I-7540D-WF

CAN to Wi-Fi Converter

User's Manual

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Warranty

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Document Revision

Version	Author	Date	Description of changes
1.0	T.H.	2011-04-26	First Release Revision
1.1	T.H.	2011-12-13	Update images of module appearance
2.0	T.H.	2012-01-02	Add CAN ID Filter function description

Table of Contents

1. Introduction

The I-7540D-WF supports the wireless transmission of CAN data between various CAN networks or a CAN network and a WLAN network according to the 802.11b/g standard. It is highly suitable for connecting mobile (e.g., vehicles or machines) or stationary CAN networks and is often used for short ranges up to 100 m.(TCP data protocols are available.) Using an appropriately configured router, CAN data can be transmitted over the Internet. There are two operating modes in the I-7540D-WF: the access point mode and the ad-hoc mode. In the access point mode, the data connection takes place over one or several WLAN access points that are often part of the company's internal IT infrastructure. In the ad-hoc mode, a direct connection is established between a single I-7540D-WF device and a PC or laptop (with an integrated WLAN interface), or with a second I-7540D-WF device. In this way, the I-7540D-WF can be used as a CAN diagnosis interface. The wireless connection that is established between two I-7540D-WF units can be used instead of a cable, and enables the connection of CAN networks that would otherwise be difficult to link such as rotational machinery.

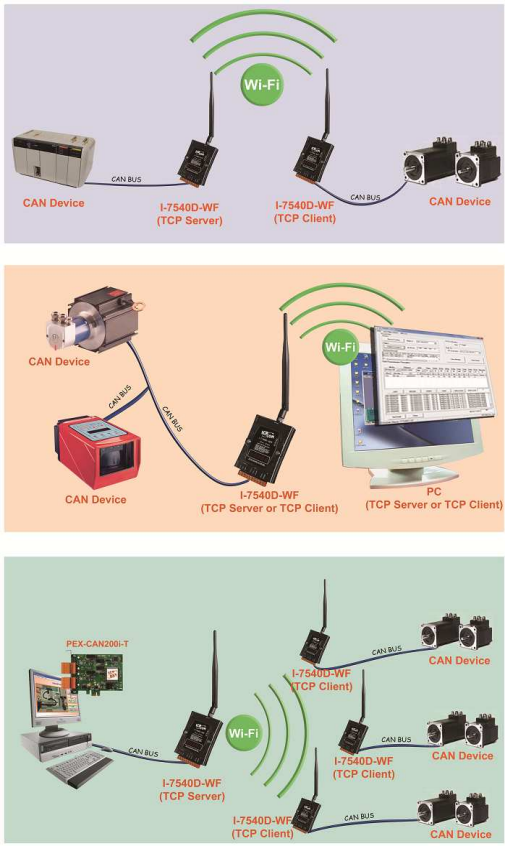


Figure 1-1**:** Application architecture for the I-7540D-WF

1.1 Operation Mode

I-7540D-WF provides wireless data transmission of CAN, and supports AP and Ad-hoc operation modes of WLAN.

1.2 Features

- RoHS Design
- IEEE 802.11b/g compliant
- Built-in jumper to select 120 ohm terminal resister of CAN bus
- Watchdog inside
- Wireless data transmission via WLAN
- Support two operation modes: Infrastructure mode and Ad-hoc mode
- Support point to point or point to multi-points connection via WLAN
- Support WEP, WPA and WPA2 encryption for WLAN
- CAN 2.0A/2.0B compliant
- Support CAN bus acceptance filter configuration
- Communication efficiency(peak value): one-way is up to 700 fps (client->server, server->client)，two-way 350 fps (client<=>server)
- Wireless transmission distance: up to 100 meters

1.3 Specifications

[UART Specs:]

- Connector : 10-pin screw terminal connector(Pin1/ Pin2/ Pin3)
- COM1 : RS-232(TXD, RXD, GND)
- Baud Rate (bps) : 115200

[CAN Specs:]

- Connector **:** 10-pin screw terminal connector(Pin5/ Pin6/ Pin7)
- CAN Baud Rate **:** 5K ~ 1Mbps
- Isolation Voltage **:** 3000 VDC power protection on CAN side, 2500Vrms photo-couple isolation on CAN bus
- Terminator Resistor: Selectable 120Ω terminator resistor by jumper
- Specification; ISO-11898-2, CAN 2.0A and CAN 2.0B

[Wireless Specs:]

- Standard Supported **:** IEEE 802.11b & IEEE 802.11g
- Frequency Range **:** 2.412GHz ~ 2.484GHz
- Center Frequencies：Europe – 2.412GHz ~ 2.472GHz
  USA – 2.412GHz ~ 2.462GHz
- Channels: Europe – 13 channels

USA – 11 channels

[Antenna Specs:]

- Connector : RP SMA Male (Plug)
- Radiation : Omni-Directional
- Band : 2.4 ~ 2.5GHz
- Gain : 5 dBi

[Module Specs:]

- Dimensions **:** 117mm x 76mm x 37mm (H x W x D)
- Operating temperature **:** -25 ~ 75°C (-13 ~ 167°F)
- Storage temperature **:** -30 ~ 80°C (-40 ~ 176°F)
- Humidity **:** 10 to 90%, non-condensing
- LEDs **:** PWR LED - Power indicator
  Wi-Fi LED - Wi-Fi communication indicator
  CAN LED - CAN communication indicator
  WLAN LED - WLAN connection indicator
  CNT. LED - TCP connection indicator

[Utility Tool:]

