H01 Module Output Interface

01 UART/RS485 output

02 PWM Processing value output

03 PWM Controlled output

1. UART/RS485 Output

(1) Serial interface frame data format

	Type	Start Bit	Data Bit	Stop Bit	Parity	Baud Rate
UART interface	Full Duplex	1	8	1		9600bps
RS485 interface	Half Duplex	1	8	1		9600bps

(2) Control code format

Description	Read real time distance value	Read temperature value	Modify address	Read filtering distance value
Code	0x01	0x02	0x03	0x05

Frame date	Description	Byte
Start Bit	0x55 0x55	1byte
Start Bit	0xaa 0xaa	1byte
Address	0x01 0x01	1byte
Control bit	Control code	1byte
Data_H	High data of distance value	1byte
Data_H	Low data of distance value	1byte
Parity Sum	Sum communication check	1byte

(3) Read real time distance value

Code: 0x01

	Start Bit		Address	Code	Data		Parity Sum
Master request	0x55	0xaa	0x01	0x01	N/A	N/A	Checksum
Slave response	0x55	0xaa	0x01	0x01	Data_H	Data_L	Checksum

Example:

The address of the ultrasonic module is 0x01,

The master sends

0x55 0xaa 0x01 0x01 checksum

Checksum=(Start bit+user address+command)&0x00ff

=(0x55+0xaa+0x01+0x01) &0x00ff

=0x01

The return command of the ultrasonic module is

0x55 0xAA 0x01 0x01 0x02 0x33 checksum

Checksum=(Start bit+user address+command+data)&0x00ff

=(0x55+0xaa+0x01+0x01+0x02+0x33) &0x00ff

=0x36

Among them, 0x02 is the high data of the distance value

0x33 is the low data of the distance value

The distance value is 0x0233, converted to decimal is 563. the unit is: mm

(4) Read filter time distance value

0x05

	Start Bit		Address	Code	Data		Parity Sum
Master request	0x55	0xaa	0x01	0x01	N/A	N/A	Checksum
Slave response	0x55	0xaa	0x01	0x01	Data_H	Data_L	Checksum

Example:

The address of the ultrasonic module is 0x01,

The master sends

0x55 0xaa 0x01 0x01 checksum

Checksum=(Start bit+user address+command)&0x00ff

=(0x55+0xaa+0x01+0x01) &0x00ff

=0x01

The return command of the ultrasonic module is

0x55 0xAA 0x01 0x01 0x02 0x33 checksum

Checksum=(Start bit+user address+command+data)&0x00ff

=(0x55+0xaa+0x01+0x01+0x02+0x33) &0x00ff

=0x36

Among them, 0x02 is the high data of the distance value

0x33 is the low data of the distance value

The distance value is 0x0233, converted to decimal is 563. the unit is: mm

(5) Read temperature value

Code: 0x02

	Start Bit		Address	Code	Data		Parity Sum
Master request	0x55	0xaa	0x01	0x01	N/A	N/A	Checksum
Slave response	0x55	0xaa	0x01	0x01	Data_H	Data_L	Checksum

Example:

If the address of the ultrasonic module is 0x01, the master sends

0x55 0xaa 0x01 0x02 checksum

Checksum=(Start Bit+user address+command)&0x00ff

=(0x55+0xaa+0x01+0x02) &0x00ff

=0x02

The return command of the ultrasonic module is

0x55 0xAA 0x01 0x02 0x00 0x23 checksum

Checksum=(Start bit+user address+command+data)&0x00ff

=(0x55+0xaa+0x01+0x02+0x00+0x23) &0x00ff

=0x25

Among them, the highest bit of the high data Data_H of the temperature is 0 when the temperature is positive.

For example: 0x01 is the high data of temperature,

0x23 is the low data of temperature,

The hexadecimal system of the effective temperature value is 0x123, and the decimal system is 291,

Converted into a temperature value of 29.1℃, the unit is: Celsius

the highest bit of the high data Data_H of the temperature is 1 when the temperature is negative,

For example:

0x80 is the high data of temperature

0x64 is the low data of temperature

The hexadecimal system of the effective temperature value is 0x64, and the decimal system is 100,

Converted into a temperature value of -10.0°C, the unit is: Celsius

(6) Modify address

Code: 0x03 (Add: is the address need to change)

	Start Bit		Address	Code	Data		Parity Sum
Master request	0x55	0xaa	ADD	0x03	N/A	N/A	Checksum
Slave response	0x55	0xaa	ADD	0x03	N/A	N/A	Checksum

