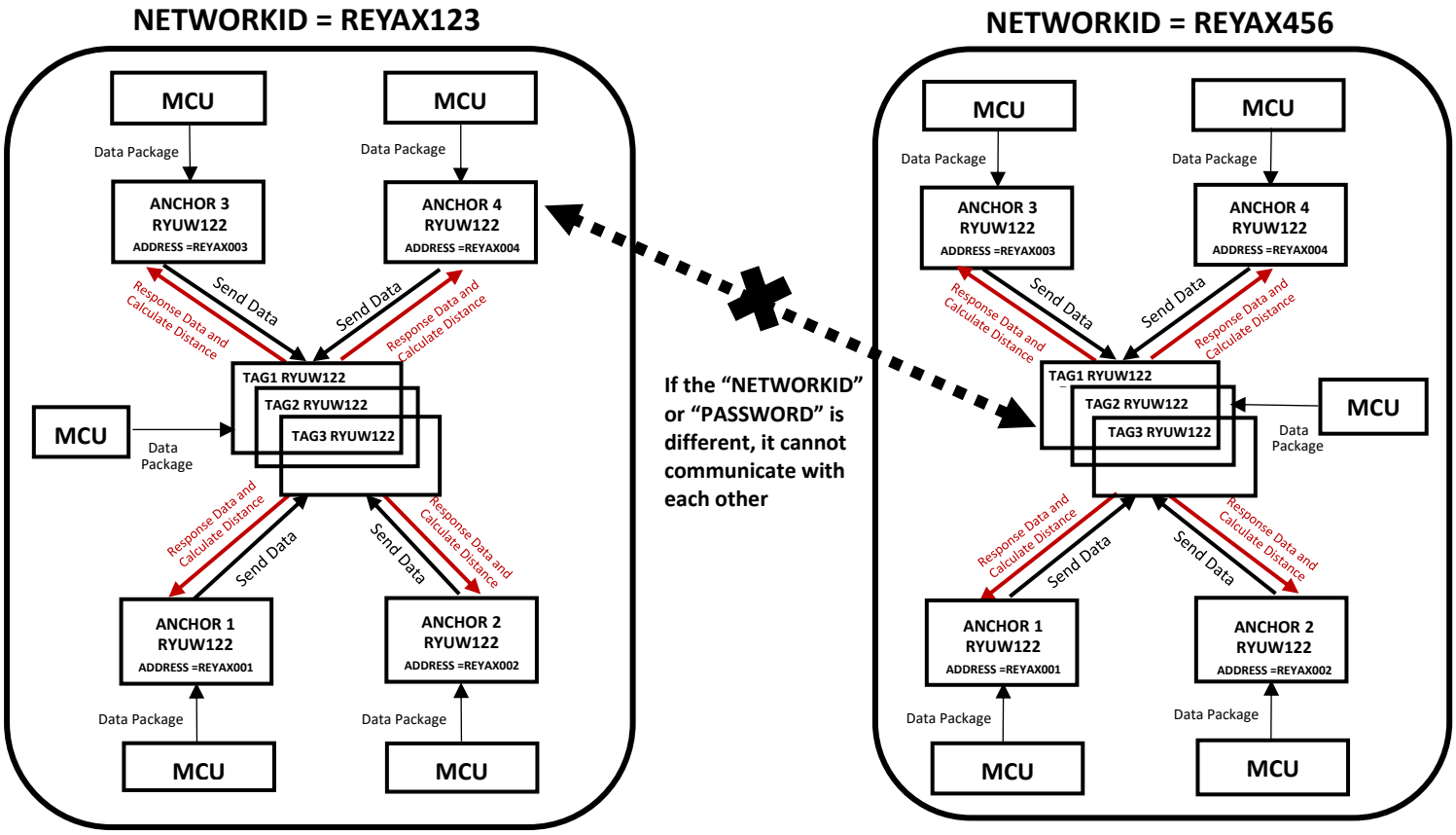
RYUW122 AT COMMAND GUIDE

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



1. When RYUW122 is the TAG role, the data is stored in RYUW122. When Anchor transmits the data to TAG, the data will be transmitted back to Anchor and the distance will be calculated.
2. The signals transmitted by each Anchor cannot overlap, otherwise the data will be easily lost.

