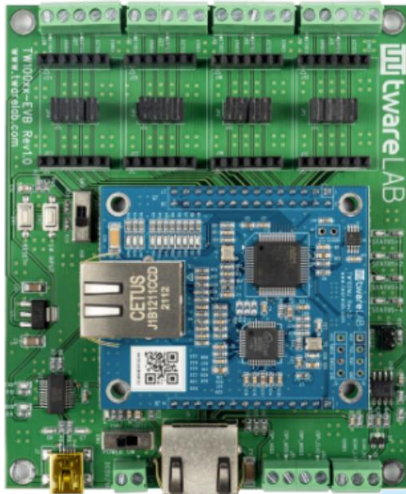


TW100XX-EVB

TARJETA DE EVALUACIÓN PARA TW100MJ



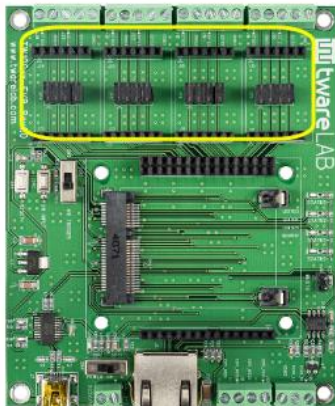
DESCRIPCIÓN:

TW100MJ-EVB es una placa de evaluación para el módulo integrado basado en WIZnet W5500 y ARM Cortex-M4 (ST o GIGA DEVICE) TW100MJ.

Se utiliza como convertidor de protocolo, el TW100MJ convierte los datos enviados por el dispositivo serial en datos TCP/IP y los transmite a la red, y convierte los datos TCP/IP recibidos a través de la red en datos seriales y los transmite.

CARACTERÍSTICAS:

- 4 canales en serie que se pueden procesar de forma simultánea e independiente.
- Se puede usar directamente conectando a un equipo en serie.
 - Agregue fácil y rápidamente la funcionalidad de Internet a su dispositivo serie.
 - El firmware se puede modificar para admitir varios dispositivos y entornos.
- Sistema estable y fiable con chip de hardware W5500.
- Adquisición de IP DHCP / Consulta DNS / Consulta de tiempo NTP / Soporte de configuración de zona horaria.
- Comunicación de datos TCP/UDP.
- Opción de empaquetamiento de datos Ethernet.
- Proporcione el programa de herramienta de configuración para una fácil configuración y control.
- Compatibilidad con comandos en serie para la configuración en serie.
- Admite interfaz Ethernet de 10/100 Mbps y interfaz serial de hasta 3 Mbps.
- Compatible con WIZ145SR de WIZnet.



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			Revisó	ARSL
			Fecha	14/11/2022

ESPECIFICACIONES:

PARÁMETRO	DESCRIPCIÓN
MCU	STM32F405RGT6 ó GD32F405RGT6 (RAM: 192Kbyte, FLASH: 1Mbyte)
LAN	W5500 (10/100 Mbps Ethernet)
UART	4 PUERTOS (3.3 VCD, TTL NIVEL)
Puerto de consola	SOPORTADO
Dimensión	TW100MJ: 48.26 (W) x 61.4 (H) x 22 (D) Tablero base: 108.00 (W) x 90.00 (H)
Conector	2.54 mm de cabecera de pines, J5: 2X14, J5: 1X14
Tensión de entrada	3.3 VCD
Disipación de energía	Típico: 100 mA, Pico: 150 mA
Temperatura	Operación: 0°C ~ 70°C, Almacenamiento: -40°C ~ 85°C
Humedad	10 ~ 80%

CONTENIDO

- TW100MJ
- Bsse de la placa
- Cable USB a mini 5PIN

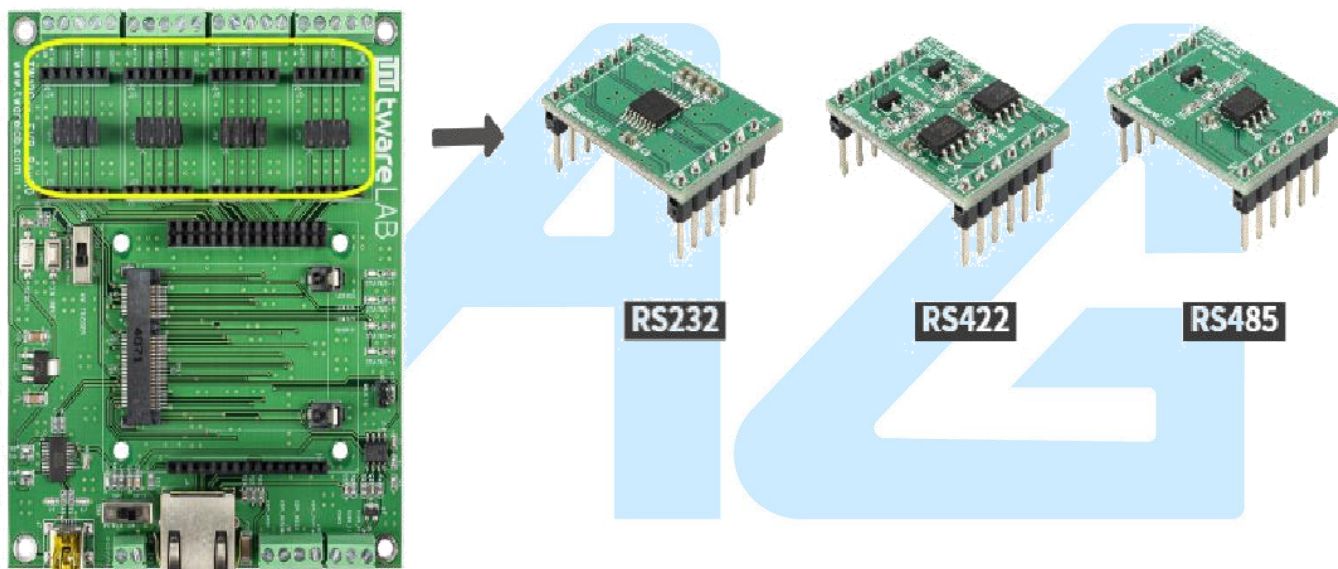


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TABLERO DE OPCIONES

Básicamente, el terminal serie está conectado al puerto UART del módulo TW100MJ a un nivel TTL de 3.3VCD. La conversión del nivel de señal RS232/RS422/RS485 es posible instalando un módulo convertidor en serie en el conector de cabecera dentro de cada terminal.

- Cambia el nivel TTL a RS232/RS422/RS485 mediante el módulo conversor.
- Disponible de 1 a 4 módulos en función de las necesidades.



Link de software de configuración:

https://www.dropbox.com/s/hhhmvvvanqrln2z/twarelab_config_v1-1-1.zip?dl=0

¿Qué vamos a innovar hoy?

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			Fecha	14/11/2022

twareLAB

4CH S2E Module

Datasheet Ver1.1

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1 INTRODUCTION

1.1 KEY FEATURES

- 4 Port Serial-to-Ethernet
- Support DHCP IP Acquisition
- Support DNS Query
- Support NTP Time Query
- Support Time Zone Setting
- TCP/UDP Data Communication
- Ethernet Data Packing Option
- Support Up to 3Mbps UART Baud Rate

1.2 PRODUCT SPECIFICATIONS

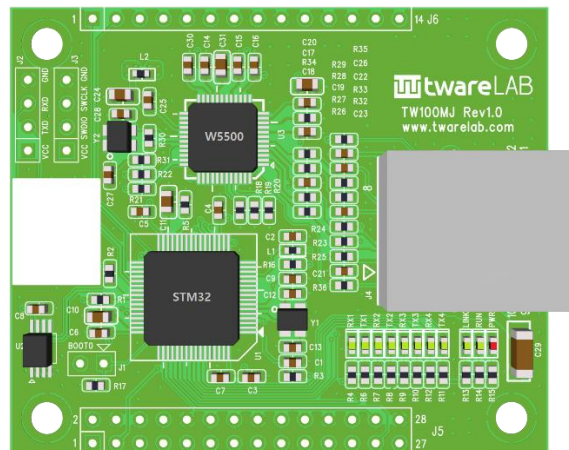
Specification	
MCU	STM32F405RGT6 (RAM: 192Kbyte, FLASH: 1Mbyte)
LAN	W5500 (10/100Mbps Ethernet)
UART	4 Port (3.3V TTL Level)
Console Port	Supported
Dimension	TW100MJ: 48.26(W)x61.4(H)x22(D), TW100XR: 48.26(W)x58.00(H)x15(D)
Connector	2.54mm Pitch Pin Header. J5: 2x14, J6: 1x14
Input Power	DC 3.3V
Power Dissipation	Typical: 100mA, Peak: 150mA
Temperature	Operation: 0°C ~ +70°C, Storage: -40°C ~ +85°C
Humidity	10 ~ 80%

2 HARDWARE SPECIFICATION

2.1 DESCRIPTION

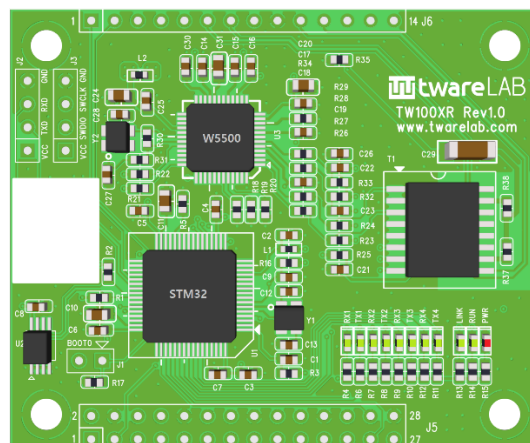
2.1.1 TW100MJ

- RJ45 embedded (Ethernet Transformer inside)
- 2.54 pitch pin header interface (42 pins)

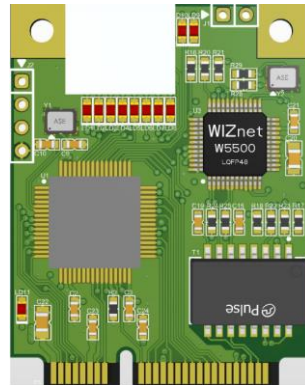


2.1.2 TW100XR

- Ethernet Transformer embedded
 - RJ45 is needed on the customer board
- 2.54 pitch pin header interface (42 pins)



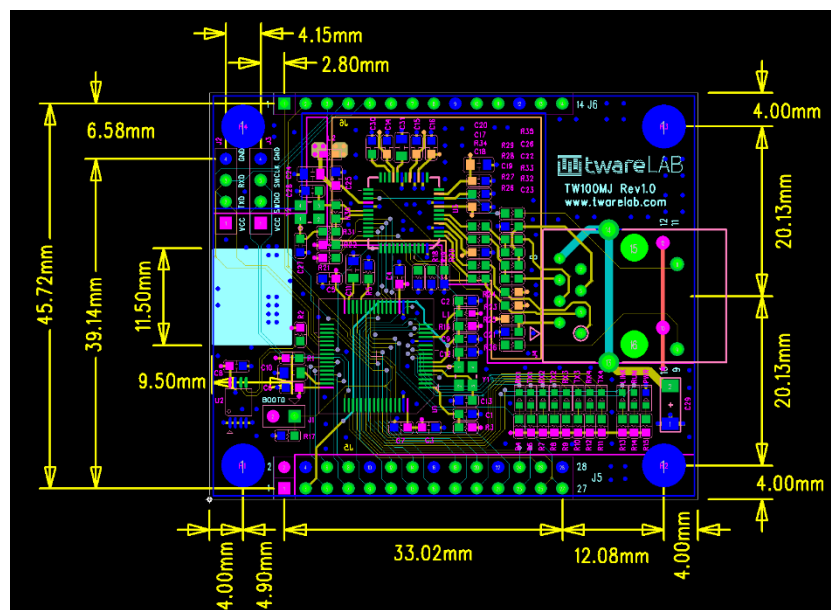
2.1.3 TW100PC



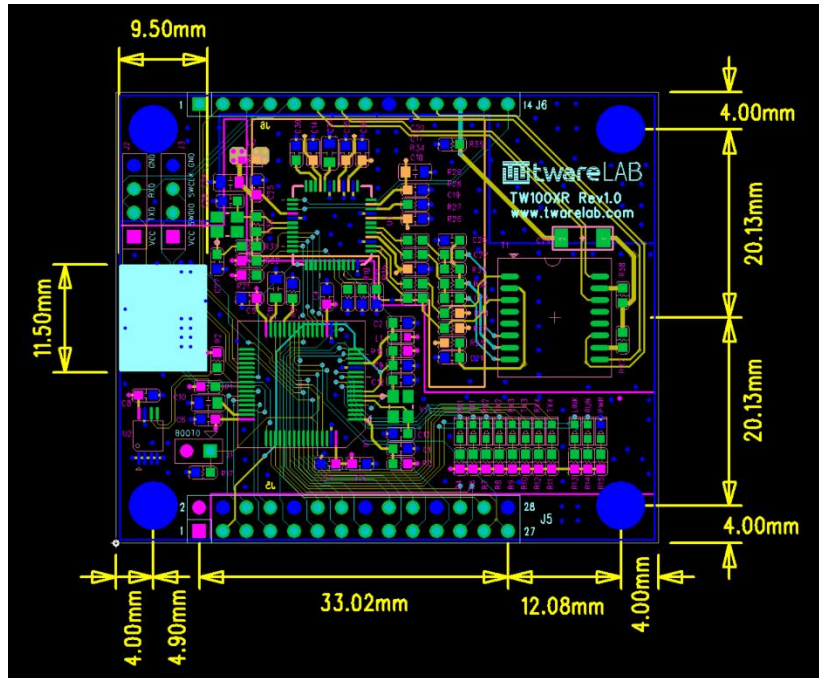
- Ethernet Transformer embedded
 - RJ45 is needed on the customer board
- miniPCI interface (52 pins)