- Provide WLAN connection and configuration interface
- Provide WLAN encryption configuration interface
- Provide CAN bus acceptance filter configuration interface
- Provide CAN messages transmission / reception interface

[Application:]

- Factory Automation
- Building Automation
- Home Automation
- Control System
- Monitor System
- Vehicle Automation

2. Hardware

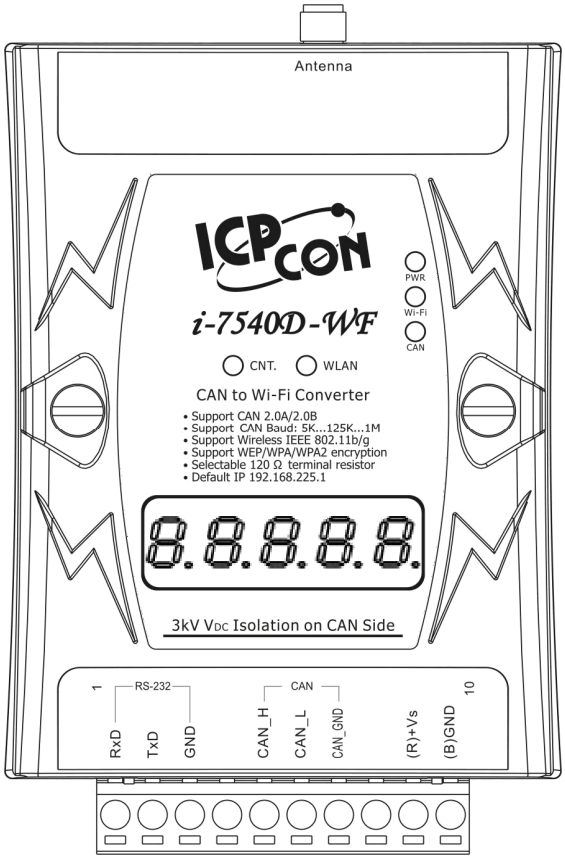


Figure 2-1**:** Hardware externals of the I-7540D-WF

2.1 Block Diagram

Figure 2-2 is a block diagram illustrating the functions on the I-7540D-WF module. It provides the 3000Vrms Isolation in the CAN interface site.

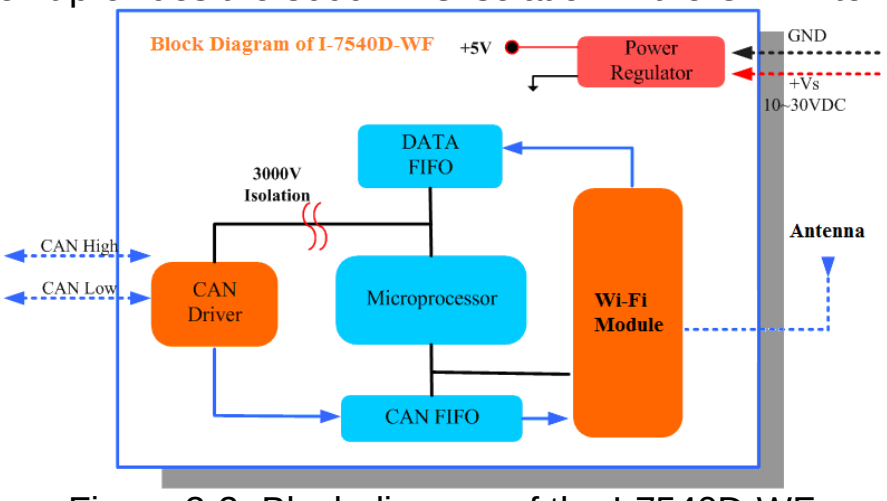


Figure 2-2**:** Block diagram of the I-7540D-WF

2.2 Pin Assignment

Table 2-1**:** 10-pin screw terminal connecter

10-pin screw terminal connecter	
Pin	Description
1	RS-232 RXD
2	RS-232 TXD
3	RS-232 GND
4	Not Connect
5	CAN_H
6	CAN_L
7	CAN_GND
8	Not Connect
9	+Vs(+10 ~ +30 VDC)
10	GND

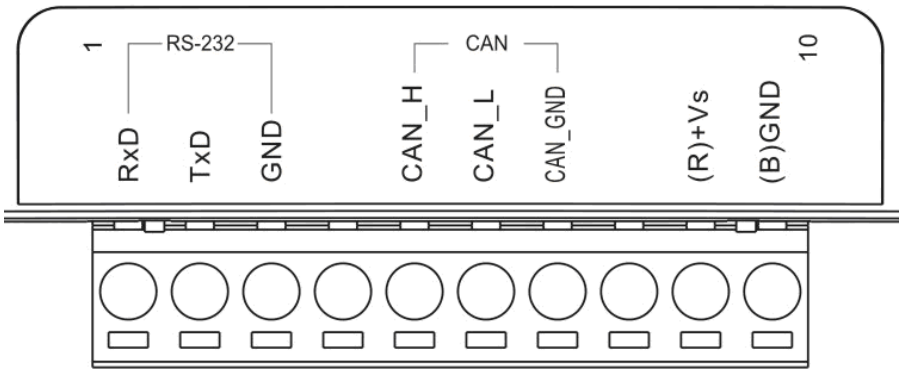


Figure 2-3**:** Pin Assignment on the I-7540D-WF

2.3 Hardware Connection

I-7540D-WF module supports the CAN data wireless communications, it provides a wireless link interface for CAN network, and the RS-232 interface provides to configuration the parameter of product.

