# RF Program Writing

# Analysis and Q&A

## ➢ *RWS-375/374/371 Series Q&A:*
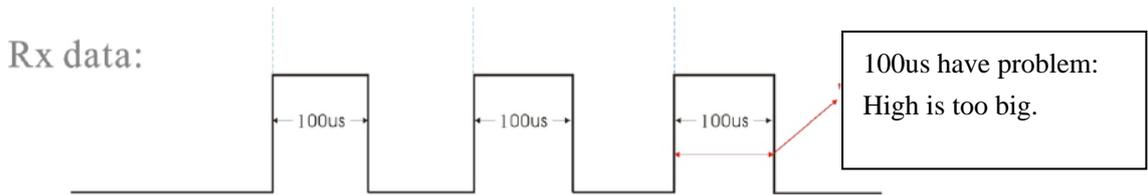
1. Transmitter Data:

❶ Tx data:

60us    60us    60us

300us    300us

Receiver Data:

Rx data:

├ 100us ┤    ├ 100us ┤    ├ 100us ┤

100us have problem:
High is too big.

2. Transmitter Data:

❷ Tx data:

30us    30us    30us

300us    300us

Receiver Data:

Rx data:

140Us

180-140Us

140Us

140us have problem:
LOW PULSE is too big.
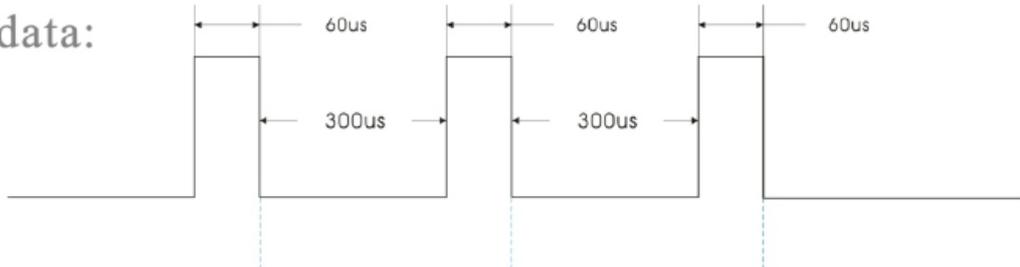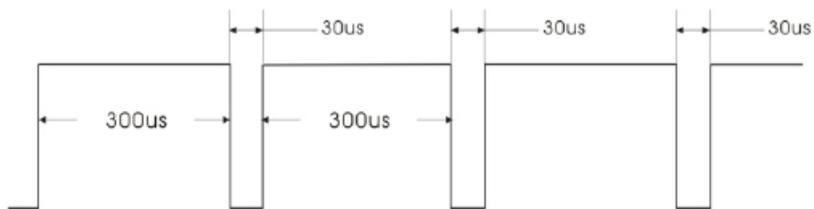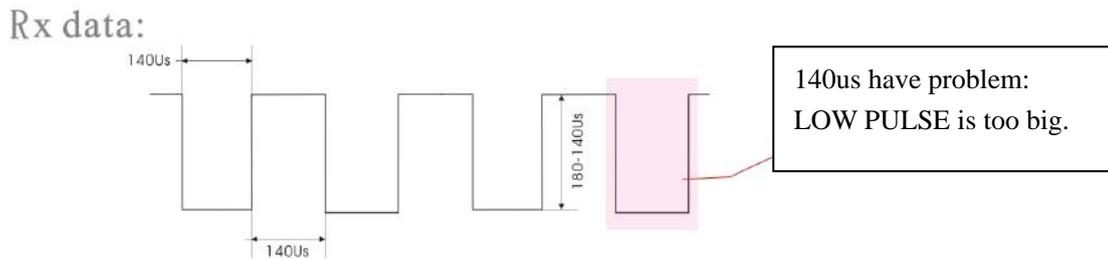
**WENSHING Answer：**

Because RWS-375/374/371 Series Modulate Mode ASK，So that it is unable to handle by normal encoder/decoder. The ASK will be changed by different electric field, and it causes the ASK Receiver Data phase deviation to be large relatively. Therefore, the Encoder must execute the Manchester encode method. Please refer to the above compilation model: Holtek HT-12E.