2.2 DIMENSION

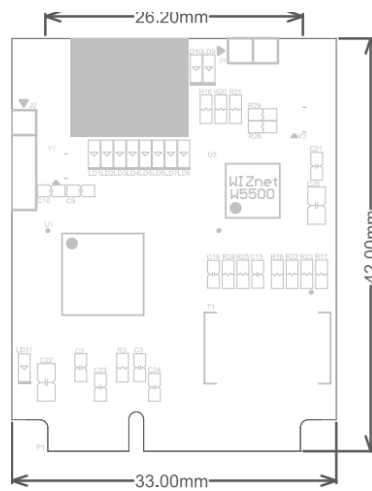
2.2.1 TW100MJ



2.2.2 TW100XR



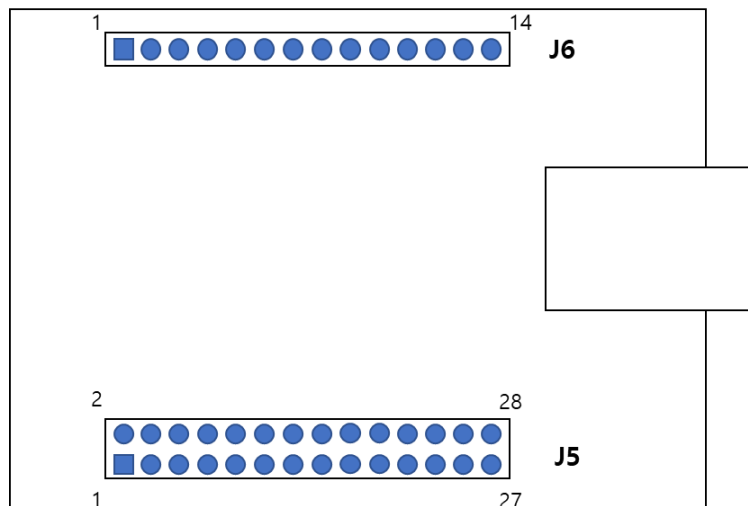
2.2.3 TW100PC



2.3 PIN MAP

2.3.1 TW100MJ / TW100XR

2.3.1.1 Header Pin Layout



2.3.1.2 J5 Connector

Pins	Signal	I/O	Description
1	VCC_3.3	S	Power 3.3V
2	VCC_3.3	S	Power 3.3V
3	/RESET	I	Board Rest, Active Low
4	GND	S	Ground
5	UART1_RX	I	3.3V TTL Level.
6	UART1_CTS	I	3.3V TTL Level
7	UART1_TX	O	3.3V TTL Level
8	UART1_RTS	O	3.3V TTL Level
9	STATUS_1	O	0: TCP Disconnected, 1: TCP Connected
10	GND	S	Ground
11	UART2_RX	I	3.3V TTL Level.
12	UART2_CTS	I	3.3V TTL Level
13	UART2_TX	O	3.3V TTL Level
14	UART2_RTS	O	3.3V TTL Level
15	STATUS_2	O	0: TCP Disconnected, 1: TCP Connected
16	GND	S	Ground
17	UART3_RX	I	3.3V TTL Level.
18	UART3_CTS	I	3.3V TTL Level
19	UART3_TX	O	3.3V TTL Level

20	UART3_RTS	O	3.3V TTL Level
21	STATUS_3	O	0: TCP Disconnected, 1: TCP Connected
22	GND	S	Ground
23	UART4_RX	I	3.3V TTL Level.
24	UART4_CTS	I	3.3V TTL Level
25	UART4_TX	O	3.3V TTL Level
26	UART4_RTS	O	3.3V TTL Level
27	STATUS_4	O	0: TCP Disconnected, 1: TCP Connected
28	GND	S	Ground

2.3.1.3 J6 Connector

Pins	Signal	I/O	Description
1	SW_INPUT	I	SW Input. Internal Pull-Up.
2	HW_TRIGGER	I	AT Command Mode Activate. Active Low. Internal Pull-Up
3	Console_TX	O	
4	Console_RX	I	
5	BOOT	I	Active High
6	MDI_TXM	O	Differential Signal to RJ45. Available for only TW100XR
7	MDI_TXP	O	Differential Signal to RJ45. Available for only TW100XR
8	NC		
9	GND	S	
10	MDI_RXM	I	Differential Signal to RJ45. Available for only TW100XR
11	MDI_RXP	I	Differential Signal to RJ45. Available for only TW100XR
12	AGND	S	Analog Ground
13	/LINK_LED	O	Active Low. LINK LED indicator. Available for only TW100XR
14	/ACT_LED	O	Active Low. ACT LED indicator. Available for only TW100XR

2.3.2 TW100PC

2.3.2.1 miniPCI Layout



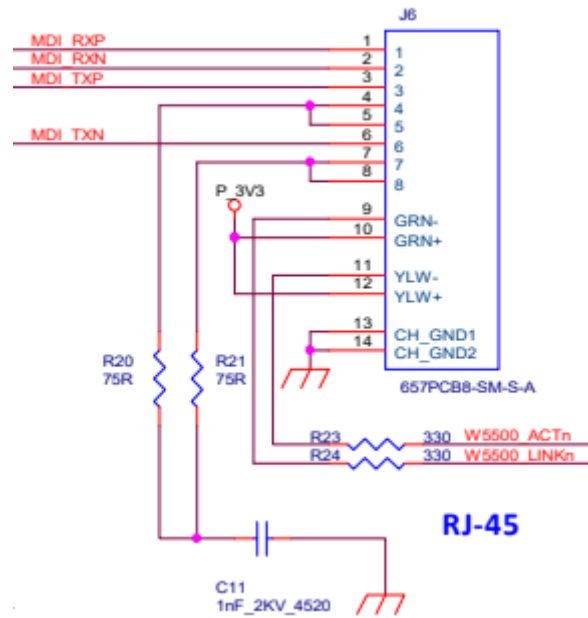
2.3.2.2 miniPCI Connector

Pins	Signal	I/O	Description
1	VCC_3.3	S	Power 3.3V
2	GND	S	Ground
3	NC		
4	NC		
5	NC		
6	NRST	I	Board Rest, Active Low
7	UART2_CTS	I	3.3V TTL Level
8	UART2_RTS	O	3.3V TTL Level
9	UART2_TX	O	3.3V TTL Level.
10	UART2_RX	I	3.3V TTL Level
11	VCC_3.3	S	Power 3.3V
12	GND	S	Ground
13	STATUS_1	O	0: TCP Disconnected, 1: TCP Connected
14	STATUS_2	O	0: TCP Disconnected, 1: TCP Connected
15	STATUS_3	O	0: TCP Disconnected, 1: TCP Connected
16	STATUS_4	S	0: TCP Disconnected, 1: TCP Connected
17	UART3_TX	O	3.3V TTL Level.
18	UART3_RX	I	3.3V TTL Level
19	NC		
20	UART3_CTS	I	3.3V TTL Level.
21	UART3_RTS	O	3.3V TTL Level
22	SW_Input	I	SW Input. Internal Pull-Up.
23	VCC_3.3	S	Power 3.3V
24	GND	S	Ground
25	Console_TX	O	3.3V TTL Level
26	Console_RX	O	3.3V TTL Level

27	NC		
28	NC		
29	UART1_TX	O	3.3V TTL Level.
30	UART1_RX	I	3.3V TTL Level
31	UART1_CTS	I	3.3V TTL Level.
32	UART1_RTS	O	3.3V TTL Level
33	NC		
34	NC		
35	UART4_RTS	O	3.3V TTL Level.
36	UART4_TX	O	3.3V TTL Level
37	UART4_RX	I	3.3V TTL Level.
38	UART4_CTS	I	3.3V TTL Level
39	HW_TRIGGER	I	AT Command Mode Activate. Active Low. Internal Pull-Up
40	NC		
41	NC		
42	NC		
43	VCC_3.3	S	Power 3.3V
44	GND	S	Ground
45	/LINK_LED		Active Low. LINK LED indicator
46	/ACT_LED		Active Low. ACT LED indicator
47	MDI_RXN		Differential Signal to RJ45
48	MDI_TXN		Differential Signal to RJ45
49	MDI_RXP		Differential Signal to RJ45
50	MDI_TXP		Differential Signal to RJ45
51	NC		
52	AGND		

2.4 REFERENCE SCHEMATIC

This is only for TW100XR and TW100PC.



3 HISTORY

Date	Description
2022-11-02	V1.0 First Released
2023-01-27	V1.1 Add 2.5 Reference Schematic

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4CH S2E Module

User Manual Ver1.0

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1 INTRODUCTION

1.1 KEY FEATURES

- 4 Port Serial-to-Ethernet
- Support DHCP IP Acquisition
- Support DNS Query
- Support NTP Time Query
- Support Time Zone Setting
- TCP/UDP Data Communication
- Ethernet Data Packing Option
- Support Up to 3Mbps UART Baud Rate

1.2 PRODUCT SPECIFICATIONS

Specification	
MCU	STM32F405RGT6 (RAM: 192Kbyte, FLASH: 1Mbyte)
LAN	W5500 (10/100Mbps Ethernet)
UART	4 Port (3.3V TTL Level)
Console Port	Supported
Dimension	TW100MJ: 48.26(W)x61.4(H)x22(D), TW100XR: 48.26(W)x58.00(H)x15(D)
Connector	2.54mm Pitch Pin Header. J5: 2x14, J6: 1x14
Input Power	DC 3.3V
Power Dissipation	Typical: 100mA, Peak: 150mA
Temperature	Operation: 0°C ~ +70°C, Storage: -40°C ~ +85°C
Humidity	10 ~ 80%

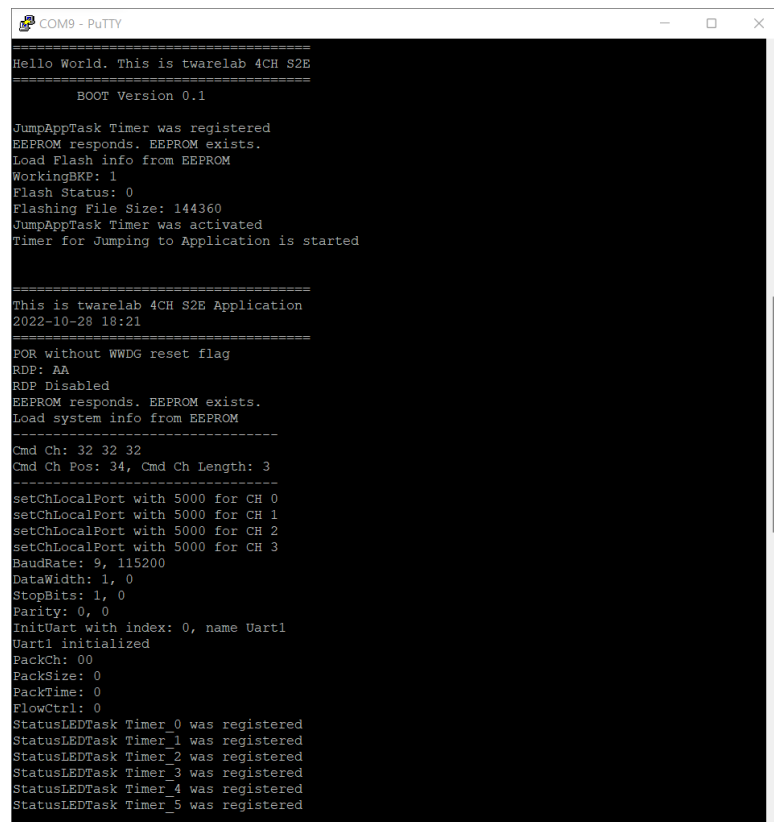
Table 1 Product Specifications

2 GETTING STARTED

2.1 HARDWARE SETTING

The procedure for testing the TW100xx EVB follows the below sequence.