2.3.1 CAN port connection

The hardware connection between device and the I-7540D-WF is as Figure 2-4.

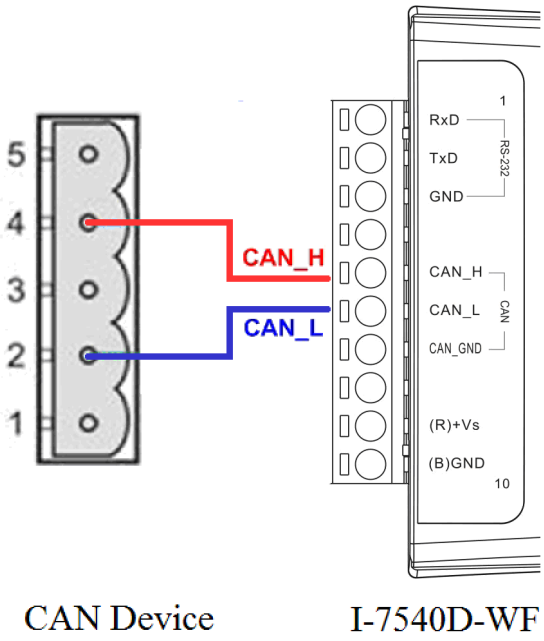


Figure 2-4: CAN Hardware Wire Connection

2.3.2 Serial port connection

The I-7540D-WF offers RS-232 serial interfaces to the user. The following figures describe the COM port to a serial device via serial network.

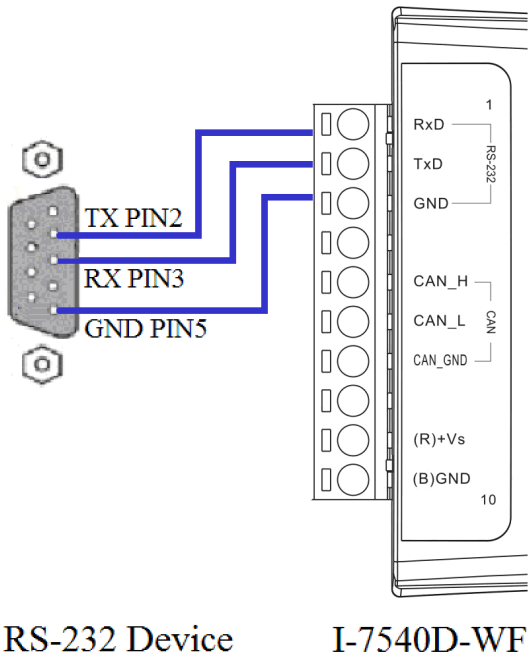


Figure 2-5: RS-232 Wire Connection

2.4 Terminator Resistor Settings

According to the ISO 11898 specifications, the CAN Bus network must be terminated by two terminal resistors (120Ω) for proper operation, as shown in the following figure.

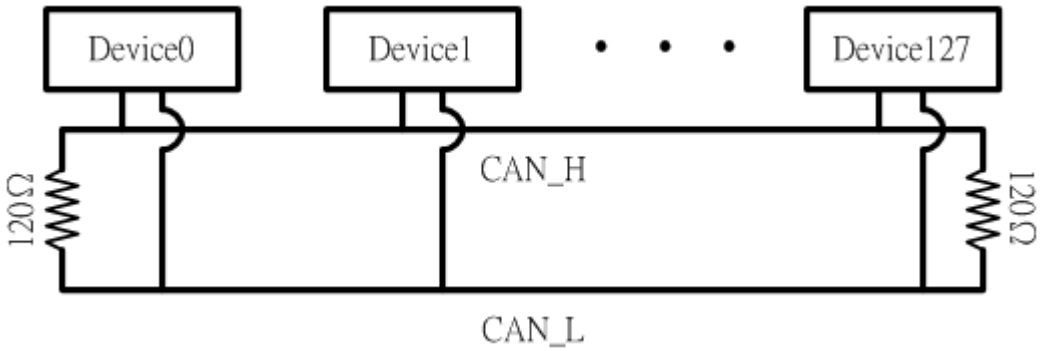


Figure 2-6: Terminal Resistor

Therefore, the I-7540D-WF module supplies a jumper for users to active the terminal resistor or not. If users want to use this terminal resistor, please open the I-7540D-WF cover and use the JP2 to activate the 120Ω terminal resistor built in the module, as the Figure 2-7. Note that the default setting is active.

The purpose of the terminal resistor is used to terminate the electrical signal, in order to avoid reflected signals interfere with the normal signal transduction. If the I-7540D-WF is not in the terminal at the CAN network, the termination resistors should not be enabled.

