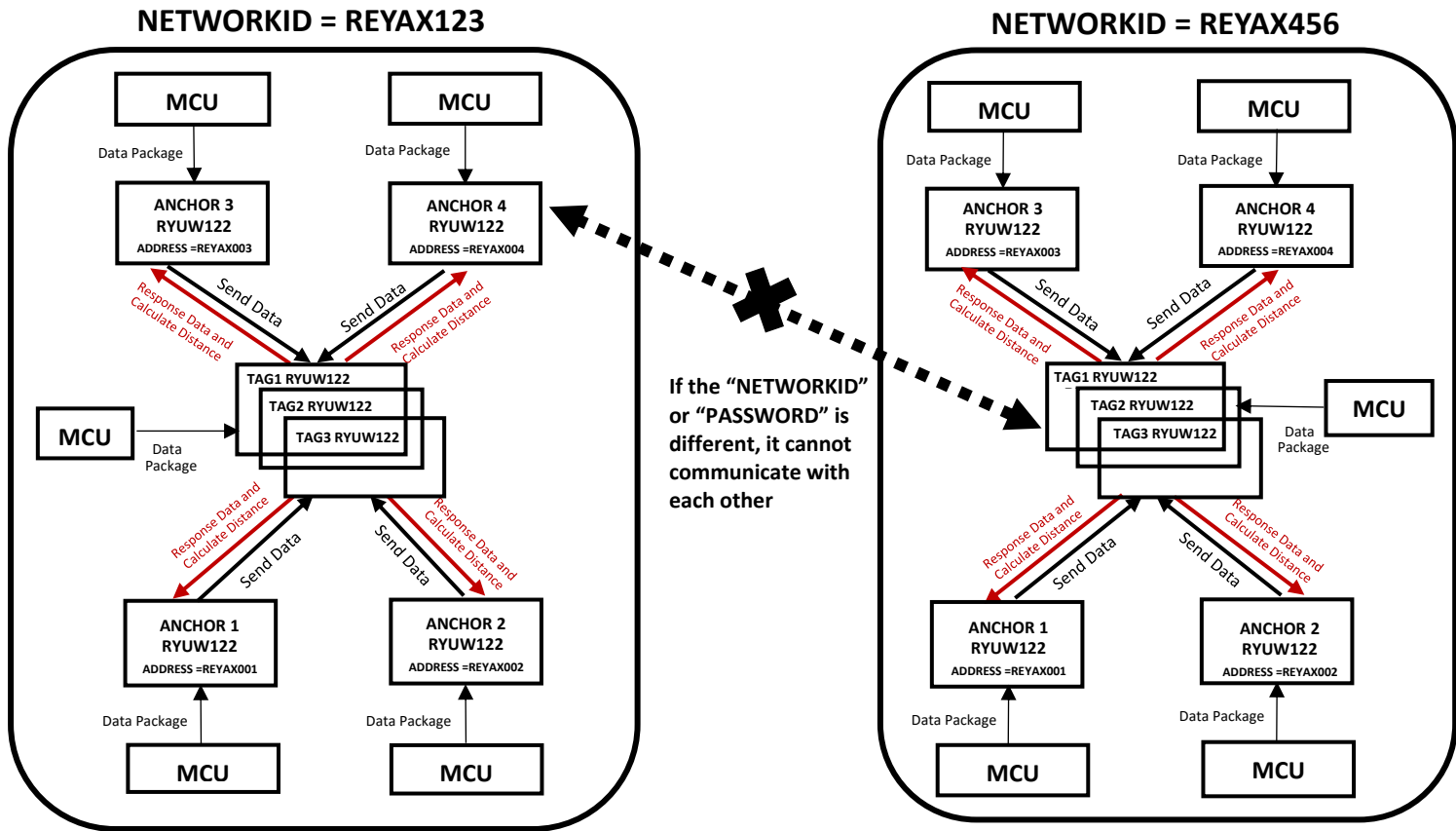


# RYUW122 AT COMMAND GUIDE

## THE NOTIFICATION OF USING AT COMMAND

1. The RYUW122 can set as role of “ANCHOR” or “TAG”. The distance value will be output through ANCHOR, and the data transmission can be bidirectional.
2. First you must use the AT+MODE command to set the module as ANCHOR or TAG.
3. Use “AT+NETWORKID” to set the UWB network group. Only those that set with the same NETWORK ID can communicate with each other.
4. Use “AT+ADDRESS” to set a unique Address.
5. Use “AT+CPIN” to set the UWB network encryption password. Only those that set with the same encryption password can be decoded correctly.
6. If you want to transmit data to ANCHOR from TAG, You must use AT+TAG\_SEND command.
7. If you want to transmit data to TAG from ANCHOR and obtain the distance, You must use AT+ANCHOR\_SEND command.
8. When TAG is set to the parameter of “AT+TAGD” for power-saving purpose, the “AT+TAG\_SEND” and “AT+ANCHOR\_SEND” command under the ANCHOR must match the RF duty cycle of TAG.