- ① Connect the USB mini cable included in the EVB Box to the J7 USB MINI SOCKET.
- ② Connect the USB Type A terminal to the computer.
- ③ Change the power switch (SW4) to the [ON] part.
- ④ When the LD1 LED lights up, it means that the power is applied normally.
- ⑤ In Windows, the COM port number can be shown in “Device Manager” window. In case of Linux, the COM port can be listed by running `ls /dev/` command on the shell.
- ⑥ Run the Serial Terminal Program and open the Com port. **The default Baud Rate is 2Mbps.**
- ⑦ If no message is displayed, press SW1 (RESET SW) to hardware reset the module.
- ⑧ If the message shown in the figure below, the hardware setting has been completed.



```

COM9 - PuTTY
=====
Hello World. This is twarelab 4CH S2E
=====
BOOT Version 0.1

JumpAppTask Timer was registered
EEPROM responds. EEPROM exists.
Load Flash info from EEPROM
WorkingBKP: 1
Flash Status: 0
Flashing File Size: 144360
JumpAppTask Timer was activated
Timer for Jumping to Application is started

=====
This is twarelab 4CH S2E Application
2022-10-28 18:21
=====
FOR without WWDG reset flag
RDP: AA
RDP Disabled
EEPROM responds. EEPROM exists.
Load system info from EEPROM
=====
Cmd Ch: 32 32 32
Cmd Ch Pos: 34, Cmd Ch Length: 3
=====
setChLocalPort with 5000 for CH 0
setChLocalPort with 5000 for CH 1
setChLocalPort with 5000 for CH 2
setChLocalPort with 5000 for CH 3
BaudRate: 9, 115200
DataWidth: 1, 0
StopBits: 1, 0
Parity: 0, 0
InitUart with index: 0, name Uart1
Uart1 initialized
PackCh: 00
PackSize: 0
PackTime: 0
FlowCtrl: 0
StatusLEDTask Timer_0 was registered
StatusLEDTask Timer_1 was registered
StatusLEDTask Timer_2 was registered
StatusLEDTask Timer_3 was registered
StatusLEDTask Timer_4 was registered
StatusLEDTask Timer_5 was registered

```

Figure 1 Debug Message Screen at Boot

2.1.1 Debug Port

entry	Value
Baud Rate	2Mbps
Data Bit	8
Stop Bit	1
Parity	None
Flow Ctrl	None

Table 2 Settings for Debug UART Ports

2.2 FACTORY DEFAULT VALUE

classification	entry		Value
General Info	DHCP		Disable (Static IP)
	Debug		Disable
	Local IP Address		192.168.0.100
	Local Subnet		255.255.255.0
	Local Gateway		192.168.0.1
	DNS Server IP		168.126.63.1
Channel Info	Mode		Server Mode
	Connection Status		Disconnected
	DNS		Disable
	UDP		Disable
	Remote IP		0.0.0.0
	Local Port		0
	Remote Port		0
	Domain Name		NULL
	UART	Baud Rate	115200
		Data bit	8
		Stop bit	1
		Parity	None
	Packing Condition	Char	Disable (0x00)
		Size	Disable (0)
		Time	Disable (0)
	Inactivity Time		Disable (0)

Table 3 Factory reset values

2.3 RESET

There are two ways to reset a module.

Hardware Reset, which controls the /RESET pin connected to the NRST pin of the MCU, and
Software Reset, which controls the SW_INPUT pin connected to the GPIO of the MCU.

Software Reset is divided into “General Software Reset” and “Factory Reset” according to the time it takes to keep the SW_INPUT LOW.

2.3.1 Hardware Reset

It is the same as the specification of the NRST pin of MCU.

2.3.2 Software Reset

Keeping the SW_Input pin at least 100ms LOW will enter the Software Reset Enable state, and if you input the SW_Input pin to HIGH, the module will be Software Reset.

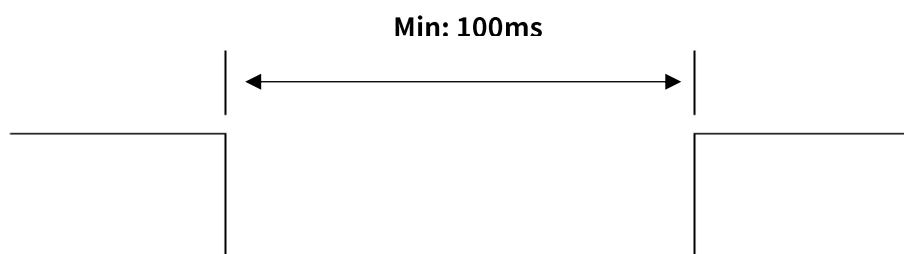


Figure 2 Software Reset Signal Timing Diagram

2.3.3 Factory Reset

If the SW_Input pin is kept at 5 seconds LOW, the “Factory Reset Enable” state is entered, and then you input the SW_Input pin to HIGH, the module changes all setting values to their initial factory settings.



Figure 3 Factory Reset Signal Timing Diagram

2.4 COMMAND MODE

HW_TRIGGER pin can be controlled to turn AT Command Mode on/off.

When the HW_TRIGGER pin go to LOW, it allows the module to be controlled via AT Command.

UART1 port only accepts AT Command. When the HW_TRIGGER pin is HIGH, UART1 is used for data communication, and when the HW_TRIGGER pin is LOW, UART1 is used for AT commands channel.

For details, see the section [AT Commands](#).

3 CONFIGURATION TOOL

twareLAB Standard Configuration Tool is a PC application used to set the configuration data on modules. There are two versions, one for Windows and one for Linux, and they are available as freeware.

Figure 4 below shows the initial screen displayed after running the Configuration Tool.

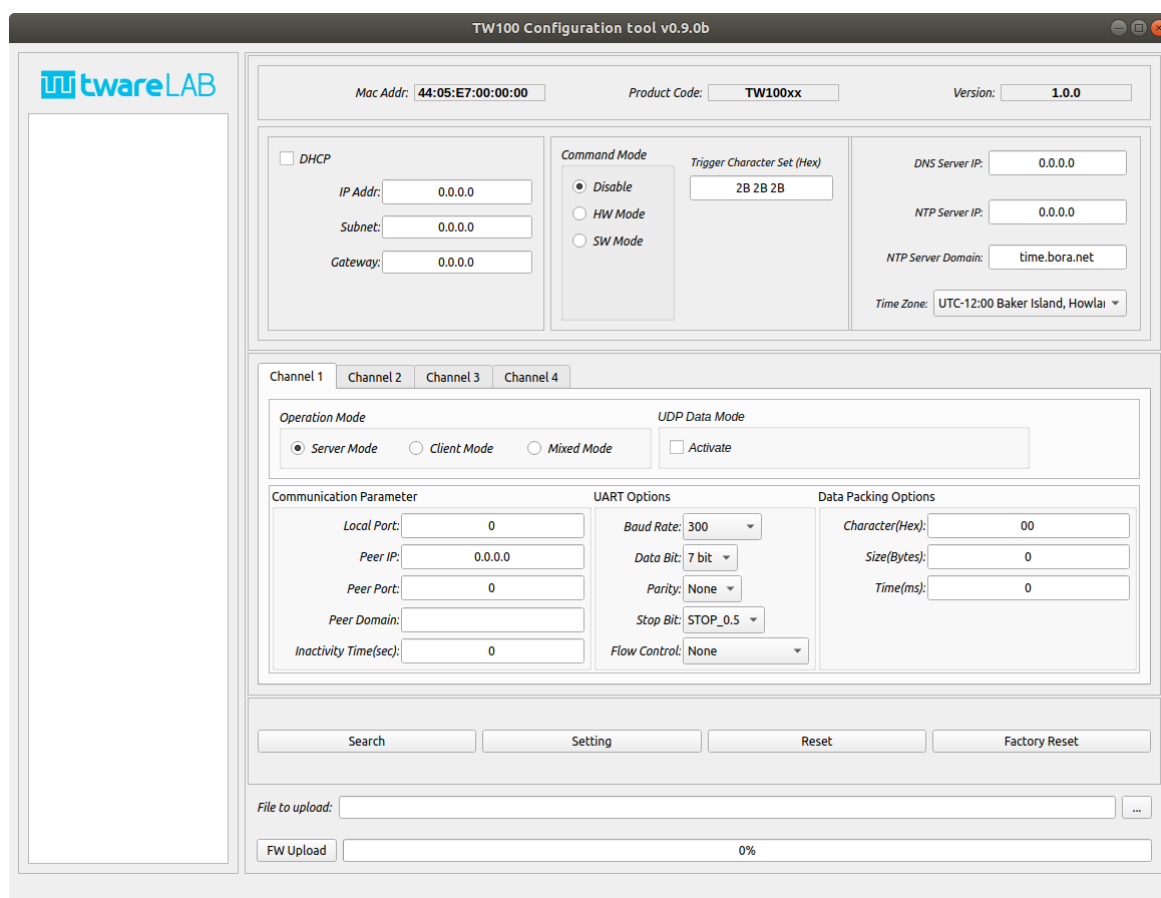
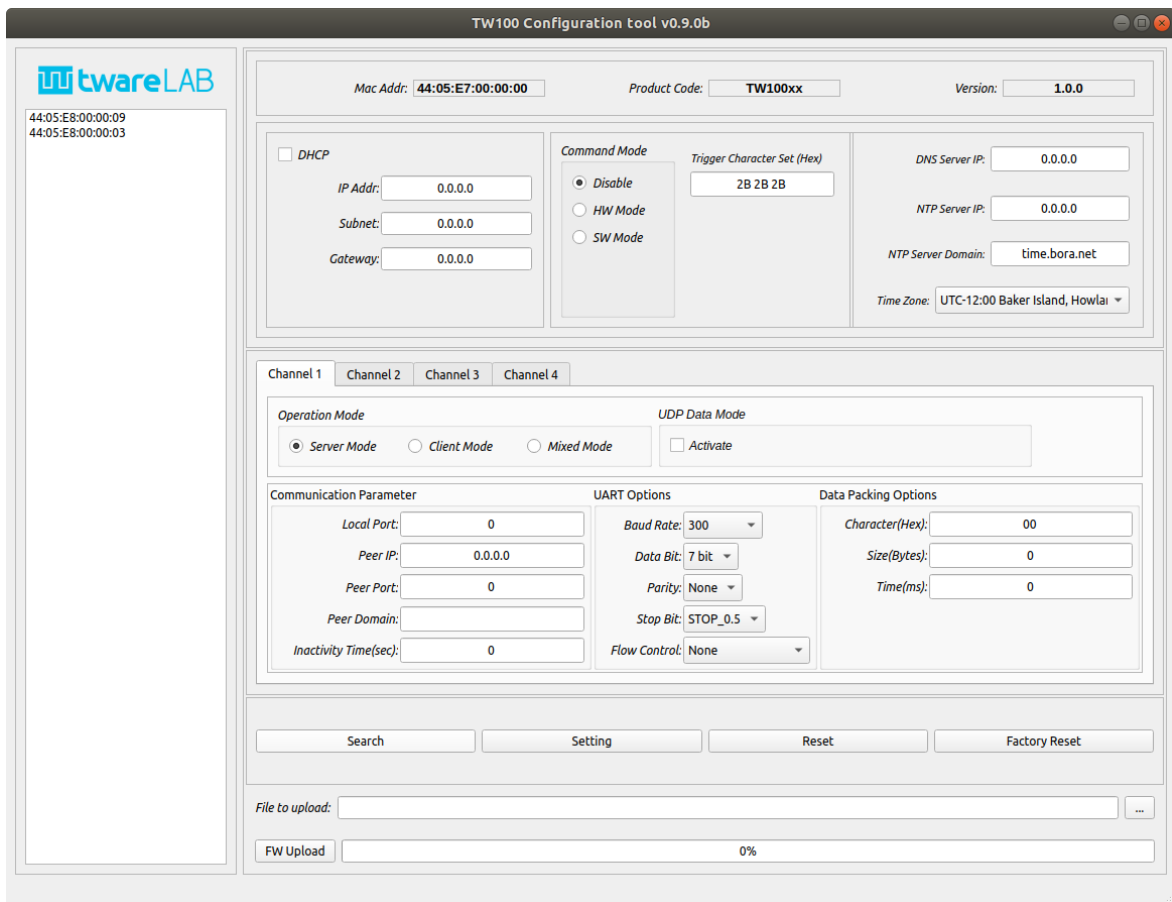


Figure 4 twareLAB Configuration Tool splash screen

Device search, configuration, reset, Factory reset, and firmware update functions can be performed, see "TW100XX Configuration Tool Manual" for detailed instructions.

The figure below shows the screen after Device search.



The screenshot displays the TW100 Configuration tool v0.9.0b interface. On the left, a list of MAC addresses is shown: 44:05:E8:00:00:09 and 44:05:E8:00:00:03. The main configuration area is divided into several sections:

- Mac Addr:** 44:05:E7:00:00:00
- Product Code:** TW100xx
- Version:** 1.0.0
- DHCP:** ☐ DHCP
- IP Addr:** 0.0.0.0
- Subnet:** 0.0.0.0
- Gateway:** 0.0.0.0
- Command Mode:**
 - ☒ Disable
 - ☐ HW Mode
 - ☐ SW Mode
- Trigger Character Set (Hex):** 2B 2B 2B
- DNS Server IP:** 0.0.0.0
- NTP Server IP:** 0.0.0.0
- NTP Server Domain:** time.bora.net
- Time Zone:** UTC-12:00 Baker Island, Howl...