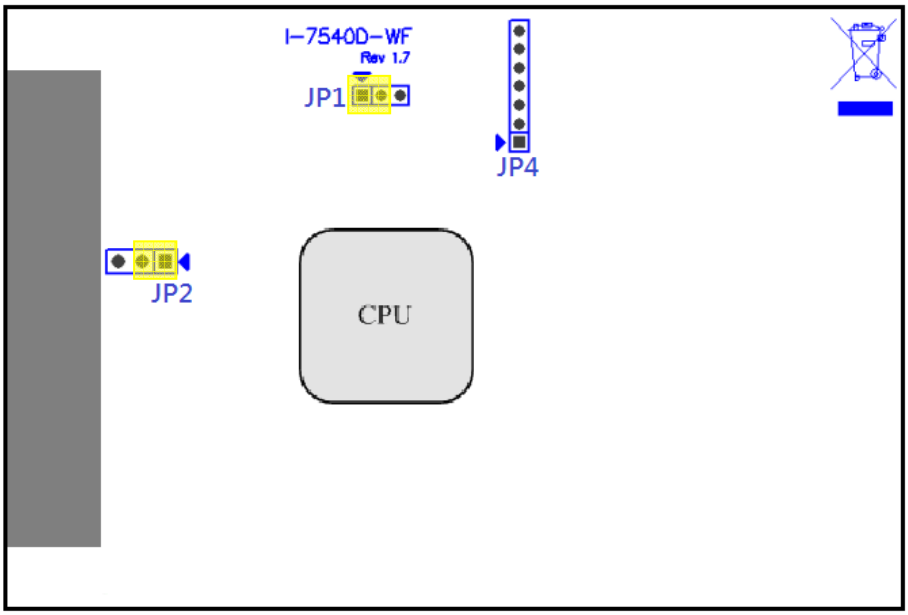


Figure 2-7: Terminal Resistor Jumper

Figure 2-8**:** Terminal resistor JP2 Jumper Position

2.5 Watchdog Timer Settings

A watchdog timer (WDT) is a device that performs a specific operation after a certain period of time if something goes wrong and the system does not recover on its own. A watchdog timer can perform a warm boot(restarting the system) after a certain number of milliseconds.

The I-7540D-WF module supplies a jumper for users to active the watchdog timer or not. If users want to use this WDT, can open the I-7540D-WF cover and use the JP1 to activate the WDT built in the module, as the Figure 2-7. Note that the default setting is active.

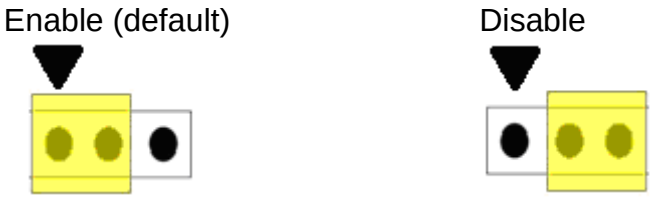


Figure 2-9: Watchdog timer JP1 Jumper Position

2.6 Init / Normal Dip-switch

On the back of the I-7540D-WF module, there is a dip-switch used for firmware operation or firmware updating of the module. The following steps show how to use this dip-switch.

2.6.1 Firmware Update Mode

Please set the dip-switch to the “Init” (Initial) position as Figure 2-10, and then the I-7540D-WF will work in the “Firmware Update Mode” after reset the power of the module. In this mode, users can update the

firmware of the I-7540D-WF module from computer's RS-232 port via CA-0910 cable shown as Figure 2-12.

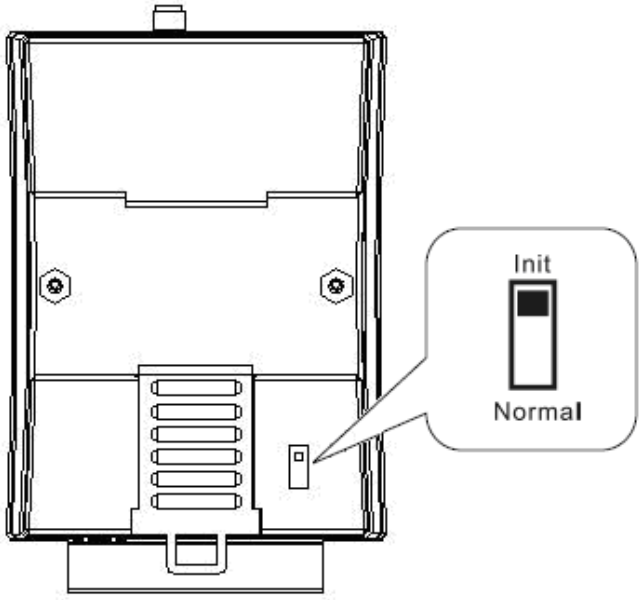


Figure 2-10: Init Position of Dip-Switch

Figure 2-11: CA-0910 Cable

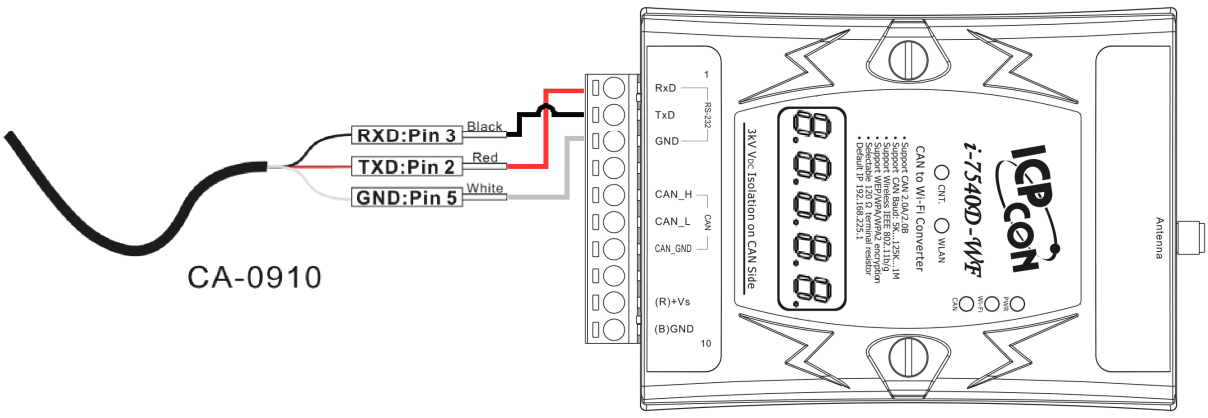


Figure 2-12: Firmware downloads connection

Users just need to execute “Firmware_Update_Tool.exe” and follow the below steps to complete the firmware updating process.
[1] Choose “**COM**” interface and “**COM Port**”.
[2] Click “**Browser**” button to choose firmware file. (e.g. **I-7540D-WF.fw**)
[3] Click “**Firmware Update**” button to start firmware updating process.