# NETWORK STRUCTURE



## AT Command Set

It is required to key in “enter” or “\r\n” in the end of all AT Commands.

Add “?” in the end of the commands to ask the current setting value.

It is required to wait until the module replies +OK so that you can execute the next AT command.

### 1. AT Test if the module can respond to Commands.

Syntax	Response
AT	+OK

### 2. Software RESET

Syntax	Response
AT+RESET	+RESET +READY

### 3. AT+MODE Set the wireless work mode.

Syntax	Response
AT+MODE=<Parameter> <Parameter>range 0 to 1 0 : TAG mode (Default). 1 : ANCHOR mode 2 : Sleep mode  Example : Set to the ANCHOR mode. AT+MODE=1 <i>*The settings will be memorized in flash.</i>	+OK
AT+MODE?	+MODE=1

**4. AT+IPR** Set the UART baud rate.

Syntax	Response
AT+IPR=<rate> <rate> is the UART baud rate : 9600 57600 115200(Default)  Example: Set the baud rate as 57600, AT+IPR=57600 *The settings will be memorized in flash.	+OK
AT+IPR?	+IPR=57600

**5. AT+ CHANNEL** Set RF Channel.

Syntax	Response
AT+CHANNEL=<Channel> <Channel> is the RF band. 5 : 6489.6MHz(default) 9: 7987.2 MHz  Example: Set the RF Channel as 7987.2 MHz AT+ CHANNEL =9 *The settings will be memorized in flash.	+OK
AT+CHANNEL?	+CHANNEL=9

**6. AT+BANDWIDTH** Set the RF Bandwidth

Syntax	Response
AT+ BANDWIDTH=<Bandwidth> <Bandwidth>0~1, list as below : 0: 850 KHz (default) 1: 6.8M  Example: Set the RF bandwidth as 6.8MHz AT+BANDWIDTH=1 *The settings will be memorized in flash.	+OK
AT+BANDWIDTH?	+BANDWIDTH=1

**7. AT+NETWORKID** Set the network ID.

Syntax	Response
AT+NETWORKID=<NETWORK ID> <NETWORK ID>= 8 BYTES ASCII (default 00000000)  Example: Set the network ID as REYAX123 <b>AT+NETWORKID=REYAX123</b> <i>*The settings will be memorized in Flash.</i>	+OK
AT+NETWORKID?	+NETWORKID=REYAX123

**8. AT+ADDRESS** Set the ADDRESS ID of module.

Syntax	Response
AT+ADDRESS=<Address> <Address>= 8 BYTES ASCII (default 00000000)  Example: Set the address of module as DAVID123. <b>AT+ADDRESS=DAVID123</b> <i>*The settings will be memorized in Flash.</i>	+OK
AT+ADDRESS?	+ADDRESS=DAVID123

**9. AT+UID?** 96bit Unique ID of module.

Syntax	Response
AT+UID?	+UID=E04737

**10. AT+CPIN** Set the AES128 password of the network.

Syntax	Response
<p>AT+CPIN=&lt;Password&gt;</p> <p>&lt;Password&gt;: A 32 characters long AES password From 00000000000000000000000000000000 to FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF (default 00000000000000000000000000000000)</p> <p>Only by same password can the data be recognized. After resetting, the previously password will disappear.</p> <p>Example: Set the password as below, FABC0002EEDCAA90FABC0002EEDCAA90 <b>AT+CPIN=FABC0002EEDCAA90FABC0002EEDCAA90</b></p> <p><i>*The settings will be memorized in Flash.</i></p>	<p>+OK</p>
<p>AT+CPIN? (default) AT+CPIN? (After setting the password)</p>	<p>+CPIN=00000000000000000000000000000000 000000000000 +CPIN=FABC0002EEDCAA90FABC0002EEDCAA90</p>

**11. AT+TAGD** Set the parameters of TAG RF duty cycle

Syntax	Response
<p>AT+TAGD=&lt; Time of RF enable &gt;,&lt; Time of RF disable &gt;</p> <p>&lt; Time of RF enable &gt; From 10 to 28000ms, The minimum interval is 10ms.</p> <p>&lt; Time of RF disable &gt; From 10 to 28000ms, The minimum interval is 10ms.</p> <p>(Default AT+TAGD=0,0 RF always enable)</p> <p><i>*During the&lt; Time of RF enable &gt;, the pin8(PA7) will output Hi,At this time, the &lt;data&gt; can transmit to the RYUW122 module by AT+ANCHOR_SEND command.</i></p> <p><i>During the&lt; Time of RF Disable &gt;, the pin8(PA7) will output Low.</i></p> <p>Example: Set TAG RF duty cycle as 1sec enable then 1 sec disable. <b>AT+TAGD=1000,1000</b></p>	<p>+OK</p>
<p>AT+TAGD?</p>	<p>+TAGD=1000,1000</p>

