresponding interface to work and pull down the SCL pin. When the distance measurement module of the corresponding interface is finished working, The transfer module will pull the SCL pin high and set the TRIP_STA bit of the 0XA5 register to 1.

When the host detects that SCL is high or reads the TRIP_STA bit of the 0XA5 register as 1, it can read the corresponding register data of the interface ranging module. If the host does not want the switch module to pull the SCL pin low during the interface operation, it can write 0X00 to the upper eight bits of the 0XA6 register, and the SCL pin status remains high at this time.

Remarks: The time range required for the module from triggering to completion of the detection: (15ms + response time of the ranging module connected to the interface) ~ (5ms + set timeout).

Example 1:
Trigger the interface 1 ranging module to work and read the data of the corresponding register.
(1) Judge whether the register data can be read by the level of the SCL pin:
①Send "Slave address (device address (7bit) + write (1bit)) + 0XA1 register address + instruction": 0XD0 0XA1 0XD1
②Wait for the SCL pin to be pulled low
③Wait for the SCL pin to be pulled high
④Send "slave address (device address (7bit) + read (1bit))" to read 0XA1 register data: 0XD1
⑤Read 2 bytes continuously

(2) Judge whether the register data can be read through the TRIP_STA bit of the 0XA5 register:
①Send "Slave address (device address (7bit) + write (1bit)) + 0XA1 register address + instruction": 0XD0 0XA1 0XD1
②Send "Slave address (device address (7bit) + write (1bit)) + 0XA5 register address": 0XD0 0XA5
③Send "slave address (device address (7bit) + read (1bit))" to read 0XA5 register data: 0XD1
④Read 1 byte of data (the upper eight bits of the 0XA5 register)
⑤If the TRIP_STA bit of the 0XA5 register is 1, then execute the next step, otherwise return to ② to continue execution
⑥Send "Slave address (device address (7bit) + write (1bit)) + 0XA1 register address" 0XD0 0XA1
⑦Send "slave address (device address (7bit) + read (1bit))" to read 0XA1 register data: 0XD1
⑧Read 2 bytes continuously

Example 2:
Trigger to work from the interface 1 ranging module to the interface 4 ranging module and read the data of the corresponding register.
(1) Judge whether the register data can be read by the level of the SCL pin:
①Send slave address (device address (7bit) + write (1bit)) + 0XA1 register address + instruction: 0XD0 0XA1 0XD4
②Wait for the SCL pin to be pulled low
③Wait for the SCL pin to be pulled high
④Send "slave address (device address (7bit) + read (1bit))" to read 0XA1 register data: 0XD1
⑤Read 8 bytes continuously

(2) Judge whether the register data can be read through the TRIP_STA bit of the 0XA5 register:
①Send "Slave address (device address (7bit) + write (1bit)) + 0XA1 register address + instruction": 0XD0 0XA1 0XD4
②Send "Slave address (device address (7bit) + write (1bit)) + 0XA5 register address": 0XD0 0XA5
③Send "slave address (device address (7bit) + read (1bit))" to read 0XA5 register data: 0XD1
④Read 1 byte of data (the upper eight bits of the 0XA5 register)
⑤If the TRIP_STA bit of the 0XA5 register is 1, then execute the next step, otherwise return to ② to continue execution
⑥ Send "Slave address (device address (7bit) + write (1bit)) + 0XA1 register address": 0XD0 0XA1
⑦Send "slave address (device address (7bit) + read (1bit))" to read 0XA1 register data: 0XD1
⑧Read 2 bytes continuously

Example 3:
(1) Modify the level of the SCL trigger interface ranging module during operation to high level:
①Send slave address (device address (7bit) + write (1bit)) + 0XA6 register address + register high eight-bit data:
0XD0 0XA6 0X00
②Send "Slave address (device address (7bit) + write (1bit)) + 0XA5 register address": 0XD0 0XA5
③Send "Slave address (device address (7bit) + read (1bit))" to read 0XA5 register data: 0XD1
④Read 1 byte of data (the upper eight bits of the 0XA5 register)
⑤If the SCL_STA bit of the 0XA5 register is 1, execute the next step, otherwise return to ② to continue execution
⑥ Modification completed