The result will be shown in “Firmware Update” field.

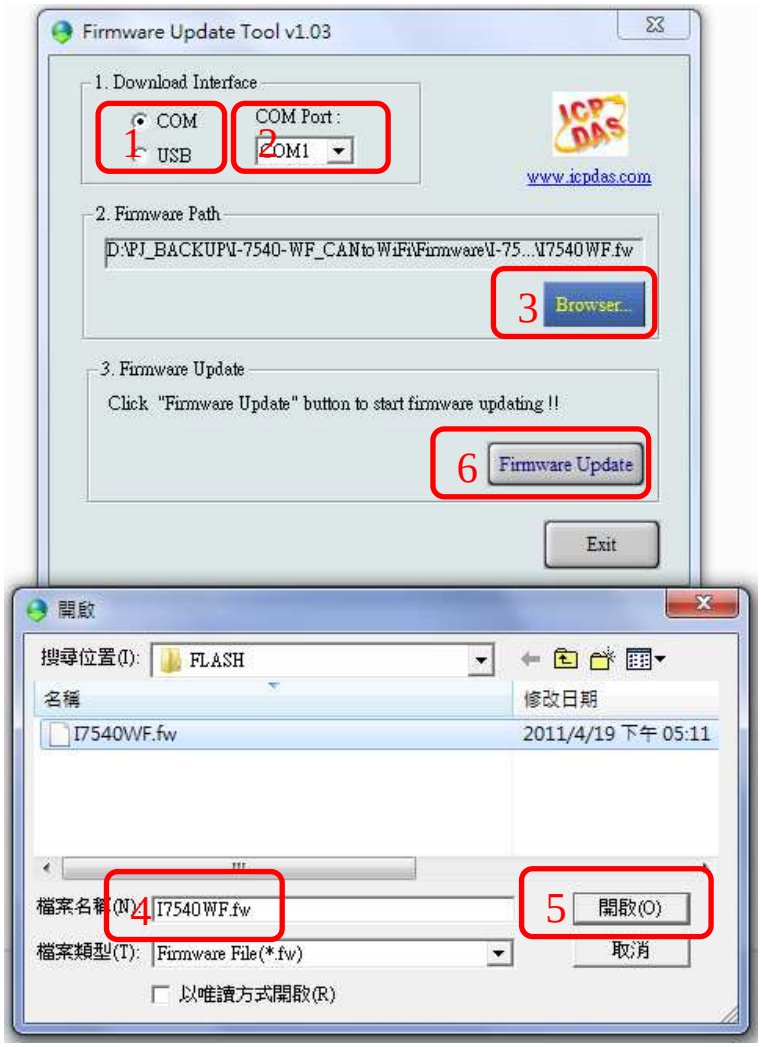


Figure 2-13**:** I-7540D-WF firmware update process

The I-7540D-WF firmware can be downloaded from
ftp://ftp.icpdas.com/pub/cd/fieldbus_cd/can/converter/i-7540d-wf/firmware/

The Firmware_Update_Tool program can be downloaded from
ftp://ftp.icpdas.com/pub/cd/fieldbus_cd/can/converter/i-7540d-wf/software/tool/

2.6.2 Firmware Operation Mode

In the operation mode, users need to set the dip-switch to the “Normal” position as Figure 2-14 and reset the power, and the I-7540D-WF can run in the operation mode. In this mode, user can use the I-7540D-WF with a computer or with another I-7540D-WF module for wireless connection. This can be transmitted the CAN data through the WLAN.

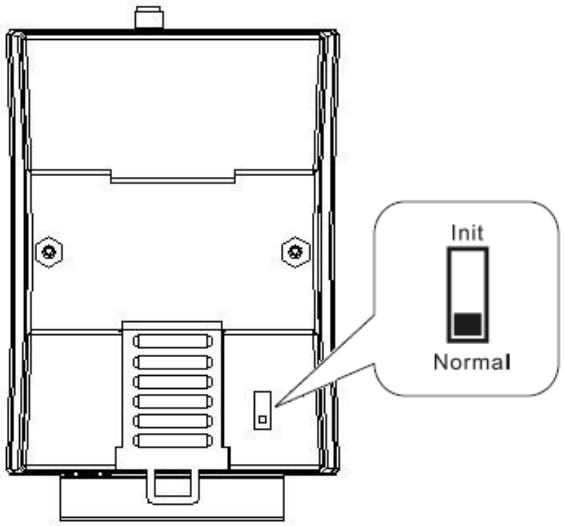


Figure 2-14**:** Normal Position of Dip-Switch

2.7 LED Indication

There are five LEDs to indicate the various states of the I-7540D-WF. The following is the illustration of these five LEDs.

(1) PWR LED :

It is used to help users to check whether the I-7540D-WF is standby. If the module is working in “firmware operation” mode, the PWR LED is always turned on.

It is also used for demonstrating an error that has occurred. The PWR LED is normally turned on when the module works in a good condition. For different error conditions represented by the indicator LED, please refer to Table 2-2.

