WizFi360

Application – Throughput

Version 1.2

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History

Ver	Date	Description
1.0	Aug.2019	Initial version
1.1	Sep.2019	Add command mode throughput test result
1.2	Oct.2019	Modify contents about command mode

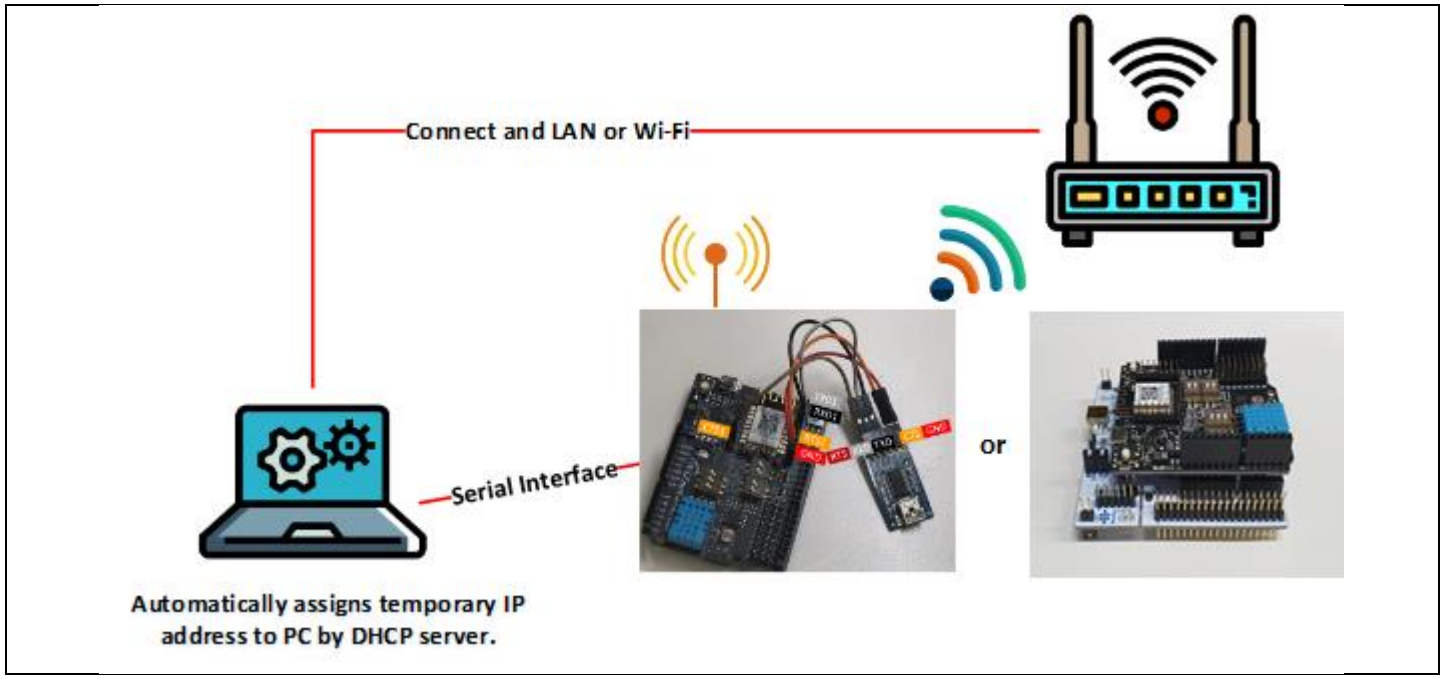
Contents

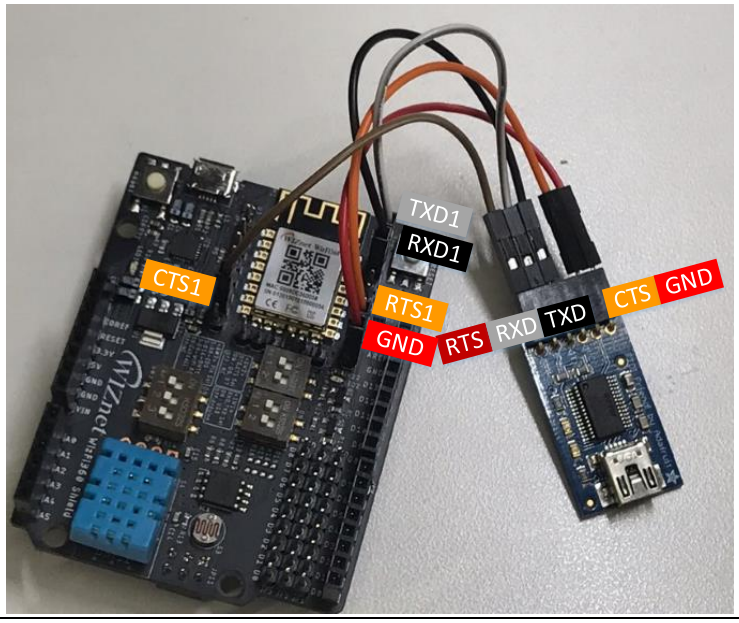
1. Test environment

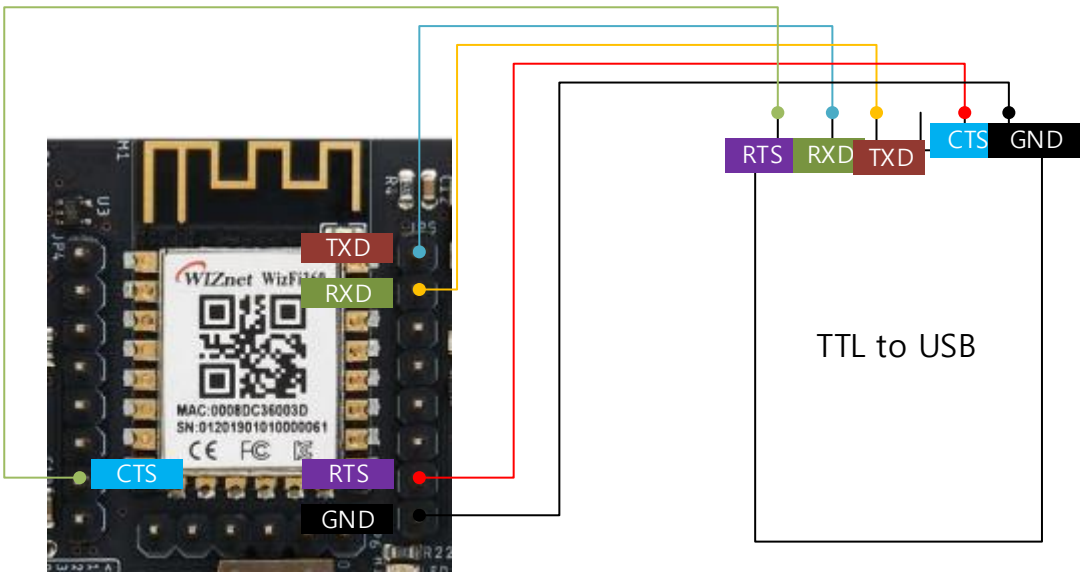
To UART throughput test, it controls using CTS / RTS and WizFi360 control software are required.

- WizFi360 EVB or WizFi360io
- STM32Fxxx EVB(NUCLEO-F401RE)
- PC
- Serial Tool
  - YAT Serial Tool(Data Mode)