Below these settings, there are tabs for Channel 1, Channel 2, Channel 3, and Channel 4. The Channel 1 tab is selected, showing the following options:

- Operation Mode:**
 - ☒ Server Mode
 - ☐ Client Mode
 - ☐ Mixed Mode
- UDP Data Mode:** ☐ Activate
- Communication Parameter:**
 - Local Port:** 0
 - Peer IP:** 0.0.0.0
 - Peer Port:** 0
 - Peer Domain:**
 - Inactivity Time(sec):** 0
- UART Options:**
 - Baud Rate:** 300
 - Data Bit:** 7 bit
 - Parity:** None
 - Stop Bit:** STOP_0.5
 - Flow Control:** None
- Data Packing Options:**
 - Character(Hex):** 00
 - Size(Bytes):** 0
 - Time(ms):** 0

At the bottom, there are buttons for Search, Setting, Reset, and Factory Reset. Below these buttons, there is a section for file upload:

- File to upload:** [Empty field]
- FW Upload:** 0%

Figure 5 Device Search Results Screen

The following is the firmware update screen.

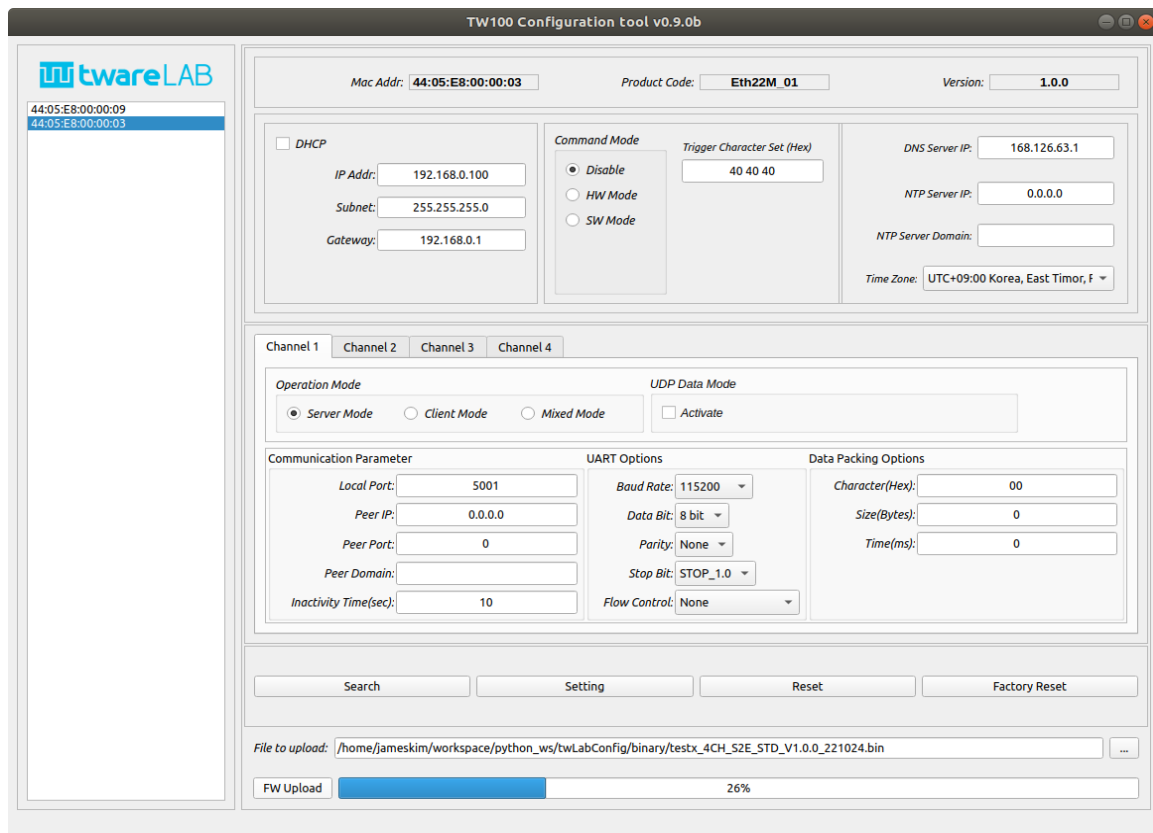


Figure 6 Firmware Upload Screen

If it is performed normally, the following message window will appear.

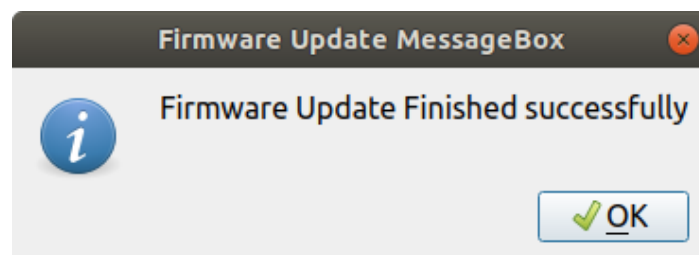


Figure 7Box displayed after firmware upload is complete

4 AT COMMANDS

Attention) All AT commands must always end with ‘\r\n’ at the end.

Function	Command Syntax
Command mode check	AT\r\n
Reboot the module	AT+REBOOT\r\n
Check PRODUCT ID	AT+PRODUCTID?\r\n
Check the firmware version	AT+VER?\r\n
MAC Address Verification	AT+MAC?\r\n
Check your registration status	AT+REG?\r\n
Request registration	AT+REG=<option>\r\n
Check network information	AT+DNETINFO?\r\n
Network Information Settings	AT+DNETINFO=<ip mode>,<local ip>,<subnet>,<gateway>\r\n
Check the DNS server address	AT+DNSIP?\r\n
Setting the DNS Server Address	AT+DNSIP=<dns server IP>\r\n
DNS Query request	AT+DNSQUERY?<domain name>\r\n
Check NTP Server Address	AT+NTP?\r\n
Setting NTP server address	AT+NTP=<ntp server url>\r\n
Check the current time	AT+TIME?\r\n
Check Time Zone	AT+TZONE?\r\n
Time Zone Settings	AT+TZONE=<time zone>\r\n
Check UART Information	AT+UART?\r\n
Setting UART Information	AT+UART=<uart num>,<uart1 setting>,...<uartn setting>\r\n
Check Peer information	AT+PEERINFO?\r\n
Setting Peer Information	AT+PEERINFO=<peer num>,<peer1 setting>,...<peern setting>\r\n
FWUP Start	AT+FWUPSTART=<file size>\r\n
FWUP Data	AT+FWUPDATA=<data>\r\n
FWUP Finish	AT+FWUPFINISH\r\n
SWI NPUT check	AT+SWINPUT?\r\n
SWINPUT Settings	AT+SWINPUT=<option>\r\n
CRC16 Usage Verification	AT+USECRC16?\r\n
Enabling CRC16	AT+USECRC16=<option>\r\n

Table 4 AT Command List

4.1 CHECK COMMAND MODE

4.1.1 command

```
AT\r\n
```

4.1.2 response

```
OK\r\n
```

4.1.3 Example

```
AT\r\n
OK\r\n
```

4.2 REBOOT THE MODULE

4.2.1 command

```
AT+REBOOT\r\n
```

4.2.2 response

```
+REBOOT\r\n
OK\r\n
```

4.2.3 Example

```
AT+REBOOT\r\n
+REBOOT\r\n
OK\r\n
```

4.3 CHECK PRODUCT ID

4.3.1 command

```
AT+PRODUCTID?\r\n
```

4.3.2 response

```
+PRODUCTID=<productid>\r\n  
OK\r\n
```

4.3.3 Example

```
AT+PRODUCTID?\r\n  
+PRODUCTID=0x0101\r\n  
OK\r\n  
AT+VER?\r\n
```

4.4 CHECK THE FIRMWARE VERSION

4.4.1 command

```
AT+VER?\r\n
```

4.4.2 response

```
+VER=<version>\r\n  
OK\r\n
```

4.4.3 Example

```
AT+VER?\r\n  
+VER=1.0.9\r\n  
OK\r\n
```

4.5 MAC ADDRESS VERIFICATION

4.5.1 command

```
AT+MAC? \r\n
```

4.5.2 response

```
+MAC=<mac addr>\r\n  
OK\r\n
```

4.5.3 Example

```
AT+MAC? \r\n  
+MAC=44:05:E8:12:34:56\r\n  
OK\r\n
```

4.6 CHECK YOUR REGISTRATION STATUS

4.6.1 command

```
AT+REG? \r\n
```

4.6.2 response

```
+REG=<status>\r\n  
OK\r\n
```

4.6.3 Example

```
AT+REG? \r\n  
+REG=0\r\n  
OK\r\n
```

4.7 REQUEST REGISTRATION

4.7.1 command

```
AT+REG=<option>\r\n
```

4.7.2 response

```
+REG=<option>\r\n
OK\r\n
```

4.7.3 Example

```
AT+REG=1\r\n
+REG=1\r\n
OK\r\n
```

4.8 REQUESTING NETWORK INFORMATION

4.8.1 command

```
AT+ DNETINFO?\r\n
```

4.8.2 response

```
+DNETINFO=<ip mode>,<local ip>,<subnet>,<gateway>\r\n
OK\r\n
```

4.8.3 Example

```
AT+DNETINFO? \r\n
+DNETINFO=0,192.168.0.100,255.255.255.0,192.168.0.1\r\n
OK\r\n
```

4.9 NETWORK INFORMATION SETTINGS

4.9.1 command

```
AT+DNETINFO=<ip mode>,<local ip>,<subnet>,<gateway>\r\n
```

4.9.2 response

```
+DNETINFO=<ip mode>,<local ip>,<subnet>,<gateway>\r\n
OK\r\n
```

4.9.3 Example

```
AT+DNETINFO=0, 192.168.0.101, 255.255.255.0, 192.168.0.1\r\n
+DNETINFO=0, 192.168.0.101, 255.255.255.0, 192.168.0.1\r\n
OK\r\n
```

4.10 CHECK THE DNS SERVER ADDRESS

4.10.1 command

```
AT+DNS? \r\n
```

4.10.2 response

```
+DNS=<dns server ip>\r\n
OK\r\n
```

4.10.3 Example

```
AT+DNS? \r\n
+DNS=168.126.63.1\r\n
OK\r\n
```

4.11 SETTING THE DNS SERVER ADDRESS

4.11.1 command

```
AT+DNS=<dns server ip>\r\n
```

4.11.2 response

```
+DNS=<dns server ip>\r\n
OK\r\n
```

4.11.3 Example

```
AT+DNS=168.126.63.1\r\n
+DNS=168.126.63.1\r\n
OK\r\n
```

4.12 CHECK THE NTP SERVER ADDRESS

4.12.1 command

```
AT+NTP? \r\n
```

4.12.2 response

```
+NTP=<ntp server domain>\r\n
OK\r\n
```

4.12.3 Example

```
AT+NTP? \r\n
+NTP=time.bora.net\r\n
OK\r\n
```

4.13 SETTING NTP SERVER ADDRESS

4.13.1 command

```
AT+NTP=<ntp server domain>\r\n
```

4.13.2 response

```
+NTP=<ntp server domain>\r\n
OK\r\n
```


4.13.3 Example

```
AT+NTP=time.bora.net\r\n
+NTP=time.bora.net\r\n
OK\r\n
```

4.14 CHECK THE CURRENT TIME

4.14.1 command

```
AT+TIME? \r\n
```

4.14.2 response

```
+TIME=YYYY/MM/DD/hh:mm:ss, <Day of Week>, <Time Zone>\r\n
OK\r\n
```

4.14.3 Example

```
AT+TIME? \r\n
+TIME=2022/08/03/02:44:33, WED, <?>\r\n
OK\r\n
```

4.15 TIME ZONE SETTINGS

4.15.1 command

```
AT+TZONE=<Time Zone>\r\n
```

4.15.2 response

```
+TZONE=<Time Zone>\r\n
OK\r\n
```

4.15.3 Example

```
AT+TZONE=+1\r\n
+TZONE=+1\r\n
OK\r\n
```

4.16 CHECK UART INFORMATION

4.16.1 command

```
AT+UART? \r\n
```

4.16.2 response

```
+UART=<uart num>, <uart 1 setting >,...,<uart n setting>\r\n
OK\r\n
```

4.16.2.1 Uart setting

Individual options use numeric characters between 0 ~ 15, and connects options with the Dash('-') character.

The order of the options is as follows.

<BaudRate>-<Databit>-<Stopbit>-<Parity>-<FlowCtrl>-<PackCH>-<PackSize>-<PackTime>-<InactivitiTime>

4.16.2.2 BaudRate

BaudRate(bps)	Value
300	0
600	1
1,200	2
2,400	3
4,800	4
9,600	5
19,200	6

38,400	7
57,600	8
115,200	9
230,400	10
460,800	11
921,600	12
1,000,000	13
2,000,000	14
3,000,000	15

Table 5 BaudRate Index

4.16.2.3 DataBit

Databit	Value
7 (Not Support yet)	0
8 (Default)	1

Table 6 DataBit Index

4.16.2.4 StopBit

Stopbit	Value
0.5 (Not support yet)	0
1 (Default)	1
1.5 (Not support yet)	2
2 (Not support yet)	3

Table 7 StopBit Index

4.16.2.5 Parity

Parity	Value
None	0
ODD	1
EVEN	2

Table 8 Parity Option Index

4.16.2.6 FlowCtrl

FlowCtrl	Value
None	0
XON/XOFF	1
RTS/CTS	2
RTS ONLY	3
Reverse RTS ONLY	4

Table 9 FlowCtrl Option Index

4.16.2.7 PackCH

Represents a character as a Hex value.