(2) Wi-Fi LED :

This LED can indicate the Wi-Fi reception or transmission state of the I-7540D-WF. When I-7540D-WF is in Wi-Fi sending or receiving state, the LED will blink.

(3) CAN LED :

This LED can indicate the CAN data reception or transmission state of the I-7540D-WF. When I-7540D-WF is in CAN data sending or receiving state, the LED will blink.

(4) WLAN LED :

This LED can indicate whether the I-7540D-WF’s WLAN connection is established. When WLAN connection is established, the LED will be normally on; otherwise, it will be flashing or off.

(5) CNT. LED :

This LED can indicate whether the I-7540D-WF’s TCP connection is established. When TCP connection is established, the LED will be normally on; otherwise, it will be flashing.

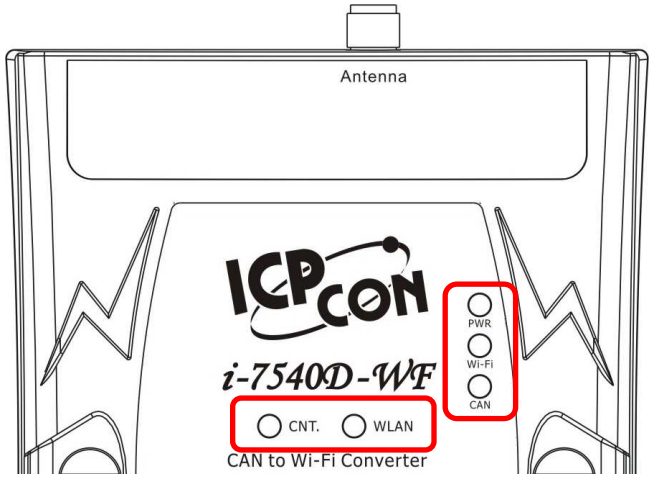


Figure 2-15: LED position of the I-7540D-WF

Table 2-2: LED indication of the I-7540D-WF

LED Name	I-7540D-WF Status	LED Status
ALL LEDs	Firmware Updating Mode	All LED On
	Hardware WDT Fail	All LED blink per 1 second
	Contact to ICP DAS	All LED blink per 100 ms
PWR & CNT. LED	Wi-Fi Module Failure	Blink per 500 ms
PWR LED	No Error	Always turned on
	CAN Bus Transmission Fail	Blink per 100 ms
	CAN Bus-Off	Blink per 500 ms
	CAN Buffer Full	Blink per 1 sec
	Wi-Fi Buffer Full	Flashes twice per 100 ms , every 1 second
	Power Failure	Off
Wi-Fi LED	Data transmission	Blink
	Bus Idle	Off
CAN LED	Data transmission	Blink
	Bus Idle	Off
WLAN LED	WLAN connection established	Always turned on
	WLAN during connection establishment	Blink or Off
CNT.	TCP connection established	Always turned on
	TCP during connection establishment	Blink

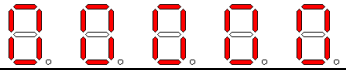
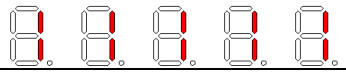
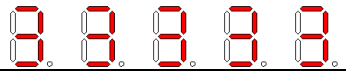
2.8 Seven-segment display

The I-7540D-WF has five seven-segment displays; it can display the internal parameter setting of I-7540D-WF during operation.

2.8.1 Title Description

Before to show the contents of the parameters, the display will appear the following titles, the user may know the parameter at present by way of this demonstration title.

Table 2-3**:** Display Title

Display Title	Display Information
	Local IP setting
	Remote IP setting
	Net Mask setting
	Gateway setting
	TCP/IP Port Number setting
	Operation Mode setting
	Wi-Fi Connection Mode setting
	Wireless Connection Channel setting
	Wi-Fi Encryption setting
	CAN Baud Rate setting

2.8.2 The contents of Parameter

Table 2-4-1**:** Display contents

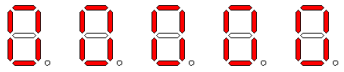
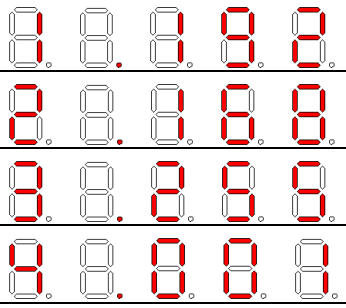
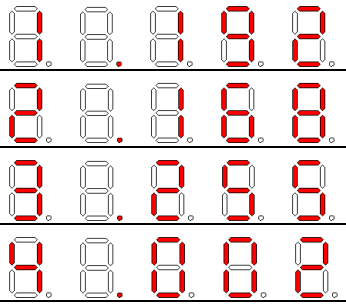
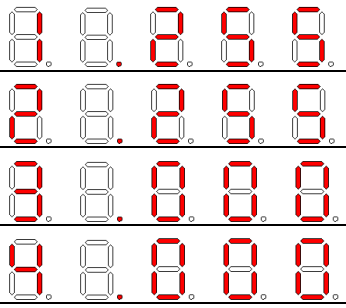
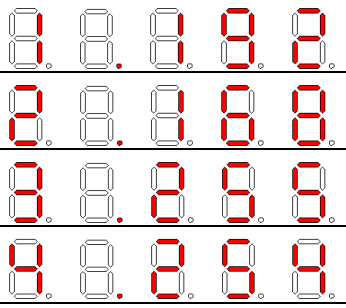
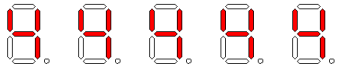
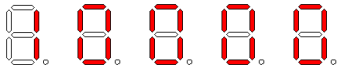
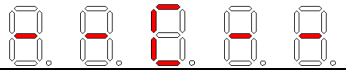
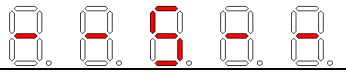
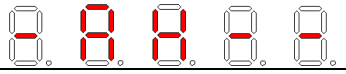
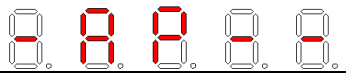
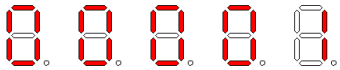
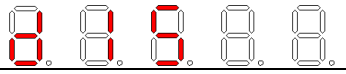
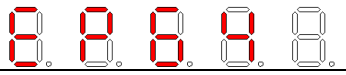
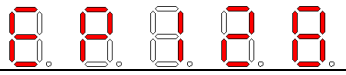
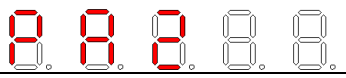
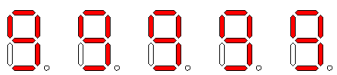
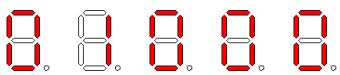
Display title	Display contents	Display information
		Local IP setting (192.168.255.1)
		Remote IP setting (192.168.255.2)
		Net Mask setting (255. 255.0. 0)
		Gateway setting (192.168.255.254)
		TCP/IP Port Number setting (10000)