(2) Modify the level of the SCL trigger interface ranging module during operation to low level:
①Send slave address (device address (7bit) + write (1bit)) + 0XA6 register address + register high eight-bit data: 0XD0 0XA6 0X01
②Send "Slave address (device address (7bit) + write (1bit)) + 0XA5 register address": 0XD0 0XA5
③Send "slave address (device address (7bit) + read (1bit))" to read 0XA5 register data: 0XD1
④Read 1 byte of data (the upper eight bits of the 0XA5 register)
⑤If the SCL_STA bit of the 0XA5 register is 1, execute the next step, otherwise return to ② to continue execution
⑥ Modification completed

Example 4:
(1) Modify the timeout to 30, that is, 300ms:
①Send slave address (device address (7bit) + write (1bit)) + 0XA7 register address + register high eight-bit data + register low eight-bit data: 0XD0 0XA7 0X00 0X1E

②Send "Slave address (device address (7bit) + write (1bit)) + 0XA5 register address": 0XD0 0XA5
③Send "slave address (device address (7bit) + read (1bit))" to read 0XA5 register data: 0XD1
④Read 1 byte of data (the upper eight bits of the 0XA5 register)
⑤If the TIM_STA bit of the 0XA5 register is 1, execute the next step, otherwise return to ② to continue execution
⑥ Modification completed

Example 5:
(1) Modify the slave address to 0XD2:
①Send slave address (device address (7bit) + write (1bit)) + 0XAD register address + new slave address:
0XD0 0XAD 0XD2

(4) IIC Register

1 . Register list

Status	Register Address	Register function	Type of data	Bit
Read only	0XA0	Software version	Unsigned, 16bit	16 bits software version no
Read-write	0XA1	Ranging module data of interface 1	Unsigned, 16bit	16 bits interface 1 ranging module data
Read-write	0XA2	Ranging module data of interface 2	Unsigned, 16bit	16 bits interface 2 ranging module data
Read-write	0XA3	Ranging module data of interface 3	Unsigned, 16bit	16 bits interface 3 ranging module data

Read-write	0XA4	Ranging module data of interface 4	Unsigned, 16bit	16 bits interface 4 ranging module data					
Read-write	0XA5	Register status	Unsigned, 16bit	15～11	10	9	8	7～0	
				Reserved	SCL_STA	TIM_STA	TRIP_STA	Reserved	
Read-write	0XA6	SCL level status control	Unsigned, 16bit	15～8			7～0		
				Level status control value			reserved		
Read-write	0XA7	Timeout setting	Unsigned, 16bit	Timeout					
Write only	0XAD	Address register	Unsigned, 16bit	15～8			7～0		
				Bits address value			Reserved		

Note: The register can only be read and written by byte when reading and writing.

2 . Register description

(1) Software version no. register

Register address: 0XA0

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Name	Software version no.															

Note: The software version number is a hexadecimal value.

(2) Interface 1～ 4 ranging module data register

Register address: 0XA1～0XA4

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Name	Interface data															

Description: When reading a register, the data read is the data returned by the corresponding interface register. when writing a register, it triggers the ranging module of the corresponding interface to work.

(3) Write instruction

No.	Code	Description
1	0XD1	Trigger the ranging module of the corresponding interface of current register and start detection.
2	0XD2	Start from the current register to continuously trigger the work of the ranging module of 2 interfaces
3	0XD3	Start from the current register to continuously trigger the work of the ranging module of 3 interfaces
4	0XD4	Start from the current register to continuously trigger the work of the ranging module of 4 interfaces

(4) Register status

Register address: 0XA5

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Name						SCL_STA	TIM_STA	TRIP_STA	Reserved							

Note:

①The corresponding bit needs to be manually cleared by writing 1

②Write 0XD1～0XD4 instruction to 0XA1～0XA4 register to clear the TRIP_STA bit to 0.

③ Write 0XA6, the register can clear the SCL_STA bit to 0.

④ Write 0XA7, the register can clear the TIM_STA bit to 0.

SCL_STA:

0: The level status of the SCL trigger interface ranging module during the working period has not been modified.