Space(= 20), '+' (= 32)

4.16.2.8 PackSize

A value between 0 ~ 1000 can be specified as a string.

4.16.2.9 PackTime

A value between 0 ~ 1000 can be specified as a string.

4.16.2.10 InactivityTime

A value between 0 ~ 3600 can be specified as a string.

4.16.3 Example

```
AT+UART? \r\n
+UART=1,9-1-1-0-2-00-0-0-10\r\n
OK\r\n
```

In the example above, one UART is set, Baudrate is 9(= 115200), Databit is 1(= 8bit), Stopbit is 1(= 1 bit), Parity is 0(= None), FlowCtrl is 2 (= RTS/CTS), PackCH is 00 (= Disable), and PackSize is 0(= Disable), PackTime is set to 0(= Disable), and Inactivity Time is set to 10(= 10 seconds).

4.17 SETTING UART INFORMATION

4.17.1 command

```
AT+UART=<uart num>, <uart 1 setting >, ..., <uart n setting>\r\n
```

4.17.2 response

```
+UART=<uart num>, <uart 1 setting >, ..., <uart n setting>\r\n
OK\r\n
```

4.17.3 Example

```
AT+UART=1,9-1-1-0-2-00-0-0-10\r\n
+UART=1,9-1-1-0-2-00-0-0-10\r\n
OK\r\n
```

4.18 CHECK PEER INFORMATION

4.18.1 command

```
AT+PEERINFO? \r\n
```

4.18.2 response

```
+PEERINFO=<peer num>, <peer1 setting >, ..., <peer n setting>\r\n
OK\r\n
```

4.18.2.1 Peer Setting

Individual options use numeric characters between 0 ~ 9, and connects options with the Dash('-') character.

<Operation Mode>-<Connection Status>-<bDNS>-<bUDP>-<Local Port>-<Remote IP>-<Remote Port>-<Remote Domain>

4.18.2.2 Operation Mode

Operation Mode	Value
----------------	-------

Server Mode	0
Client Mode	1

Table 10 Operation Mode Index

4.18.2.3 Connection Status

Connection Status	Value
Disconnected	0
Connected	1

Table 11 Connection Status Index

4.18.2.4 bDNS

DNS	Value
Disable	0
Enable	1

Table 12 DNS Option Index

4.18.2.5 bUDP

UDP	Value
TCP mode	0
UDP mode	1

Table 13 UDP Option Index

4.18.2.6 Local Port

Values between 0 ~ 65535 are expressed as strings.

4.18.2.7 Remote IP

xxx.xxx.xxx.xxx as a string.

4.18.2.8 Remote Port

Values between 0 ~ 65535 are expressed as strings.

4.18.2.9 Remote Domain

It is expressed as a string.

Specifies the string Null or domain name.

4.18.3 Example

```
AT+PEERINFO? \r\n
+ PEERINFO=1,0-0-1-0-5000-192.168.0.110-6000-\r\n
OK\r\n
```

In the above example, This means that one socket to communicate with the peer system is enabled, and for communication with the peer system, Operation Mode is 0(= Server Mode), the current Connection Status is 0(= Disconnected), DNS function is 1(= Enable), UDP is 0 (= TCP mode), Local Port is 5000, the Remote IP is set to 192.168.0.110, the Remote Port is set to 6000, and the Remote Domain is not specified.

4.19 SETTING PEER INFORMATION

4.19.1 command

```
AT+PEERINFO=<peer num>, <peer 1 setting >, ..., <peer n setting>\r\n
```

4.19.2 response

```
+PEERINFO=<peer num>,<peer1 setting >, ..., <peer n setting>\r\n
OK\r\n
```

4.19.3 Example

```
AT+PEERINFO=1,0-0-1-0-5000-192.168.0.110-6000-\r\n
+PEERINFO=1,0-0-1-0-5000-192.168.0.110-6000-\r\n
OK\r\n
```

※ Note) Even if there is no Remote domain, '-' must be entered at the end.

5 FLOW CONTROL MODE

5.1 RTS/CTS MODE

RTS / CTS Flow Control is a simple flow control mechanism that is part of the RS232 standard. It makes use of two further pins on the RS232 connector, RTS (Request to Send) and CTS (Clear to Send). These two lines allow the receiver and the transmitter to alert each other to their state.

When the receive buffer of Uart becomes Full, the RTS pin goes to HIGH, and when the receive buffer is released by more than a certain size, the RTS pin is output to LOW.

In addition, if the CTS pin is HIGH, data transmission (the TX pin of the UART) stops, and when the CTS pin drops LOW, data transmission can start.

5.2 XON/XOFF MODE

V1.0.0 does not support it.

5.3 RTS ONLY MODE

When connecting a UART to the RS485 Transceiver, the RTS pin is used for TX control of the RS485 Transceiver. You can use this mode if TX Enable is Active LOW.

The RTS signal drops to **LOW** before **loading** data into the TXD and switches to **HIGH** after **transmission is complete**.

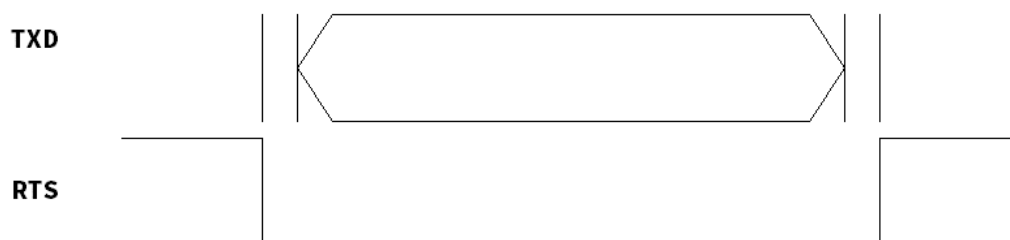


Figure 8 RTS Signal Timing Diagram in RTS Only Mode

5.4 REVERSE RTS ONLY MODE

*) V1.0.0 does not support it.

When connecting a UART to the RS485 Transceiver, the RTS pin is used for TX control of the RS485 Transceiver. You can use this mode when TX Enable is Active HIGH.

The RTS signal goes up to **HIGH before** loading data into the TXD and switches to **LOW after transmission is complete**.

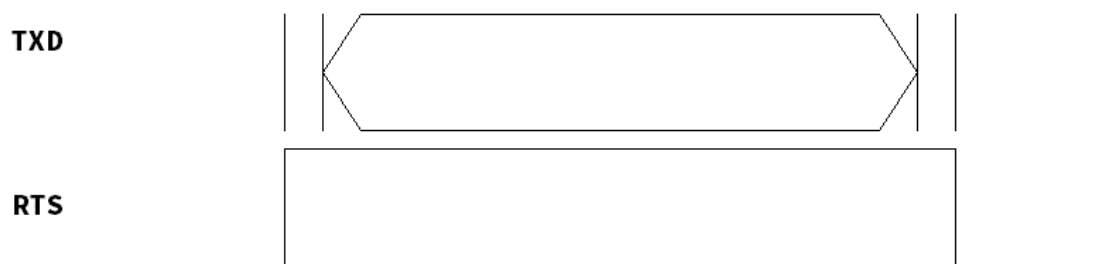


Figure 9 RTS Signal Timing Diagram in Reverse RTS Only Mode

6 OPERATION GUIDE

TCP and UDP settings are required for data communication, support various mode options as TCP Server, TCP Client, TCP Mixed, and UDP mode. In addition, the Data packing condition option can set the delimiter options of transmission data.

6.1 TCP SERVER MODE

TCP Server mode means that the TW100XX module acts as a server during the TCP connection establishment process for serial data communication, and waits for a TCP connection from any peer on the specified local port.

Performs an operation to send serial data received over a connected TCP connection and to send data received over a TCP connection to the serial interface.

Therefore, for TCP server mode operation, the operation mode must be set to "Server Mode" using AT Command or Configuration tool, and the network settings such as Local IP, Subnet, Gateway, and Local Port must be set normally.

Mac Addr: 44:05:E7:00:00:00 Product Code: TW100xx Version: 1.0.0

☐ DHCP

IP Addr: 0.0.0.0 Subnet: 0.0.0.0 Gateway: 0.0.0.0

Command Mode: ☒ Disable ☐ HW Mode ☐ SW Mode

Trigger Character Set (Hex): 2B 2B 2B

DNS Server IP: 0.0.0.0 NTP Server IP: 0.0.0.0 NTP Server Domain: time.bora.net Time Zone: UTC-12:00 Baker Island, Howla

Channel 1 Channel 2 Channel 3 Channel 4

Operation Mode: ☒ Server Mode ☐ Client Mode ☐ Mixed Mode

UDP Data Mode: ☐ Activate

Communication Parameter: Local Port: 5000 Peer IP: 0.0.0.0 Peer Port: 0 Peer Domain: Inactivity Time(sec): 0

UART Options: Baud Rate: 300 Data Bit: 7 bit Parity: None Stop Bit: STOP_0.5 Flow Control: None

Data Packing Options: Character(Hex): 00 Size(Bytes): 0 Time(ms): 0

Search Setting Reset Factory Reset

File to upload: FW Upload 0%

Figure 10 Server mode, Local Port settings

Usage example) After a user connects a TCP connection to TW100XX, let us take a look at the operation of sending data and sending it to the serial interface. (The Hercules program used in the example below supports both TCP/IP, UDP terminal functions, and serial port terminal functions, which is convenient for testing and can be downloaded from the following link. <https://www.hw-group.com/software/hercules-setup-utility>)

1. Attempt to connect to the TW100XX board (192.168.0.35:5000) and send "TEST_DATA_FROM_ETHERNET" data.

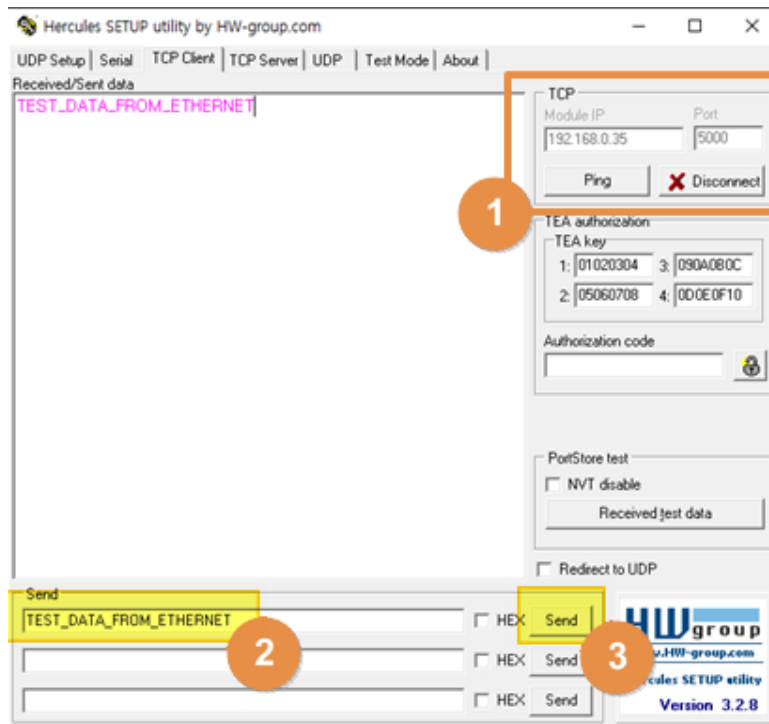


Figure 11 Data transfer after connecting to TCP client

2. You can check whether the "TEST_DATA_FROM_ETHERNET" data is received normally through the terminal of the serial interface (COM10, 115250bps) of the T W100XX board.