Table 2-4-2**:** Display contents

Display title	Display contents	Display information
	 	Operation Mode setting (Client / Server)
	 	Wi-Fi Connection Mode setting (Ad-Hoc / AP)
		Wireless Connection Channel setting (0~13)
	    	Wi-Fi Encryption setting (Disable / WEP-64 / WEP-128 / WPA / WPA2)
		CAN Baud Rate setting (5K~1000K)

2.9 Cable Selection

The CAN bus is a balanced (differential) 2-wire interface running over either a Shielded Twisted Pair (STP), Un-shielded Twisted Pair (UTP), or Ribbon cable. The CAN-L and CAN-H Wire start on one end of the total CAN network that a terminator of 120 Ohm is connected between CAN-L and CAN-H. The cable is connected from CAN node to CAN node, normally without or with short T connections. On the other end of the cable again a 120Ω(Ohm) terminator resistor is connected between the CAN

lines. How to decide a cable type, cable length, and terminator depends on the baud rate in the CAN bus network, please refer to the following table 2-5.

Figure 2-18**:** Un-shielded Twisted Pair (UTP)

Table 2-5**:** Cable selection

Bus speed	Cable type	Cable Resistance/m	Terminator	Bus Length
50k bit/s at 1000m	0.75~0.8mm2 18AWG	70 mOhm	150~300 Ohm	600~1000m
100k bit/s at 500m	0.5~0.6 mm2 20AWG	< 60 mOhm	150~300 Ohm	300~600m
500k bit/s at 100m	0.34~0.6mm2 22AWG, 20AWG	< 40 mOhm	127 Ohm	40~300m
1000k bit/s at 40m	0.25~0.34mm2 23AWG, 22AWG	< 40 mOhm	124 Ohm	0~40m

Note: The AWG means a standard method used to measure wire. The numbering system works backwards from what people would think, the thicker (heavier) the wire, the lower the number. For example: a 24AWG wire is thicker/heavier than a 26AWG wire.

3. Software

This chapter explains how to uses the I-7540D-WF Utility to carry on the I-7540D-WF wireless communication configuration、Established TCP connection and Transmission / Reception CAN messages.

3.1 Connection and Configuration Tool – I-7540D-WF Utility

I-7540D-WF wireless connection and configuration tools can be used to set the I-7540D-WF wireless network interface, and for TCP connection and CAN message reception and transmission.

I-7540D-WF Utility is a Microsoft Windows application that communicates with a I-7540D-WF over a standard RS-232 serial link by using the PC serial port. It is compatible with Microsoft Windows 95, 98, NT, 2000, Vista and 7.

The I-7540D-WF Utility can be downloaded from ftp://ftp.icpdas.com/pub/cd/fieldbus_cd/can/converter/i-7540d-wf/software/utility/

3.2 I-7540D-WF Utility

The following is the main screens provided by I-7540D-WF Utility, we provide a friendly CAN bus utility tool to allow users to send/receive the CAN messages to/from CAN network easily. This utility tool can be thought as a useful tool for monitoring CAN messages or testing CAN devices on the CAN network. It supplies several functions, such as sending CAN messages, receiving CAN messages, storing CAN messages, cyclic transmission, and so forth.

3.2.1 Connection Settings Screen

When users execute the I-7540D-WF Utility, it will show connection settings screen first as Figure 3-1. The following is the illustration for connection parameters.

■ Basic Parameter configuration

I-7540D-WF utility provides the basic configuration interfaces as shown below, such as CAN Baud Rate settings, network configuration, Wi-Fi connection settings, parameters uploading and downloading interface, the status bar display, and so forth.

Figure 3-1**:** Basic Parameter Setting Interface

◆ CAN Baud Rate configuration

CAN Baud Rate configuration interface are shown below. There are 5K ~ 1000K, a total of 15 different baud rate for users to choose, as shown in Table 3-1.