**Manchester encode method ( digital signal):**



曼策施特編碼:(數位信號)
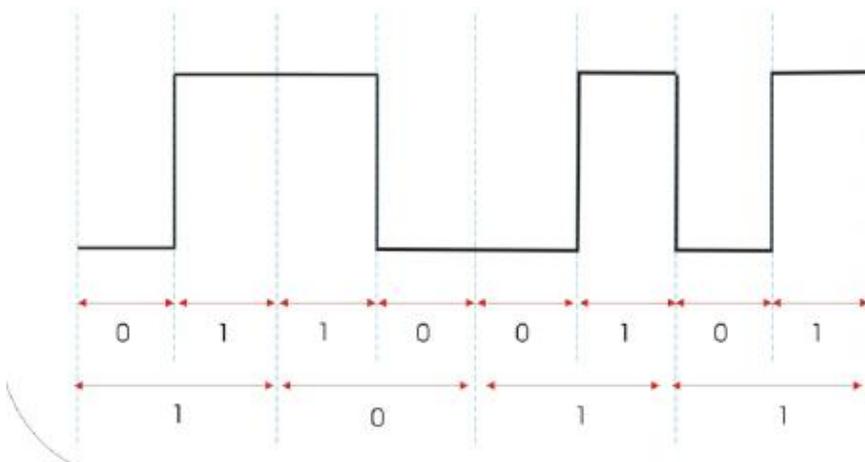
**Quotation B:**

Our product doesn't use encode and decode. At the transmitter side, the Microcontroller has time sent out the signal to TWS-AS3. Continue 5~6 pulse.

Every pulse as graphical representation: Left side is 0 and the right side is 1. At the receiver side, it will supply the battery to Receiver RWS-371-6 before 250ms receiving signal. Its output can deliver to Microcontroller of the receiving side. The software will distinguish when Pulse High is longer than low, the definition is 0, on the contrary is 1 When receiving all the pulses, it will close the power. The OOK encode method (On/Off Keying) can't be changed as above the transmitter signal, because it will be compatible with other product. At as encode situation, could you tell me how to change the Signal received?



854.5us    366.5us    OR    366.5us    854.5us
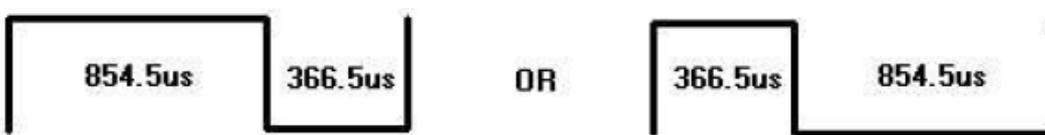
**WENSHING Answer：**

Regarding to the encode which your company gives us is the TI earliest way, afterward used by the Holtek. Generally speaking, it would be okay to use. Therefore, please confirm the follow question:

1. Whether or not the pressure drop too much from data out to MCU. MCU can't receiver. If truly, please more than 1 level Buff. But it needs positive approaching. Otherwise reverse cannot solve.

2. Explained in view of the code part, possibly because your company is too strict for MCU writing Recorder way. Generally we take 1/2 Code frequency to be CLK TIME , When is bigger than 1/2 regards as 0 ,to is smaller than time then is 1. As blow right charts:
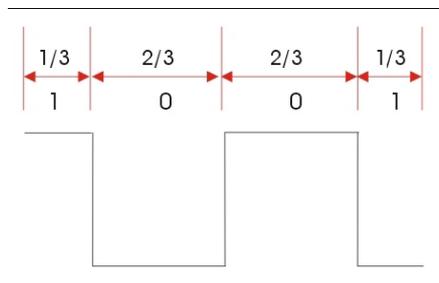


3. RF transmission signal may use the proportion expression code.
   Example: When the code data is 1, its Hi time cont is 100, Lo time cont is 50, when the code data is 0,Hi time cont is 50, Lo time cont is 100. When starts to encode, the 1st bit to be the sampling code. Sending 0, when 1st bit time MCU cont Hi time 50, after its 50 does *1+1/2=75 bit takes time to go to compare with the value, if it's bigger than 75, then the data is for 1. If it's smaller than 75, then the data is 0.