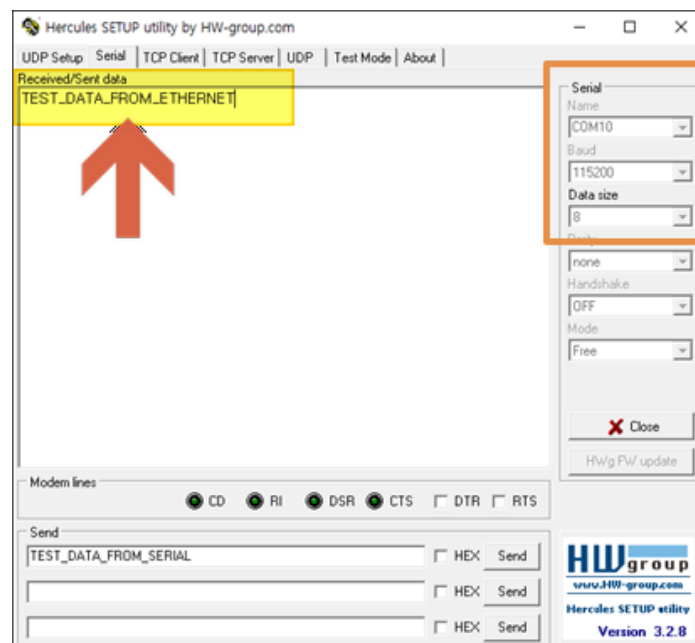
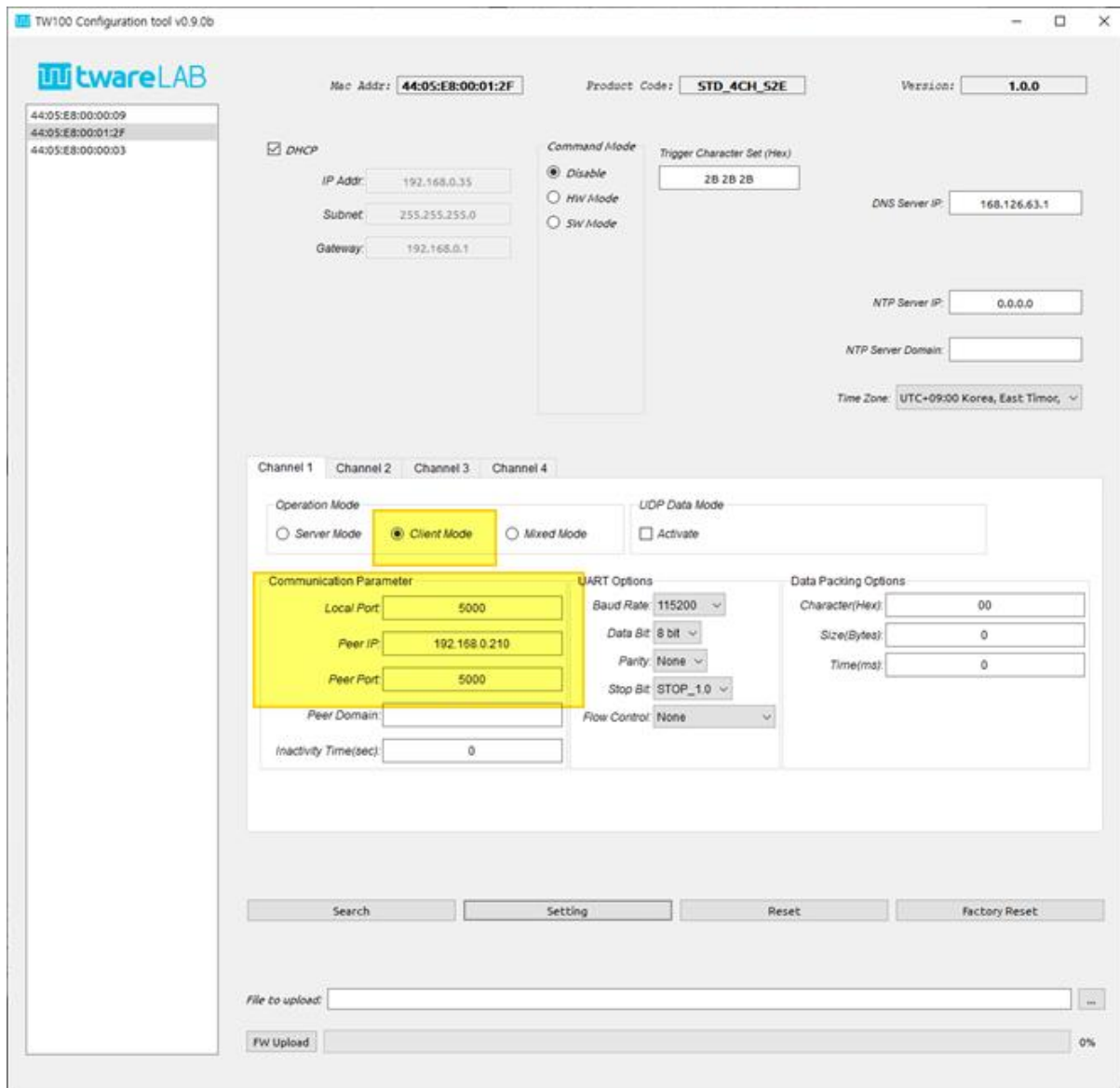


Figure 12 UART Terminal – Data Reception

6.2 TCP CLIENT MODE

Through the connected TCP connection, the method of transmitting and receiving data is the same. However, unlike the server mode, TX100XX module try to connect to the TCP server(Peer IP, Peer Port) until establishing the TCP connection.



The screenshot displays the TW100 Configuration tool v0.9.0b interface. The top section shows the device's Mac Addr (44:05:E8:00:01:2F), Product Code (STD_4CH_52E), and Version (1.0.0). Below this, the DHCP settings are visible, including IP Addr (192.168.0.35), Subnet (255.255.255.0), and Gateway (192.168.0.1). The Command Mode is set to Disable, and the Trigger Character Set (Hex) is 2B 2B 2B. The DNS Server IP is 168.126.63.1, and the NTP Server IP is 0.0.0.0. The Time Zone is set to UTC+09:00 Korea, East Timor.

The Channel 1 settings are highlighted in yellow. The Operation Mode is set to Client Mode. The Communication Parameter section includes Local Port (5000), Peer IP (192.168.0.210), Peer Port (5000), Peer Domain, and Inactivity Time(sec) (0). The UART Options section includes Baud Rate (115200), Data Bit (8 bit), Parity (None), Stop Bit (STOP_1.0), and Flow Control (None). The Data Packing Options section includes Character(Hex) (00), Size(Bytes) (0), and Time(ms) (0).

At the bottom, there are buttons for Search, Setting, Reset, and Factory Reset. A File to upload field is present, and a FW Upload progress bar shows 0%.

Figure 13 TCP Client mode, Peer IP/Port Settings

When the TCP connection is successful, it transmits the data received through the serial interface through the TCP connection, and sends the data received through the TCP connection to the serial interface.

6.3 TCP MIXED MODE

TCP Mixed mode is a method of Server and Client mode together. After the board reset, it operates in TCP Server mode and waits for a TCP connection attempt. In other words, it works the same as the TCP server mode. However, if serial data is received when there is no TCP connection, it is changed to Client mode without waiting as the server mode, and it supports trying to connect to TCP to the server specified in "Peer IP" and "Peer Port" and sending data immediately.

Therefore, when using Mixed mode, all the values of "Operation Mode", "Local Port", "Peer IP", and "Peer Port" must be set as shown in the figure below.

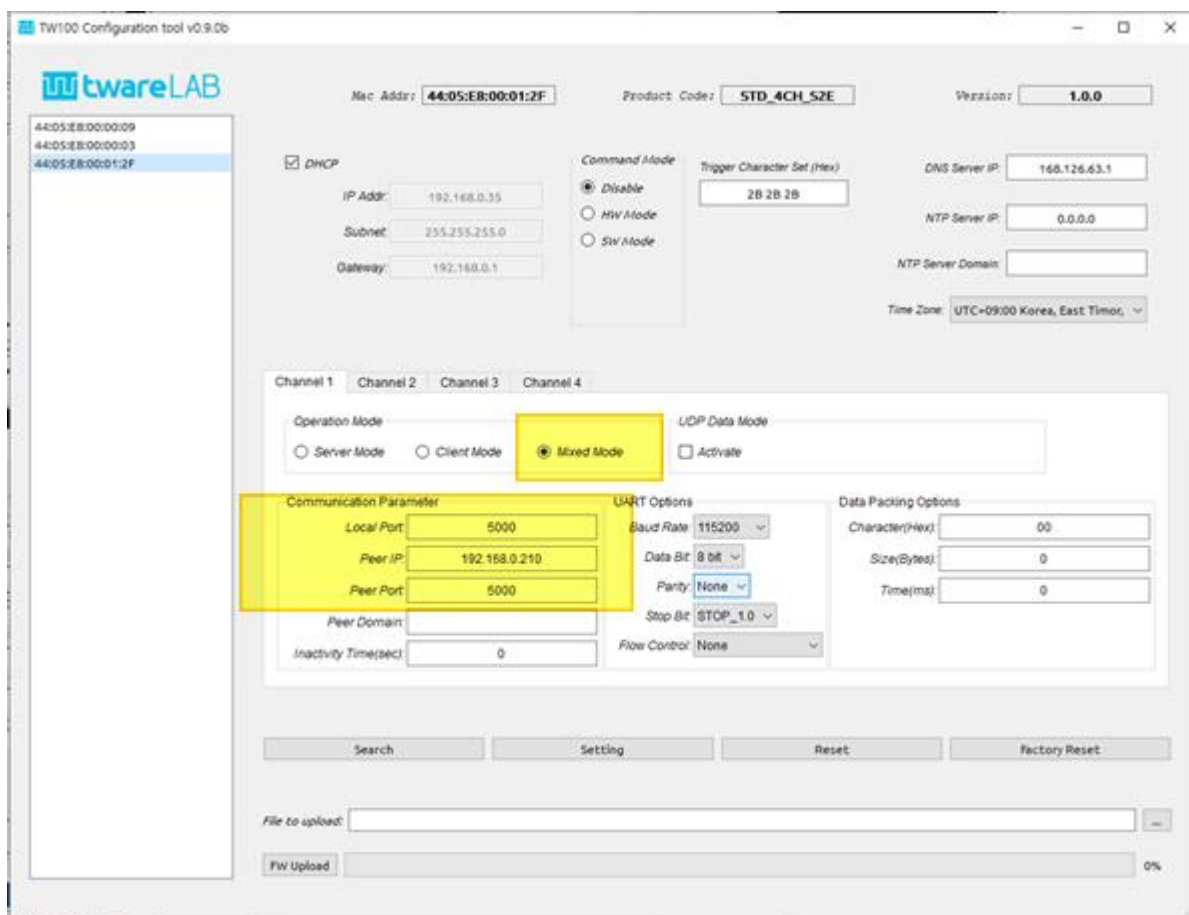


Figure 14 TCP Mixed mode, Local Port, Peer IP/Port Settings

6.4 UDP Mode

UDP mode is a mode that sends serial data through UDP communication instead of TCP.

The configuration is similar to TCP Mixed mode, as shown in the figure below. However, UDP Data Mode must be "Activate".

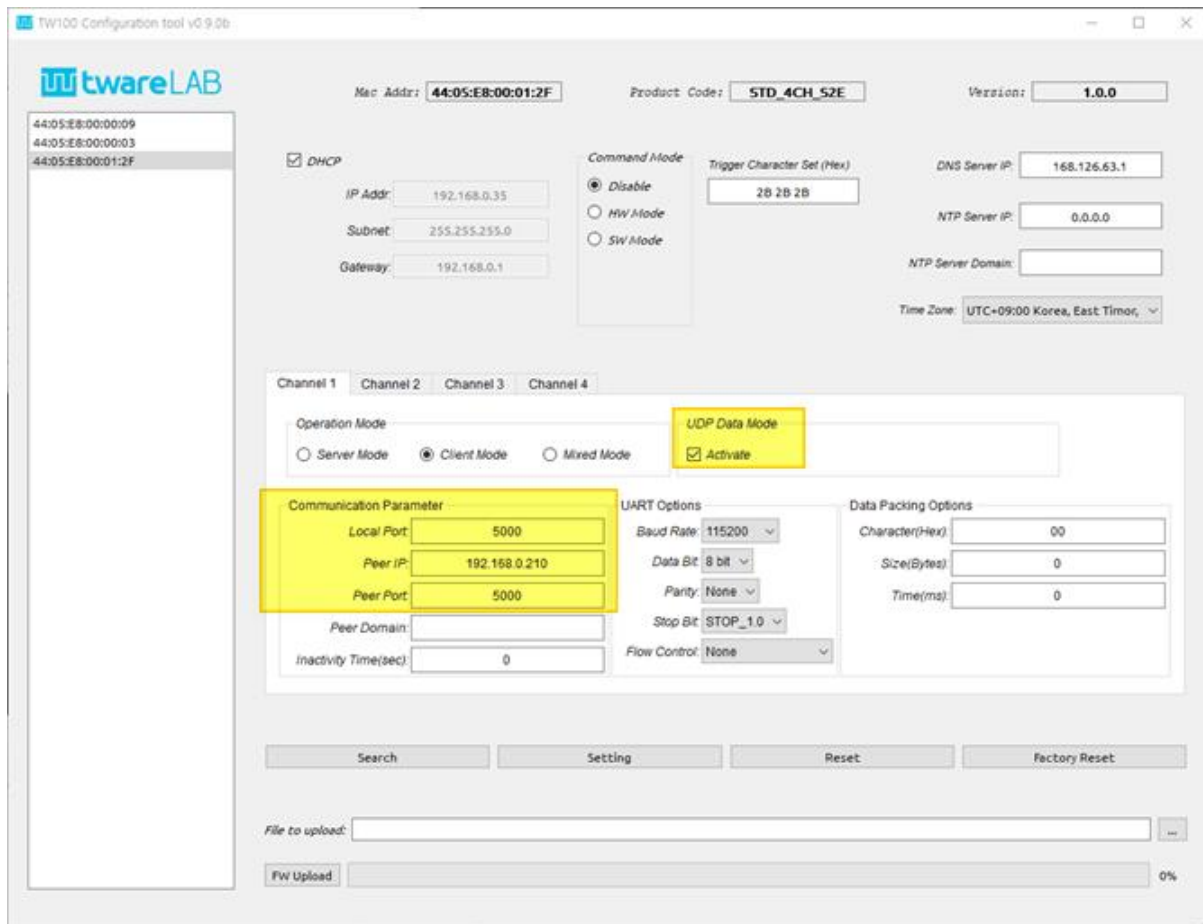


Figure 15 UDP mode, Local Port, Peer IP/Port settings

Usage example) When the user enables UDP mode on TW100XX and sends serial data, it is sent to UDP.