- WizFi360 Control Software(Command Mode)
- 1Mbyte data file
- WiFi Router(exclude when it use in softAP mode)

When data mode uses, it sets RTS/CTS in flow control the using the YAT Serial Tool and it sets DTR as Data Read signal.
When command mode uses, it sets the AT+CIPSENDBUF=2048 as maximum length of the data to be transmitted and it sends data of 2048 length. Repeat the previous operation.




TXD1
RXD1
CTS1
RTS1
GND
RTS
RXD
TXD
CTS
GND


TXD
RXD
CTS
RTS
GND
RTS
RXD
TXD
CTS
GND
TTL to USB

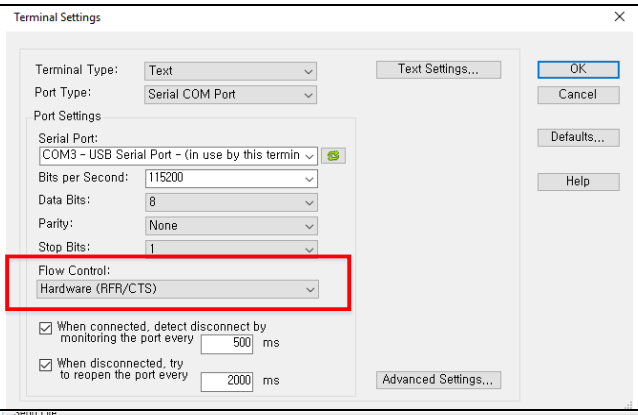
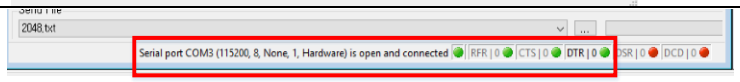
2. Using Serial command