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 *The settings will be memorized in flash.*	+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 data rate

Syntax	Response
AT+ BANDWIDTH=< data rate > < data rate >0~1, list as below： 0: 850 Kbps (Default) 1: 6.8 Mbps Example: Set the data rate as 6.8Mbps 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 Anchor12) Example: Set the NETWORKID as REYAX123 AT+NETWORKID=REYAX123 *The settings will be memorized in Flash.*	+OK
AT+NETWORKID?	+NETWORKID=REYAX123

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

Syntax	Response
AT+ADDRESS=<Address> <Address>= 8 BYTES ASCII (Default TAG12345) Example: Set the address of module as DAVID123. AT+ADDRESS=DAVID123 *The settings will be memorized in Flash.*	+OK
AT+ADDRESS?	+ADDRESS=DAVID123

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

Syntax	Response
AT+UID?	+UID=12345678901234567890 1234

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

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

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

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

12. **AT+CRFOP** Set the RF output power

Syntax	Response
AT+CRFOP=<Power> <Power>range 0 to 5 5=-32dBm(default) 4=-35dBm 3=-40dBm 2=-45dBm 1=-50dBm 0=-65dBm Example：set the output power as -50dBm AT+CRFOP=1 * It will be memorized in Flash after setting.	+OK
AT+CRFOP?	+CRFOP=1

13. AT+ANCHOR_SEND Send data to the appointed address

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

*The payload difference between Anchor and TAG cannot exceed 3 bytes, otherwise the distance may not be calculated due to the unbalanced payload lengths at both ends. If there is an excess, Null bytes can be added.

14. AT+TAG_SEND Send data to the module and wait for the anchor to read it.

Syntax	Response
AT+TAG_SEND=<Payload Length>,<Data> <Payload Length> Maximum 12bytes <Data>ASCII Format Example : Send HELLO string to the module. AT+TAG_SEND=5,HELLO	+OK

*The payload difference between Anchor and TAG cannot exceed 3 bytes, otherwise the distance may not be calculated due to the unbalanced payload lengths at both ends. If there is an excess, Null bytes can be added.

15. AT+RSSI to set the RSSI (Received Signal Strength Indication) display Enable/Disable

Syntax	Response
AT+RSSI=<Enable/Disable> < Enable/Disable> 0 : <RSSI> RSSI will not be displayed in the +ANCHOR_RCV and +TAG_RCV commands. (default) 1 : <RSSI> RSSI will be displayed in the +ANCHOR_RCV and +TAG_RCV commands. *The settings will be memorized in Flash.*	+OK
AT+RSSI?	+RSSI=0

16. **+ANCHOR_RCV** Show the received data of ANCHOR actively.

Response
+ANCHOR_RCV=<TAG Address>,< PAYLOAD LENGTH>,<TAG DATA>,<DISTANCE>,<RSSI> < TAG Address > 8 BYTES ASCII TAG Address < PAYLOAD LENGTH > From 0 to 12 <TAG DATA> ASCll Format Data < DISTANCE > The distance between ANCHOR and TAG in cm,The minimum output value is 0cm. <RSSI> Received Signal Strength Indication, This will be/not be displayed by the +RSSI command.
Example: ANCHOR received the Address DAVID123 send 5 bytes data, Content is HELLO string, Distance is 40cm, It will show as below. +ANCHOR_RCV=DAVID123,5,HELLO,40 cm

17. +TAG_RCV Show the received data of TAG actively.

Response
+TAG_RCV=< PAYLOAD LENGTH>,<DATA>,<RSSI> < PAYLOAD LENGTH > From 0 to 12 <DATA> ASCll Format Data <RSSI> Received Signal Strength Indication, This will be/not be displayed by the +RSSI command.
Example: TAG received the Address ARIEL456 send 4 bytes data, Content is TEST string, It will show as below. +TAG_RCV=4,TEST

18. AT+CAL Distance Calibration

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

19. AT+VER? To inquire the firmware version.

Syntax	Response
AT+VER?	+VER=RYUW122_V0.0.1

20. **AT+FACTORY** Set all current parameters to manufacturer defaults

Syntax	Response
AT+FACTORY Manufacturer defaults： +MODE=0 +IPR=115200 +CHANNEL=5 +BANDWIDTH=0 +NETWORKID=REYAX123 +ADDRESS=DAVID123 +CPIN=00000000000000000000000000000000 +TAGD=0,0 +CAL=0	+FACTORY

21. Other messages

Narrative	Response
After RESET	+RESET +READY

22. 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

	ANCHOR	**TAG**
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=4,TEST

REYAX
TECHNOLOGY CORPORATION, LTD

E-mail: sales@reyax.com
Website: http://reyax.com