Example：

Default sensor module address is 0x01 which change to 0x05

0x55 0xaa 0x05 0x03 checksum

Checksum=(0x55+0xaa+0x05+0x03) &0x00ff

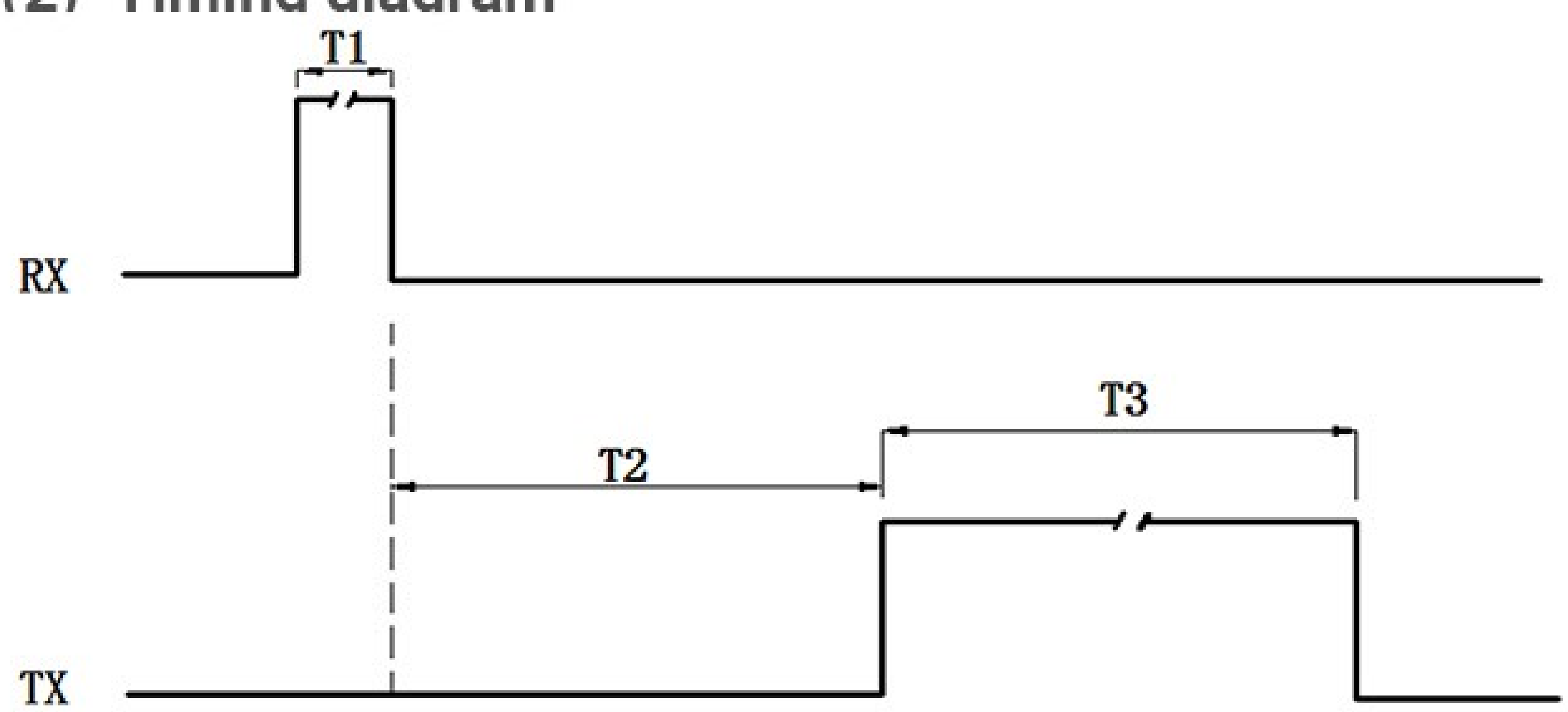
=0x07

2. PWM processing value output

(1) Instruction

When pin RX receives a high-level trigger pulse, the falling edge will trigger the module to work once, and the output pin TX will output a TTL level PWM high-level pulse width signal, the trigger cycle of the module must be greater than 160ms. If the module does not detect an object, the output pin will output a fixed pulse width of about 65ms.