**Quotation C:**

Why do you think the way of our MUC Encoder/Decoder SPEC is too strict? You suggest us use Hi time or low time to compare. But essentially, as if a little bit distinguish with using the time length to compare. Moreover our some products signal pulse time (high adds low) the time is different. Therefore we must use the method which compare high and low time. The receiving side then may be compatible our different transmitter product.

**WENSHING Answer：**

Because the receiving code time is subscribed fixed by our many clients, it makes the receiving process to be able to select High or Low. It should be 1/3 Hi 2/3 Lo for 1, and 2/3Hi 1/3 Lo for 0. This process needs to take the intermediate value, and also can differentiate directly.

**Quotation D:**

I will provide the DATA OUT waveform of RWS-371-6 to refer to you. Our different transmitter product use different time. Therefore the receiving side can't fix the using time. But use comparing Hi/Lo then can decode the different time's signal. But why RWS-371-6 output signal often have some question and cannot successfully decode when comparing the High/Low time?

If the signal of RWS-371-6 Data Out and TWS-AS3 Signal in are the same, then uses this method also to be supposed to succeed the decoding, isn't it?

**WENSHING Answer：**

Yes, Comparing Hi & Lo time it should be okay. Generally, why can't they encode? In fact, all is because of the software question; supposed 1 code Hi and Lo time is 100. Hi is 33, Lo is 67. If software engineer doesn't pay attention to write, they will write to distinguished Hi is 28-36 and having Hi electric potential is Hi.

**Quotation E:**

Why am I unable to see to 3ms delay? How do I have my original motherboard to run to 1.5V 1000mah battery?

**WENSHING Answer：**

Because many customers request that RF is bps, therefore this series can be delivered 1000 bps for the lowest, and can keep longer in power up time; If must reduce very easily, only must to offer a receiving and transmitting sample set, Our company so long as changes two capacities then to be allowed to use.

## ➢ *RWS-375/374/371 Series Applicable Sample :*

**Application**

A gate has to be controlled with a remote control. Both the transmitter and the receiver are run with a Battery of 1.5V around 1400mAh. maybe I will need two of them. The operator can sit in a car behind a window and it should be remote controlled in a range of 10 to 20 meters.



Power Control Protocol like Figure 1.1
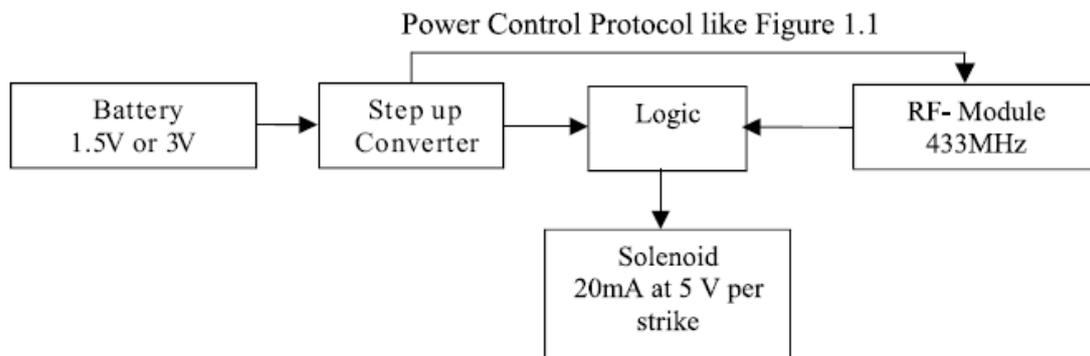
## Calculations