1. Sends data to the serial interface connected to the TW100XX.

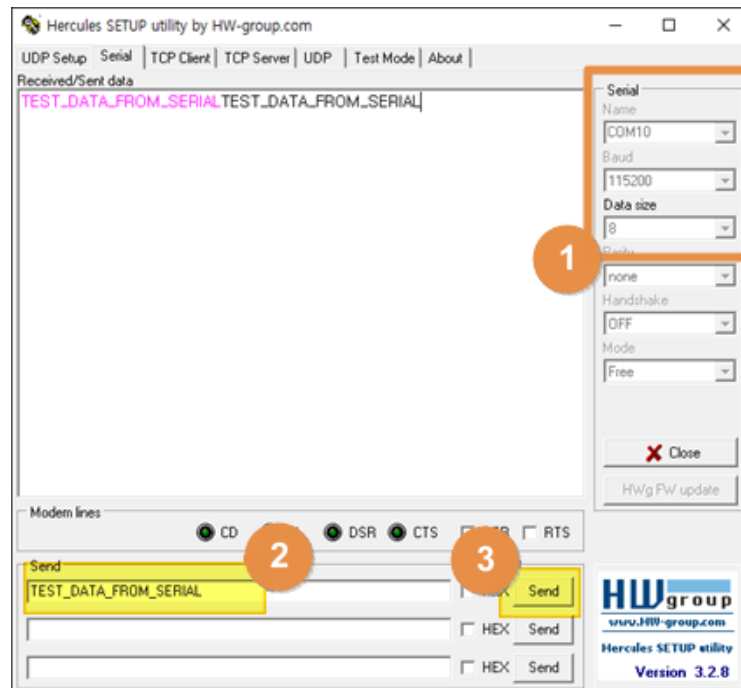


Figure 16 UART connection and data transfer

- As shown in the figure below, you can see that data is normally received via UDP through the network terminal.

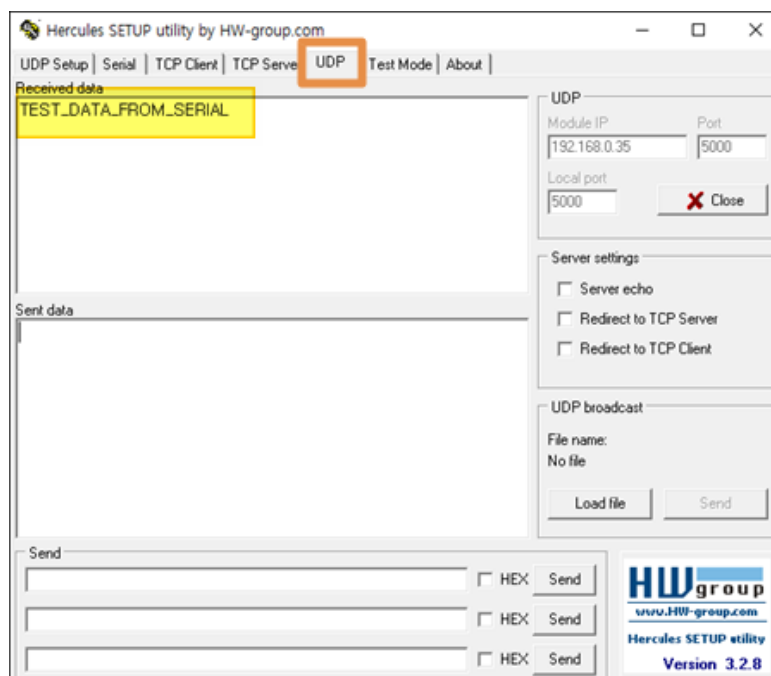


Figure 17 UDP Data Reception

6.5 DATA PACKING OPTION

When transmitting serial data to the TCP/IP network, the basic method is to send the data received from the serial directly in real time, but it is a function used when you want to collect data until a specific condition is satisfied and send the data to the TCP/IP network all at once. If two or more conditions are set, data is transmitted as soon as one condition is satisfied.

- ① Character (Hex code) – Collects serial buffer data until a specified character is entered, and then creates and transmits Ethernet packets at a time. In the Configuration tool, you can specify it as a hex code value. For example, if you want to set a carriage return(CR), enter "0d", which is the hex code value of ascii code. If the value is "00", disable this condition.
- ② Size (0 ~ 1000 bytes) - Wait until a certain length of data is stored in the serial buffer, and when the data bytes of that length are collected, they are made into Ethernet packets and transmitted at once. If the value is "0", disables this condition.
- ③ Time (0 ~ 65535 ms) – Collects serial buffer data until the specified time (milliseconds) is reached, and then creates and transmits Ethernet packets at a time. If the value is "0", disables this condition.

Usage example) Let us look at the behavior of TW100XX when the user activates the "Character" part of the "Data Packing Condition" section.

- ① Set the value of 0x0A in the "Character" section of the "Data Packing Option" section.

TW100 Configuration tool v0.9.0b

Mac Addr: 44:05:E8:00:01:2F Product Code: STD_4CH_52E Version: 1.0.0

☒ DHCP

IP Addr: 192.168.0.35 Subnet: 255.255.255.0 Gateway: 192.168.0.1

Command Mode
☒ Disable
☐ HW Mode
☐ SW Mode

Trigger Character Set (Hex): 32 32 32

DNS Server IP: 168.126.63.1
 NTP Server IP: 0.0.0.0
 NTP Server Domain:
 Time Zone: UTC+09:00 Korea, East Timor, ▾

Channel 1 Channel 2 Channel 3 Channel 4

Operation Mode
☐ Server Mode ☒ Client Mode ☐ Mixed Mode

UDP Data Mode
☐ Activate

Communication Parameter
 Local Port: 5000 Peer IP: 192.168.0.210 Peer Port: 5000 Peer Domain:
 Inactivity Time(sec): 0

UART Options
 Baud Rate: 115200 Data Bit: 8 bit Parity: None Stop Bit: STOP_1_0 Flow Control: None

Data Packing Options
 Character(Hex): 0A
 Size(Bytes): 0
 Time(ms): 0

Search Setting Reset Factory Reset

File to upload: FW Upload 0%

Figure 18 Data packing – Character setting

- ② Send data containing 0x0A to the serial interface connected to the TW100XX as shown below. “1234567” + 0x0A

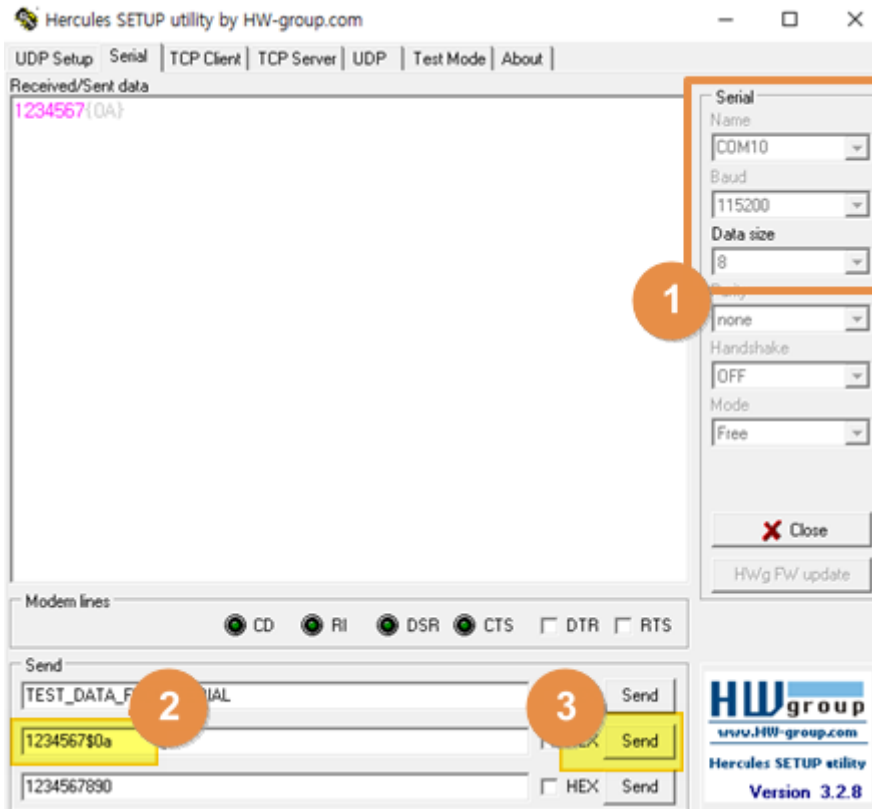


Figure 19 UART Data Transfer (including Data Packing character)

- ③ In PC connected to TCP, the "1234567" +0x0A value is normally entered at once. (If the Data Packing Option is not set, it is received in several data packets instead of at once.)

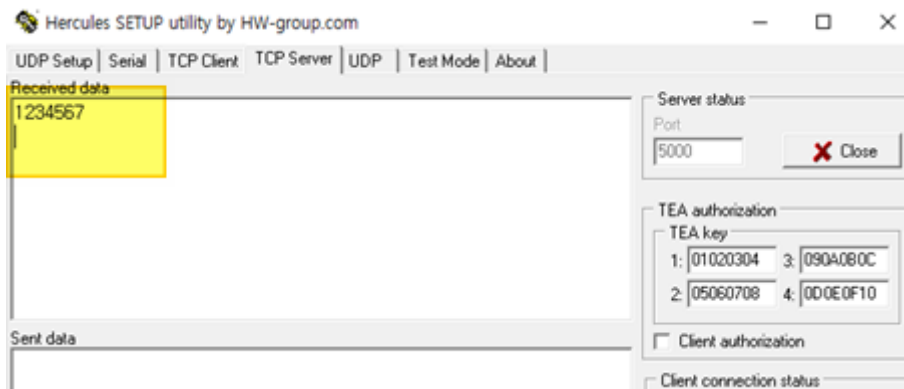


Figure 20 Receiving Packing Data

6.5.1 Data Packing Option Order

The Data Packing Option can be used in combination of three conditions. The order of conditions is Character -> Size -> Time.

7 EVALUATION BOARD

7.1 HARDWARE SPECIFICATION

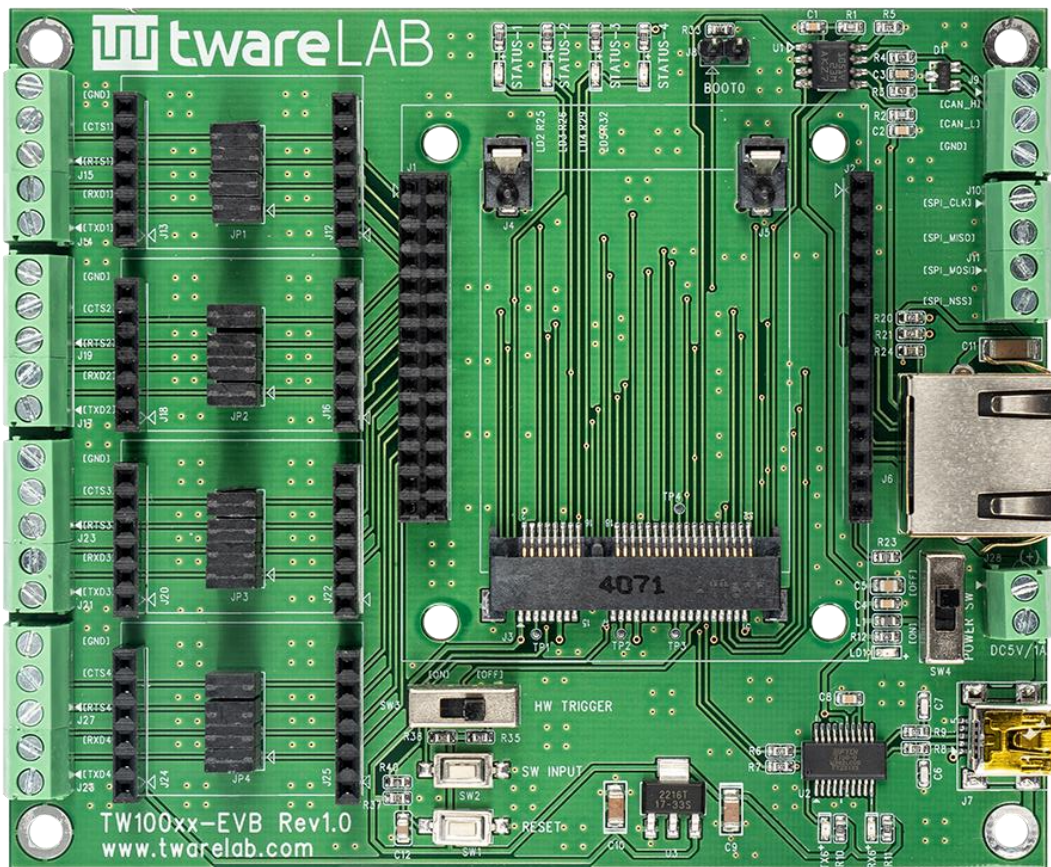


Figure 21 TW100xx EVB Image

The TW100xx-EVB is divided into 6 blocks.