(2) Timing diagram



Remark: T1=0.1～5ms, T2≥75ms, T3=0.6～65ms （Timing of PWM High-level pulse width）

(3) Formula

Formula: S=T*V/2 (S is the distance value, T is duration time of PWM high-level pulse width, V is sound travel speed in the air)

V is sound speed of 344m/S at room temperature. The simplified formula is S= T/5.8 (unit of distance S is ms, us of time T)

For example:

When the PWM high-level pulse width time T3 of the output pin TX is 10000us,

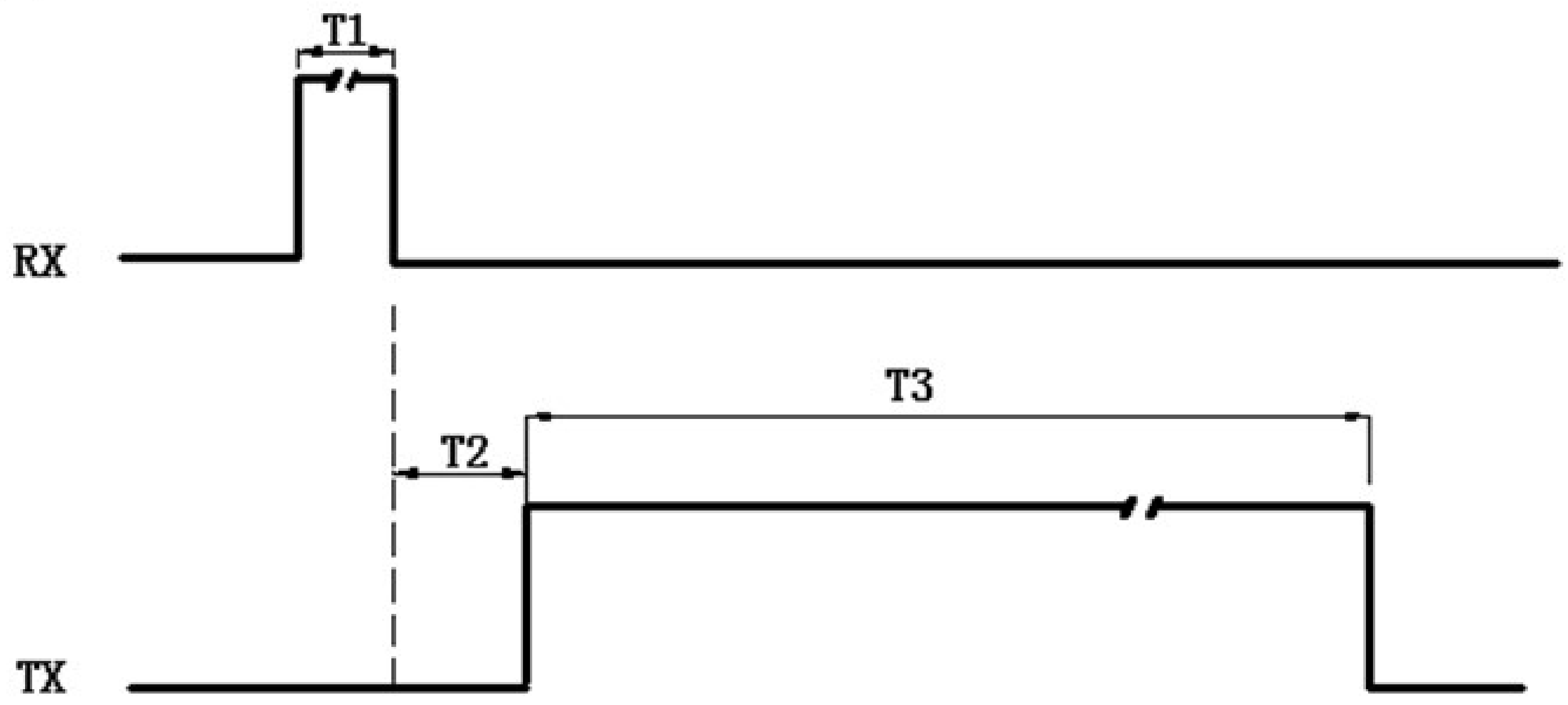
S= T/5.8=10000/5.8≈1724(mm), which means that the currently measured distance value is 1724mm.

3. PWM Controlled output format

(1) Trigger instruction

When pin RX receives a high-level trigger pulse, the falling edge will trigger the module to work once, and the output pin TX will output a TTL level PWM high-level pulse width signal, the trigger cycle of the module must be greater than 75ms. If the module does not detect an object, the output pin will output a fixed pulse width of about 65ms.

(2) Timing Diagram



Remark: T1=0.1～10ms；T2=4.5～6.0ms；T3=0.55～65ms（Timing of PWM High-level pulse width）

(3) Formula

Formula: S=T*V/2 (S is the distance value, T is duration time of PWM high-level pulse width, V is sound travel speed in the air)

V is sound speed of 344m/S at room temperature. The simplified formula is S= T/5.8 (unit of distance S is ms, us of time T)

For example:

When the PWM high-level pulse width time T3 of the output pin TX is 10000us,

S= T/5.8=10000/5.8≈1724(mm), which means that the currently measured distance value is 1724mm.