1: Modification of the level status during the operation of the SCL trigger interface ranging module is completed

TIM_STA:

0: The interface data timeout time has not been modified

1: The interface data timeout period has been modified and is effective

TRIP_STA:

0: The corresponding interface has not received the data returned by the ranging module

1: The corresponding interface has received the data returned by the ranging module, the host can read it, and write 1 to clear the corresponding bit

Remarks: Since the lower eight bits of the register are reserved, it is not necessary to read and write the low eight bits when reading and writing, but only one high eight bits can be read and written.

(5) SCL level status control register

Register address: 0XA6, default value: 0X0100

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Name	SCL_CTRL								Reserved							

Description: SCL_CTRL:

0X00: SCL is high level during the operation of the trigger interface ranging module

0X01: SCL is low level during the working period of the trigger interface ranging module, and high level after the work is completed

Remarks: Since the lower eight bits of the register are reserved, it is not necessary to read and write the lower eight bits when reading and writing, but only one upper eight bits can be read and written.

(6) Timeout setting register

Register: 0XA7 Default: 0X0014

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Name	Timeout value															

Note: The timeout value is the longest time from when the trigger signal or command is sent to the corresponding interface ranging module to return data. If it exceeds this value, the transfer module will be judged as a timeout. The setting of the timeout time depends on the maximum response time of the ranging module connected to the interface. It is recommended to set it to twice the maximum response time of the ranging module connected to the interface. The setting range is 8~200. Represents 80ms ~2000ms.

(7) Slave address register

Register:0XAD Default:0XD000

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Name	8 bits slave address								Reserved							

Description:

① 8 bits slave address = 7 bits IIC address + 1 IIC read-write bit

②The 8 bits slave address written when modifying the address = 7 bits IIC address + 1 IIC read-write bit (fixed to 0)

Only ten addresses of 0XD0, 0XD2, 0XD4, 0XD6, 0XD8, 0XDA, 0XDC, 0XDE, 0XE0, 0XE2 are supported, and broadcast addresses are not supported.

Remarks: Since the low eight bits of the register are reserved, it is not necessary to read and write the low eight bits when reading and writing, but only one high eight bits can be read and written.

(5) Error code description

1. When the ranging module of an interface is triggered for 3 consecutive times and no data is returned, the corresponding interface data will return to FFFF;
2. When the data packets received by the ranging module of an interface for 3 consecutive triggers fail the verification, the corresponding interface data will be returned to EEEE.