**12. AT+ANCHOR\_SEND** Send data to the appointed address

Syntax	Response
<p>AT+ ANCHOR_SEND =&lt;TAG Address&gt;,&lt;Payload Length&gt;,&lt;Data&gt;</p> <p>&lt;TAG Address&gt;8 BYTES ASCII</p> <p>&lt;Payload Length&gt; Maximum 12bytes</p> <p>&lt;Data&gt;ASCII Format</p> <p>Example : Send TEST string to the TAG Address DAVID123.  <b>AT+ANCHOR_SEND=DAVID123,4,TEST</b></p>	+OK

**13. AT+TAG\_SEND** Send data to the module and wait for the anchor to read it.

Syntax	Response
<p>AT+SEND=&lt;Payload Length&gt;,&lt;Data&gt;</p> <p>&lt;Payload Length&gt; Maximum 12bytes</p> <p>&lt;Data&gt;ASCII Format</p> <p>Example : Send HELLO string to the module.  <b>AT+TAG_SEND=5,HELLO</b></p>	+OK

14. **+ANCHOR\_RCV** Show the received data of ANCHOR actively.

Response
<p>+ANCHOR_RCV=&lt;TAG Address&gt;,&lt; PAYLOAD LENGTH&gt;,&lt;TAG DATA&gt;,&lt;DISTANCE&gt;</p> <p>&lt; TAG Address &gt; 8 BYTES ASCII TAG Address</p> <p>&lt; PAYLOAD LENGTH &gt; From 0 to 12</p> <p>&lt;TAG DATA&gt; ASCII Format Data</p> <p>&lt; DISTANCE &gt; The distance between ANCHOR and TAG in cm,The minimum output value is 0cm.</p>
<p>Example: ANCHOR received the Address DAVID123 send 5 bytes data, Content is HELLO string, Distance is 40cm, It will show as below.</p> <p><b>+ANCHOR_RCV=DAVID123,5,HELLO,40 cm</b></p>

15. **+TAG\_RCV** Show the received data of TAG actively.

Response
<p>+TAG_RCV=&lt; PAYLOAD LENGTH&gt;,&lt;DATA&gt;</p> <p>&lt; PAYLOAD LENGTH &gt; From 0 to 12</p> <p>&lt;DATA&gt; ASCII Format Data</p>
<p>Example: TAG received the Address ARIEL456 send 4 bytes data, Content is TEST string, It will show as below.</p> <p><b>+TAG_RCV=4,TEST</b></p>

16. **AT+CAL** Distance Calibration

Syntax	Response
<p>AT+CAL=&lt;DISTANCE CALIBRATION&gt;</p> <p>&lt;DISTANCE CALIBRATION&gt; From -100 to +100 (unit: cm)</p> <p>+0(Default)</p> <p>Example: Decrease the current output distance by 11cm</p> <p><b>AT+CAL=-11</b></p> <p><i>*The settings will be memorized in flash.</i></p>	+OK
AT+CAL?	+CAL=-11



**17. AT+VER?** To inquire the firmware version.

Syntax	Response
AT+VER?	+VER=RYUW122_V1.0

**18. Other messages**

Narrative	Response
After RESET	+RESET +READY

**19. Error result codes**

Narrative	Response
There is not "enter" or 0x0D 0x0A in the end of the AT Command.	+ERR=1
The head of AT command is not "AT" string.	+ERR=2
Parameter failure.	+ERR=3
Command failure.	+ERR=4
Unknow command.	+ERR=5

## Basic Command Example

	<b>ANCHOR</b>	<b>TAG</b>
Command/ Response	AT+MODE=1 +OK	AT+MODE=0 +OK
Command/ Response	AT+NETWORKID=REYAX123 +OK	AT+NETWORKID=REYAX123 +OK
Command/ Response	AT+ADDRESS=REYAX003 +OK	AT+ADDRESS=DAVID123 +OK
Command/ Response	AT+CPIN=FABC0002EEDCAA90FABC0002EEDCAA90 +OK	AT+CPIN=FABC0002EEDCAA90FABC0002EEDCAA90 +OK
Command/ Response		AT+TAG_SEND=5,HELLO +OK
Command/ Response	AT+ANCHOR_SEND=DAVID123,4,TEST +ANCHOR_RCV= DAVID123,5,HELLO,40 cm	+TAG_RCV=5,HELLO



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