The receiver has to check like ever 1 second if a signal is present. This means every second it has to come up from sleep or power down mode. This calculation is to see how long a battery would last with just doing the checking. Let say 3 msec to wake up and every 1 seconds a check with a battery of 1400mAh. To not miss a Package it has to check every 8msec for 3 times. The check would take .5 msec. Life expectance

Let say 3msec to wake up and every 1 seconds a check with a battery of 1400mAh. To not miss a Package it has to check every 8msec for 3 times. The check would take .5 msec. Life expectance of the battery would be in years. Protocol of the checking routine which is controlled with PIN 4 and 5 VCC
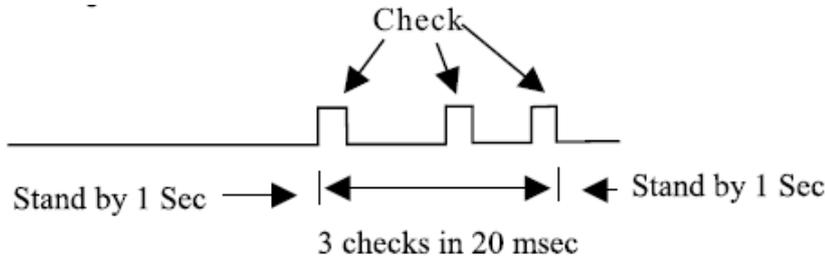


Figure 1.1 Power supply PIN 4 and PIN 5

```
1400mAh   1 sec
Time = --------------------------------------------------------- ~= 3 Years
4.5mA      3.5mSec  3 times  24 hours  360 days
```
(same again time = 1400mAh /4.5mA *1sec / 3.5msec/ 3 / 24 hours / 360 days ~ 10 Years)
☐ I am designing the system for a life expectance of 5 years.
☐ Second in this calculation is just the checking and not the actual comparing and executing the solenoid.

### Consequence:

☐ I would be on the limit but ok with two batteries of this type. But half the battery would be used in five years just with the checking.

## Actual Test:



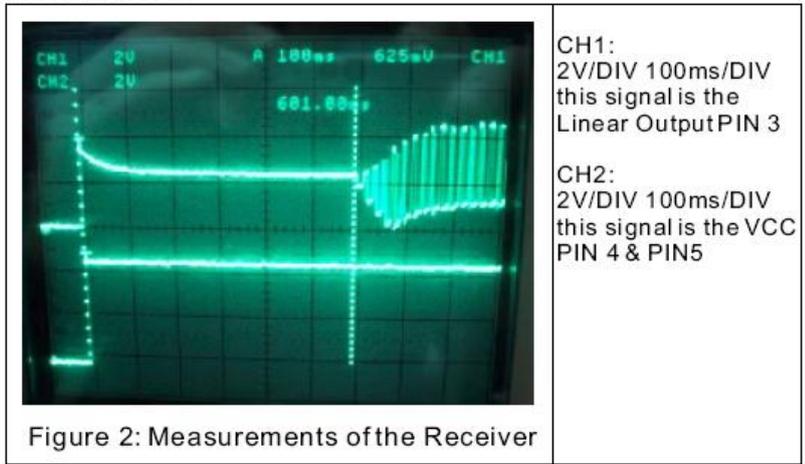| CH1:<br>2V/DIV 100ms/DIV<br>this signal is the<br>Linear Output PIN 3 |
| CH2:<br>2V/DIV 100ms/DIV<br>this signal is the VCC<br>PIN 4 & PIN5 |

Figure 2: Measurements of the Receiver

In Figure 2 you can see that it takes for the receiver 600 msec to start receiving data. If this is the case I am not able to run the receiver with a battery.