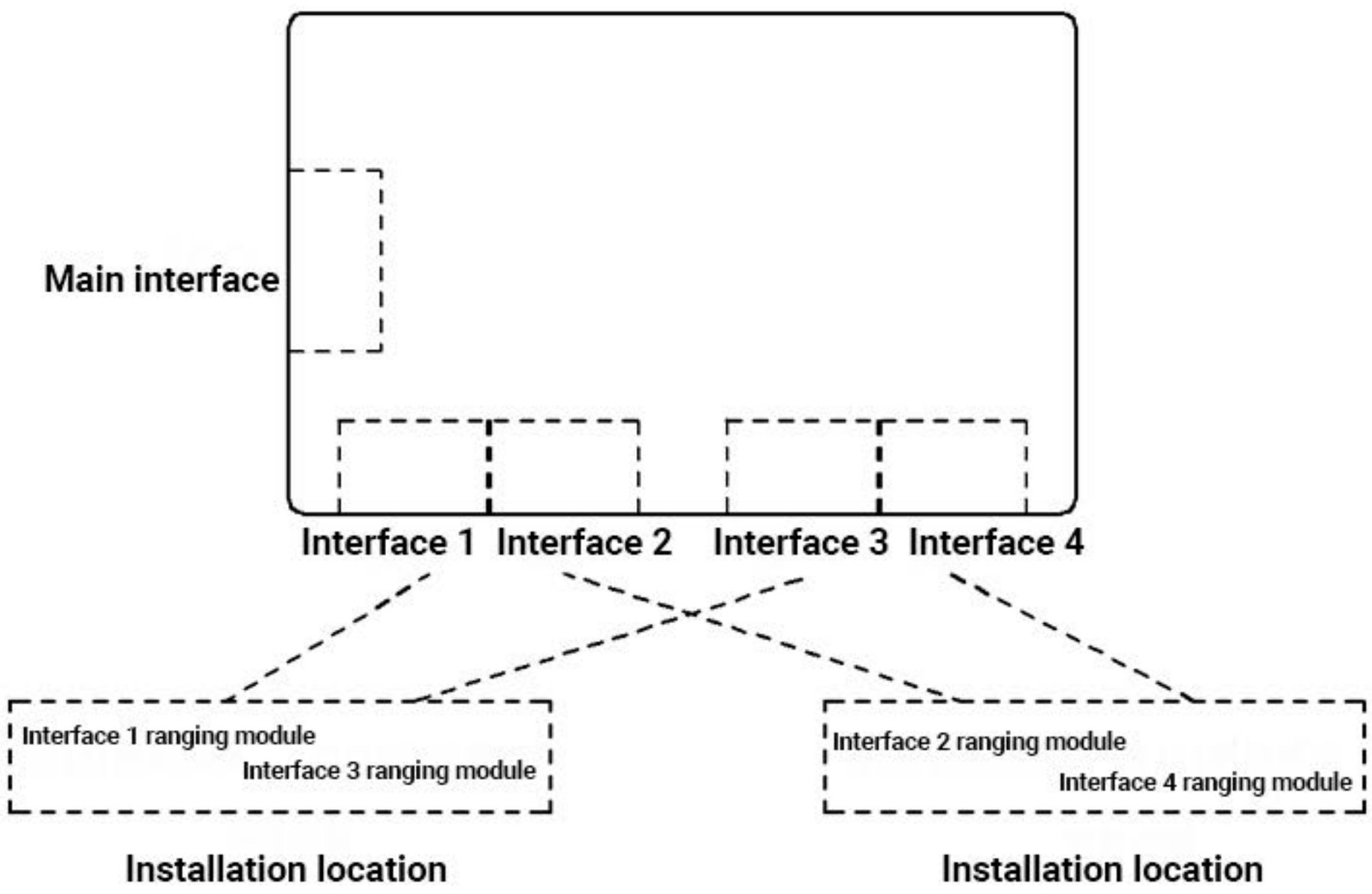
Note: When an error code appears, please check whether the distance measuring module of the interface is connected abnormally or has interference.

(6) RS485 output and IIC output Cross work mode

Since the ranging modules of 1~4 interfaces can only be triggered to work at the same time under the RS485 output and IIC output format, if you want to realize the cross working mode in the UART controlled output mode, you need to connect the ranging modules from the 4 interfaces. Go to the installation location to solve it.

Example:

First cross-place the ranging modules connected to the 2nd interface and the 3rd interface, and then trigger the ranging modules of the 1st and 2nd interfaces to work at the same time. trigger the ranging modules of interfaces 3 and 4 to work at the same time after detection finished, to achieve a cross working mode similar to the UART controlled output format, as shown in the figure



4. Switch output

The module converter has two switch output modes: automatic output and controlled output. Default factory threshold value is 1 meter. The distance value of the target detected by the ranging module of any interface is less than the set threshold, and the TX lead outputs high level;
If the distance values currently detected are greater than the set threshold of 4 interfaces, the TX lead outputs low level.
The RX of module always outputs high level by default, and the TX lead of the module only outputs high and low level signals, without driving capability.
The switch threshold value, output polarity, output mode, working mode, timeout, and automatic output real-time value and processing value output selection of the module can be modified through the Modbus protocol. For details, see Modbus registers and Modbus communication examples part.

(1) Switch Auto output

The TX lead of the main interface will output the corresponding level stat after the module completes a detection, and then immediately carry out the second detection, so as to cycle. The working cycle is determined by the ranging module connected to the interface. The shorter the response time of the ranging module connected to the interface, the shorter the working cycle of the switching module.
The level status of the main interface output can be set to output according to the real-time value or output according to the processed value. The real-time value has a fast response speed, the response time is 1 working cycle, the processed value output state is more stable, and the response time is greater than or equal to 5 working cycles.
Working cycle:

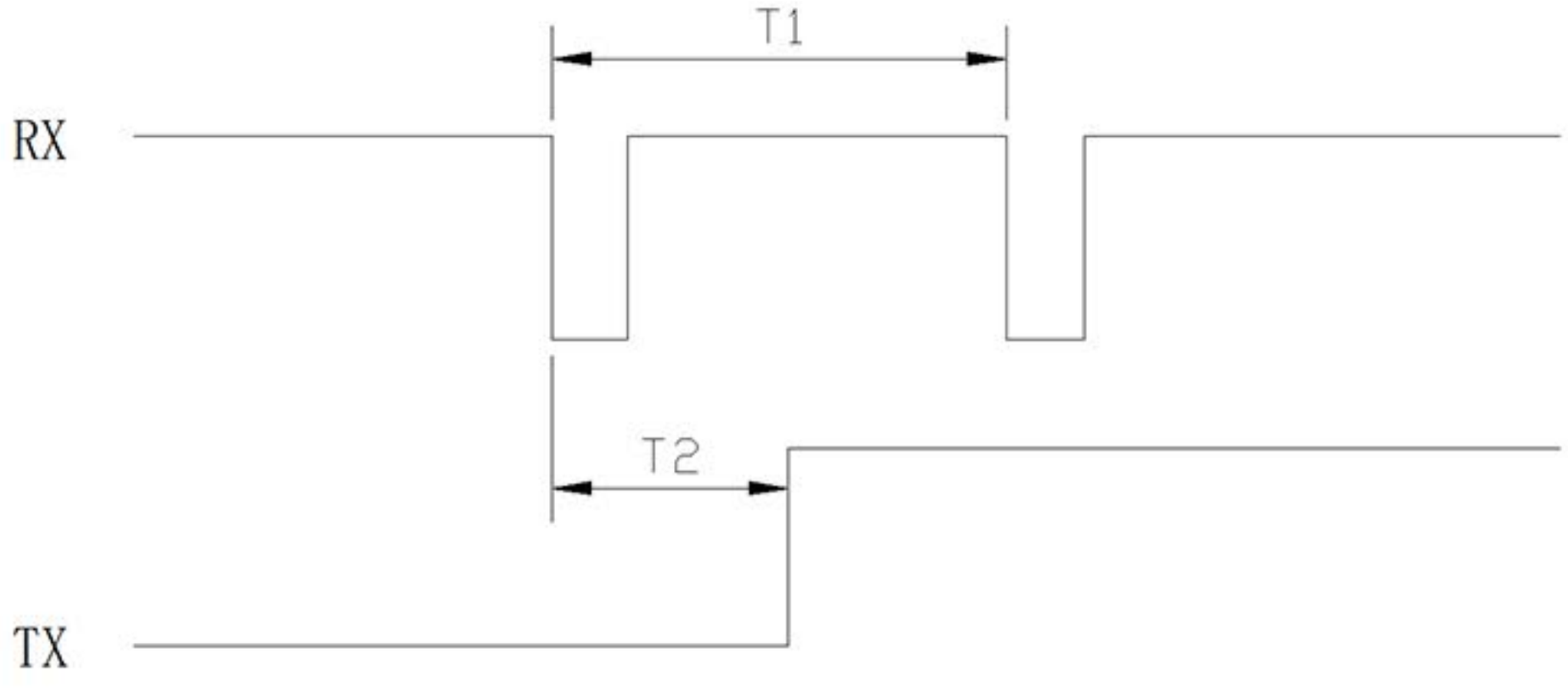
Simultaneous work: (15ms + response time of the ranging module connected to the interface) ~ (5ms + set timeout)

Cross working: (26ms+2*response time of the ranging module connected to the interface)~(6ms+2*set timeout)

Polling work: (49ms+4*response time of the ranging module connected to the interface)~(9ms+4* set timeout).

(2) Switch Controlled output

When the RX lead of the main interface receives a trigger pulse with a falling edge, the module will perform detection, and after the detection is completed, the corresponding level state will be output on the TX lead.



T2:

Simultaneous work: (15ms + response time of the ranging module connected to the interface) ~ (5ms + set timeout);

Cross working: (26ms+2*response time of the ranging module connected to the interface)~(6ms+2*set timeout);

Polling work: (49ms+4*response time of the ranging module connected to the interface)~(9ms+4*timeout set).

T1:

T1 = T2 + 20ms.

Remarks: (1) The response time of the ranging module connected to the interface is determined according to the response time of the actual connected ranging module.

The set timeout time is 200ms by default.