- **Station Mode**

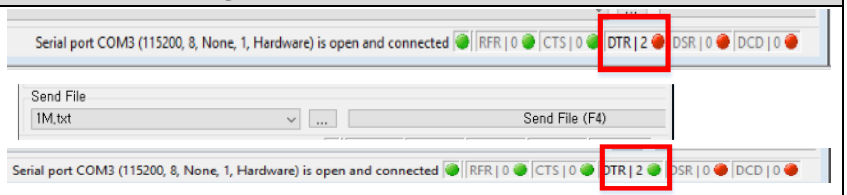
AT command	Terminal
AT AT+CWMODE_CUR=1 AT+CWDHCP_CUR=1,1 AT+CWLAP AT+CWJAP_CUR="wizms1","maker0701" AT+CIPSTA_CUR?	AT<CR><LF> <CR><LF> OK<CR><LF> AT+CWMODE_CUR=1<CR><LF> <CR><LF> OK<CR><LF> AT+CWDHCP_CUR=1,1<CR><LF> <CR><LF> OK<CR><LF> AT+CWLAP<CR><LF> +CWLAP:(4,"DIR-815_Wiznet",-59,"[redacted]",1)<CR><LF> +CWLAP:(0,"ESP_574935",-71,"[redacted]",1)<CR><LF> +CWLAP:(3,"##WIZnet_irina",-46,"[redacted]",1)<CR><LF> +CWLAP:(3,"Matthew2.4",-63,"[redacted]",2)<CR><LF> +CWLAP:(3,"rena",-46,"[redacted]",3)<CR><LF> +CWLAP:(0,"iptime",-67,"[redacted]",4)<CR><LF> +CWLAP:(3,"Dap",-63,"[redacted]",5)<CR><LF> +CWLAP:(0,"ESP_577CC7",-67,"[redacted]",6)<CR><LF> +CWLAP:(3,"wizms1",-63,"[redacted]",6)<CR><LF> +CWLAP:(0,"Wizfi360",-69,"[redacted]",6)<CR><LF> +CWLAP:(4,"DLINK-IPv6",-55,"[redacted]",10)<CR><LF> +CWLAP:(0,"iptime",-59,"[redacted]",11)<CR><LF> +CWLAP:(3,"WIZnet_Scott",-51,"[redacted]",11)<CR><LF> +CWLAP:(0,"WizFi360_A1B2D1",-69,"[redacted]",11)<CR><LF> +CWLAP:(3,"Teddy_AP",-57,"[redacted]",13)<CR><LF> <CR><LF> OK<CR><LF> AT+CWJAP_CUR="wizms1","maker0701"<CR><LF> WIFI DISCONNECT<CR><LF> WIFI CONNECTED<CR><LF> WIFI GOT IP<CR><LF> <CR><LF> OK<CR><LF> AT+CIPSTA_CUR?<CR><LF> +CIPSTA_CUR:ip:"192.168.1.120"<CR><LF> +CIPSTA_CUR:gateway:"192.168.1.1"<CR><LF> +CIPSTA_CUR:netmask:"255.255.255.0"<CR><LF> <CR><LF> OK<CR><LF>

- **UART CTS/RTS Setting**

AT command	Terminal
AT+CWUART_CUR = 115200,8,1,0,1	AT+UART_CUR=115200,8,1,0,1<CR><LF> <CR><LF> OK<CR><LF>
Terminal Setting	

1. Pressing Ctrl+Shift+S and Open the Terminal Settings window 2. You have to change the Hardware(RFR/CTS) in Flow Control	
3. If you can see under the terminal window that the CTS/DTR is green	

- TCP Client /Data mode

AT command	Terminal
AT+CIPSTART="TCP","192.168.100.27",5001 AT+CIPMODE=1 AT+CIPSEND	AT+CIPSTART="TCP","192.168.100.27",5001<CR><LF> CONNECT<CR><LF> <CR><LF> OK<CR><LF> AT+CIPMODE=1<CR><LF> <CR><LF> OK<CR><LF> AT+CIPSEND<CR><LF> <CR><LF> >
	Terminal Setting
1. When DTR is red, it sends the 1M.txt 2. If you click the DTR, it changes the DTR is green and it is sending the data through Serial	