### Question:

☐ Is there a stand by voltage where this 3 msec apply and also during that time the power consumption is in well below 1mA.
*The two proposal you gave me I am not totally clear on.*
☐ Lower the RF Current. This is a design change on your part right?
☐ Change the OPAMP to CMOS is also a design change on your side. I am already using CMOS.

### System:

I am using a RWS 371 6 433MHz receiver module with on of your transmitters.

## ➢ **TWS-HS Series Q&A:**

**Quotation A:**

Transmit one time and then it can't work anymore, also 5V power become short circuit.

**WENSHING Answer:**

Based on our past experiences, main reason to cause TWS-HS transistor been broken is because of high output voltage or antenna output impedance doesn't math.

From customer's return products to analysis, this is because of antenna output impedance doesn't match. to cause. Please notice PCB materials, can't use electric board.

**Quotation B:**

I am using a transmitter module TWS-HS-2 maximum transmission distance reaches 80 meters and I need more distance you can help me how can I get more distance. working on a project for a robot to inspect pipes.

**WENSHING Answer:**

After checked via our engineer, we found out that your circuit connect way had few mistake on E/D PIN. Please check for below circuit diagram.

TWS-HS E/D DEMO SCH
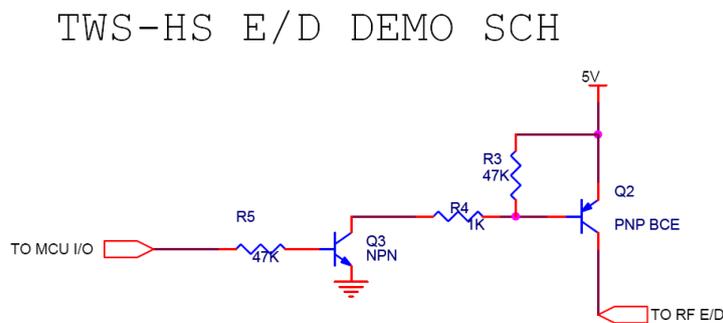


## ➢ **TRW-400B Design Doubt:**

**Question A:**

Transmissions are identified at the receiving end of normal information, and I went to change the ID of RF modules (each plus 1). After several changes, it will appear RF module into the ID of all FF. Unless RESET, otherwise it not be able to change. Whether there are ways to avoid those situations? (Our application is to allow the user can change at any time, he'd like to set the RF module ID value.)

**WENSHING Answer：**

RF module changes the ID value and RF modules need to preserve the information. It need to preserve the process of programming EEPROM, since the time of programming, it would create several reasons for this phenomenon:

1. Maybe the saved in the process, there is a new data input from the outside.
2. Power of instability.
3. Power failure suddenly. As such reasons, internal testing has to do at power each time, no need to be re-changes.

**Question B:**

In high-Bit Rate not easily transmitted, it needs to repeat many times. Whether the increase will be effective antenna, Or are there other ways to improve?

**WENSHING Answer：**

In high-Bit Rate is not easily transmitted. Can't the receiver of RF module receive, or it is because of changing the ID of RF? If RF modules can't receive, please try to add antenna or pull closer.

**Question C:**

Baud Rate19200 part is very unstable. Is there are ways to improve?

**WENSHING Answer：**

1. Regulators required IC and non-high-frequency digital circuits Power cannot be handled hastily.
2. Does CLK meet CLK 19200 standard?
3. It shall not be used with high frequency million deal with boards or parts Jumper. This is 0.5W, it cannot be arbitrarily jumper to deal with, otherwise high-frequency plenary reflection, rate is higher will cause more terrible.
4. Power supply has to use the grading of more than NTD30, 000 (such as HP).

Regulators IC cannot be used casually. It is necessary to use high-speed regulator IC.

5. Power handling worse, the rate will be transmission slowly even worse.

PA module is required for the internal stability on 5 V, MCU is for 3 V.

6. Please pay much attention on power supply. If transmitter is in the flashing lights, it is to have power-reflection and meaning it was interference already.