Serial terminal blocks, CAN/SPI terminal blocks, power supply blocks, external switch input blocks, module mounting blocks, and Ethernet connection LED blocks. Each block is described in the following sections.

7.1.1 Serial Terminal Block

The serial terminal block is a terminal block for connecting with each serial port for data communication from the outside. Basically, the serial terminal is connected to the UART port of the TW100xx module at a 3.3V TTL level.

Four RXD/TXD/RTS/CTS pins are connected.

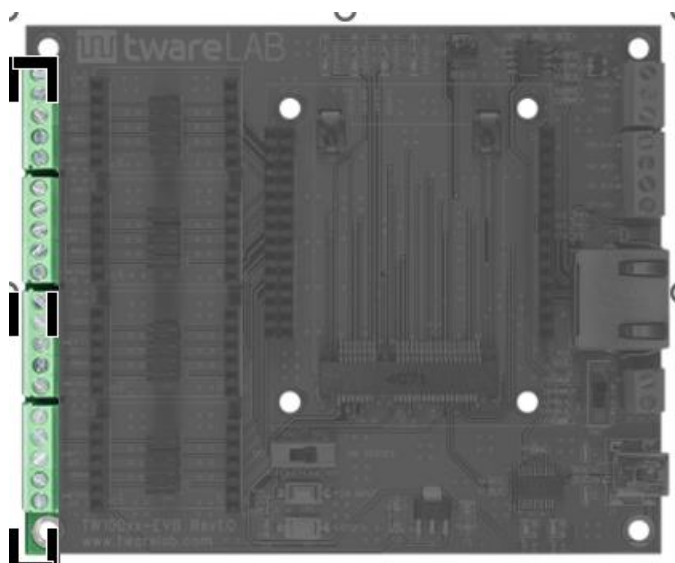


Figure 22 Serial Terminal Block

7.1.1.1 Signal Level Converter

[Serial Converter Modules](#) can be mounted on the header sockets inside each terminal to switch to RS232/RS485/RS422 signal levels.

To convert signal levels by installing a serial converter module, remove the shunter between each header socket and mount the appropriate Protocol converter module into the header socket.

The table below shows which signal each pin represents depending on whether the Serial Converter Modules module is used or not.

Silk markings	3.3V TTL	RS232	RS485	RS422
CTS	CTS	CTS(232 level)	NC	TX+

RTS	RTS	RTS(232 level)	NC	TX-
RXD	RXD	RXD(232 level)	485+	RX+
TXD	TXD	TXD(232 level)	485-	RX-

Table 14 serial terminal signals when using the Protocol converter

7.1.2 CAN & SPI Terminal Block

CAN and SPI terminals will be supported in the future for connecting for CAN communication or SPI communication.

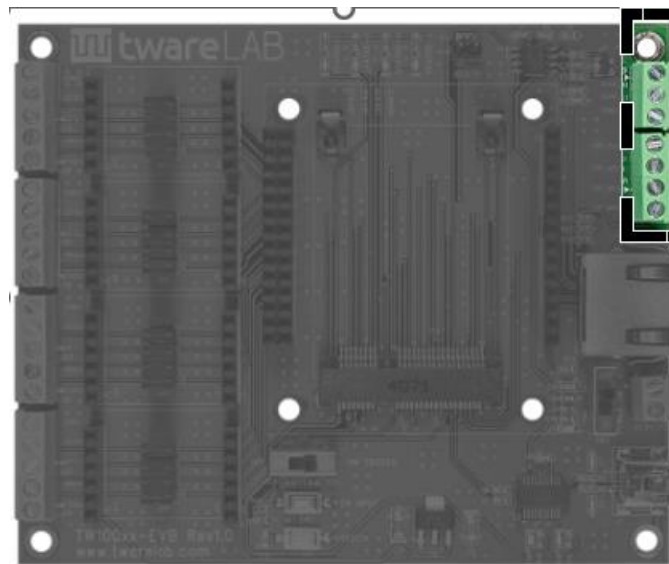


Figure 23 CAN Terminal and SPI Terminal

7.1.3 Power Input Block

The power input block includes a power ON/OFF switch for connecting external power supply. The external power input can be directly connected to a 5V power supply or 5V can be supplied from a PC via a USB socket.

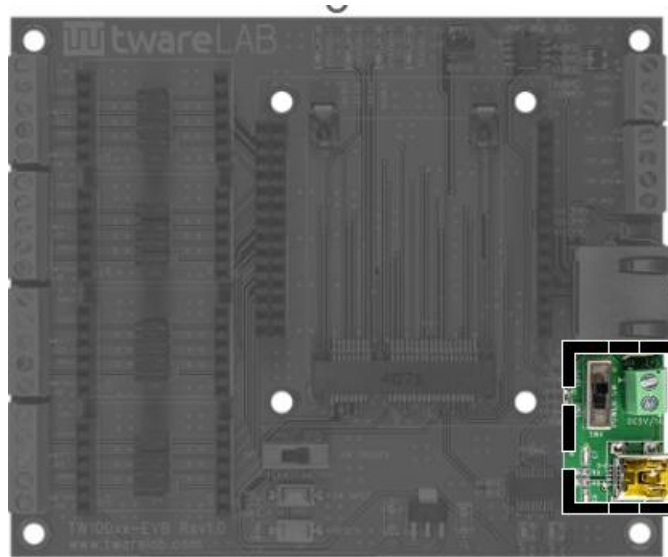


Figure 24 Power Input Block

7.1.4 Reset & Switch Block

This block consists of a Push Switch (SW1) for resetting the Hardware module, a Push Switch (SW2) and a Slide Switch (SW3) for input external options.

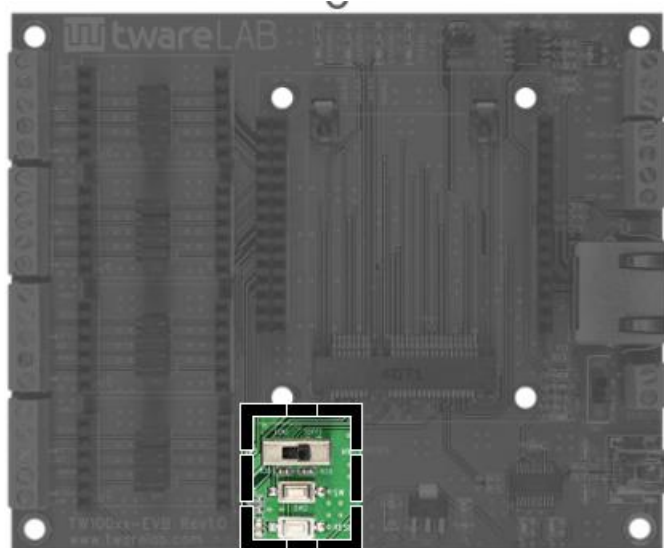


Figure 25 External Input Block

The functions of each Switch are as follows.

category	use	Details
SW1	Module Hardware Reset	
SW2	SW INPUT	Software Reset/Factory Reset (Reset)
SW3	HW Trigger	AT Command Mode Enable/Disable

Table 15 External Input Switch Functions

7.1.5 S2E Module Socket Block

This block is for mounting either TW100MJ/XR/PC.



Figure 26 TW100xx Socket Block

7.1.6 Status LED Block

This block indicates a TCP connection status of each socket through an LED. When a TCP connection is established, the corresponding LED is ON, and when the connection is closed, the LED is OFF.

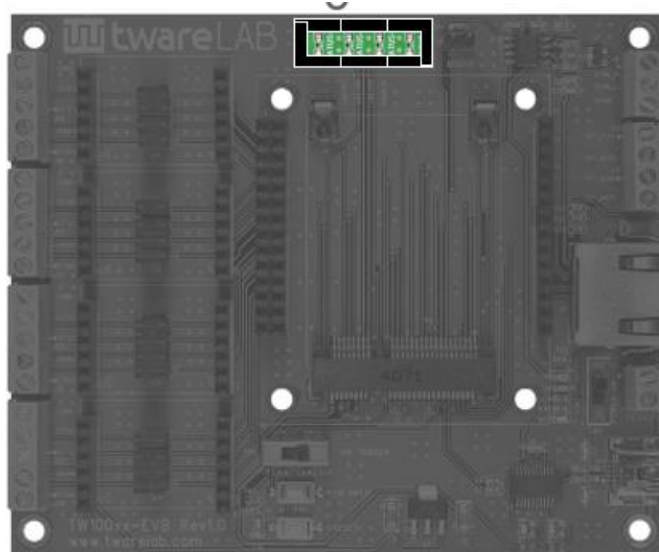


Figure 27 Socket Connection Indicating LEDs

7.2 TW100MJ EXAMPLE



Figure 28 TW100MJ Plugged EVB

7.3 TW100XR EXAMPLE



Figure 29 TW100XR Plugged EVB

7.4 TW100PC EXAMPLE



Figure 30 TW100PC Plugged EVB

7.5 SERIAL CONVERTER MODULES

7.5.1 TTL-to-232 Module



Figure 31 TTL-to-232 Converter Module

7.5.2 TTL-to-485 Module

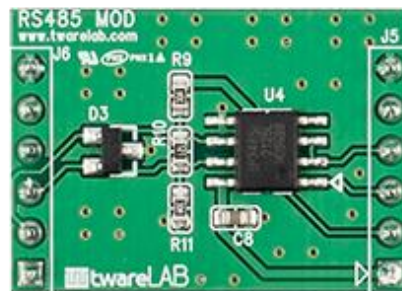


Figure 32 TTL-to-RS485 Converter Module

7.5.3 TTL-to-422 Module



Figure 33 TTL-to-RS422 Converter Module

7.5.4 Converter Module connection

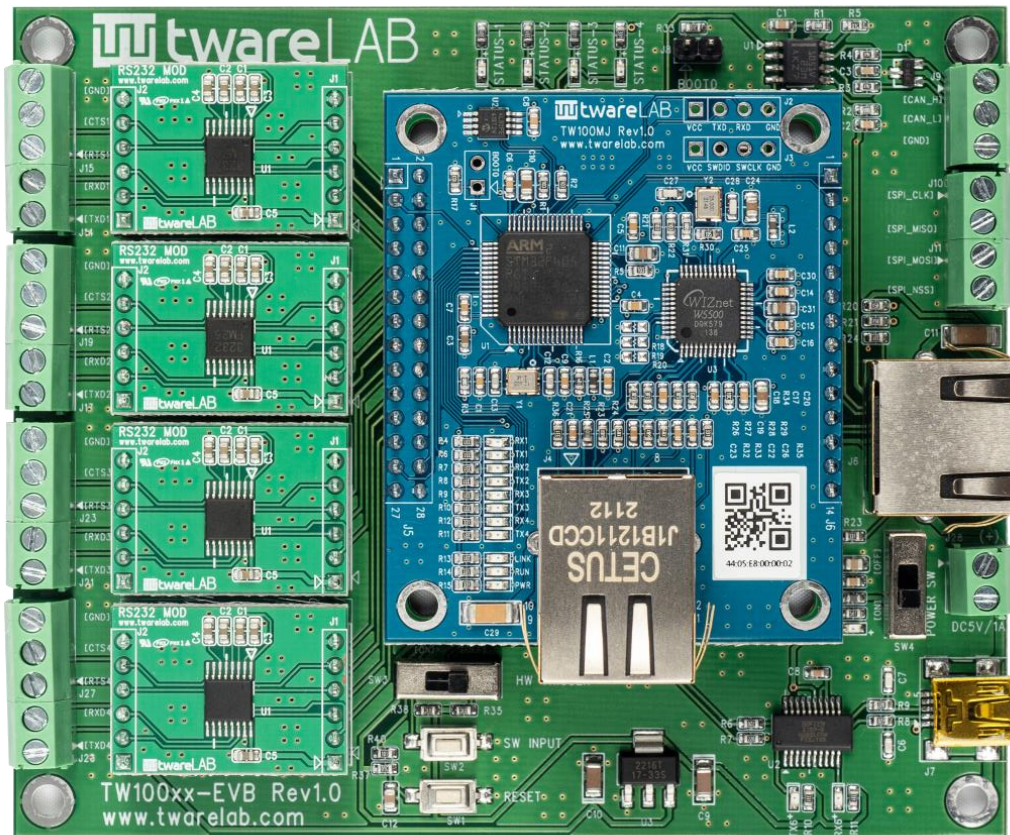


Figure 34 TW100MJ and TTL-to-RS232 modules plugged EVB

8 HISTORY

Date	Description
2022-11-02	V1.0 First Released
2022-11-09	PeerInfo Command Error Correction