- TCP Client / Command mode

AT command	Example Code

AT+CIPSTART="TCP","192.168.100.27",5001
AT+CIPMODE=0
AT+CIPSENDBUF=2048
Send the 1Mbyte.txt
	int8_t deviceTestThroughput_WizFi360(char *data, int len)
	{
	int8_t ret = RET_NOK;
	int cnt;
	int segid = 0;
	for(cnt = 0; cnt < (len / 4); cnt++) // 2k * 512 = 1M
	{
	if(ATCmdParser_send("AT+CIPSENDBUF=%d", len)&& ATCmdParser_recv("OK") && ATCmdParser_recv(">"))
	{
	if(ATCmdParser_send("%s", data) && ATCmdParser_recv("%d,SEND OK", &segid))
	{
	ret = RET_OK;
	}
	else
	{
	printf("Write data : failed\r\n");
	}
	}
	else
	{
	printf("Set buffer : failed\r\n");
	}
	}
	return ret;
	}

3. The result of UART Throughput

PC sends the 1Mbyte through serial of WizFi360(UART1) and WizFi360 send the data to TCP Server.

Baud rate	Data mode		Command mode	
	Time	Speed(bit/s)	Time	Speed(bit/s)
115200	123s	66K	93.9s	87.2K
921600	16.3s	502K	14.0s	585.1K
1000000	14.9s	550K	13.0s	630.2K
1250000	12.7s	645K	11.0s	744.7K
1500000	10.5s	780K	10.0s	819.2K
2000000	9.7s	845K	8.0s	1.0M

We measured the time from the start of data transfer to the end of data transfer using the wireshark tool, see Appendix 1.

Appendix 1

Baud rate	Data mode	Command mode
115200	123s : 66Kbit/s	11.0s : 744.7Kbit/s
921600	16.3s :502Kbit/s	10.0s : 819.2Kbit/s
1000000	14.9s : 550Kbit/s	8.0s : 1.0Mbit/s
1250000	12.7s : 645Kbit/s	11.0s : 744.7Kbit/s
1500000	10.5s : 780Kbit/s	10.0s : 819.2Kbit/s

2000000	9.7s : 845Kbit/s 6316 9.646387 192.168.100.28 192.168.100.27 TCP 490 65031 → 5001 [PSH, ACK] Seq=1023245 Ack=1 Win=614 6317 9.686546 192.168.100.27 192.168.100.28 TCP 54 5001 → 65031 [ACK] Seq=1 Ack=1023681 Win=65099 Le 6318 9.690489 192.168.100.28 192.168.100.27 TCP 374 65031 → 5001 [PSH, ACK] Seq=1023681 Ack=1 Win=614 6319 9.731538 192.168.100.27 192.168.100.28 TCP 54 5001 → 65031 [ACK] Seq=1 Ack=1024001 Win=64779 Le	8.0s : 1.0Mbit/s 3 2.492951 192.168.0.2 192.168.0.4 TCP 1078 63635 → 8000 [ACK] Seq=1 Ack=2 Win=6144 Len=1024 4 2.496860 192.168.0.2 192.168.0.4 TCP 1078 63635 → 8000 [PSH, ACK] Seq=1025 Ack=2 Win=6144 Len=1024 5 2.496929 192.168.0.4 192.168.0.2 TCP 54 8000 → 63635 [ACK] Seq=2 Ack=2049 Win=64512 Len=0 6 2.506899 192.168.0.2 192.168.0.4 TCP 1078 63635 → 8000 [ACK] Seq=2049 Ack=2 Win=6144 Len=1024 7 2.507544 192.168.0.2 192.168.0.4 TCP 1078 63635 → 8000 [PSH, ACK] Seq=3073 Ack=2 Win=6144 Len=1024 1533 10.470341 192.168.0.2 192.168.0.4 TCP 1078 63635 → 8000 [PSH, ACK] Seq=1045505 Ack=2 Win=6144 Len=1024 1534 10.470400 192.168.0.4 192.168.0.2 TCP 54 8000 → 63635 [ACK] Seq=2 Ack=1046529 Win=64512 Len=0 1535 10.485628 192.168.0.2 192.168.0.4 TCP 1078 63635 → 8000 [ACK] Seq=1046529 Ack=2 Win=6144 Len=1024 1536 10.485628 192.168.0.2 192.168.0.4 TCP 1078 63635 → 8000 [PSH, ACK] Seq=1047553 Ack=2 Win=6144 Len=1024 1537 10.485694 192.168.0.4 192.168.0.2 TCP 54 8000 → 63635 [ACK] Seq=2 Ack=1048577 Win=64512 Len=0