Table 3-1: CAN Baud Rate Options

Item	CAN Baud Rate	Item	CAN Baud Rate
1	5K	9	200K
2	10K	10	250K
3	20K	11	400K
4	40K	12	500K
5	50K	13	600K
6	80K	14	800K
7	100K	15	1000K
8	125K		

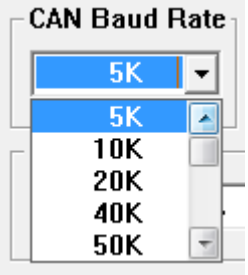


Figure 3-2: CAN Baud Rate Setting Interface

◆ Network configuration

Figure 3-3 is about the network configuration interface of I-7540D-WF. It needs to depend on the user connection request to set the scene consistent with the basic content of the network connection as follows.

Table 3-2: Network configuration instructions

Item	Description
TCP/IP Port	TCP/IP Port Number Setting
Local IP	Local IP Setting
Remote IP	Remote IP Setting
Gateway	Gateway Setting
Net Mask	Net Mask Setting
MAC Address	MAC Address Display

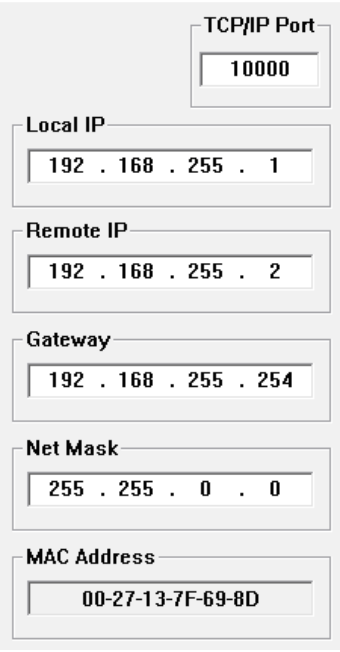


Figure 3-3：Network configuration

◆ Wi-Fi configuration

Wi-Fi configuration interface of I-7540D-WF is shown as below, such as Wi-Fi connection mode, SSID, WLK, WLCH, Encryption, and so forth. The detailed description is as the following table.

Figure 3-4**:** Wi-Fi Configuration Interface

AP Mode：

Operation Mode	Server：Set I-7540D-WF for the TCP Server mode. Client：Set I-7540D-WF for the TCP Client mode.
Wi-Fi Mode	AP：Use the wireless access point way for connection and transmission. (Must have Wi-Fi AP)
SSID	Service Set Identifier: Connected devices must be with the same SSID, SSID length must not exceed 20 characters.
WLCH	0~13：Wi-Fi transmission channel setting, connected devices must with the same channel. Setting 0 (Auto) for automatically channel modulation with Wi-Fi AP.
Encryption	NONE / WEP64 / WEP128 / WPA / WPA2: Encryption of Wi-Fi, connected devices must with the same encryption.
WLK	Key of Encryption，connected devices must with the same Key. WEP-64 ：Key length must be 10 characters. WEP-128：Key length must be 26 characters. WPA ：Key length must between 8~64 characters. WPA2 ：Key length must between 8~64 characters. Characters of key should be in range of: [0 ~ 9] or [A ~ F] or [a ~ f].

Ad-Hoc Mode：

Operation Mode	Server：Set I-7540D-WF for the TCP Server mode. Client：Set I-7540D-WF for the TCP Client mode.
Wi-Fi Mode	Ad-Hoc：Use Ad-Hoc connectivity with another I-7540D-WF to create AD-hoc wireless network.
SSID	Service Set Identifier: Connected devices must be with the same SSID, SSID length must not exceed 20 characters.
WLCH	1~13：Wi-Fi transmission channel setting, connected devices must with the same channel, can't setting 0 (Auto) channel in Ad -Hoc mode.
Encryption	NONE / WEP64 / WEP128: Wi-Fi Encryption of Wi-Fi, connected devices must with the same encryption. Not Support WPA、WPA2 encryption in Ad-Hoc mode。
WLK	Key of Encryption，connected devices must with the same Key. WEP-64 ：Key length must be 10 characters. WEP-128：Key length must be 26 characters. Characters of key should be in range of: [0 ~ 9] or [A ~ F] or [a ~ f].

◆ Parameter Transmission Interface

I-7540D-WF's parameter connection configuration interface provides wireless and RS-232 interface for connection, RS-232 interface provides upload and download parameter function; wireless interface only provides upload parameter function as following.

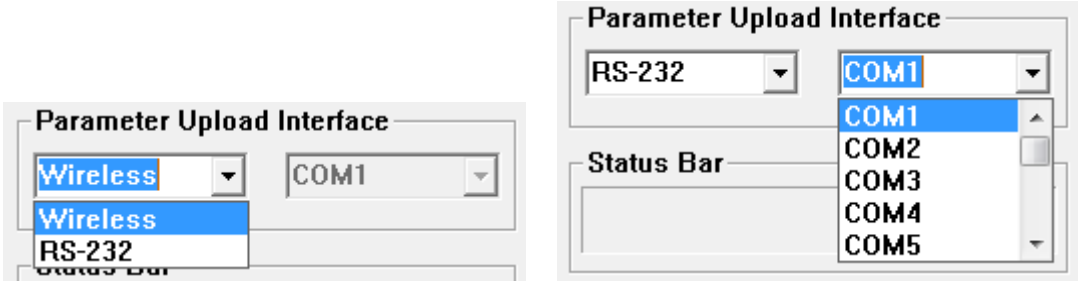


Figure 3-5: Parameter Transmission Interface

◆ Parameter Transmission status bar

I-7540D-WF utility provides the parameter transmission status display interface. By the status bar, the user can immediately understand the transfer state.

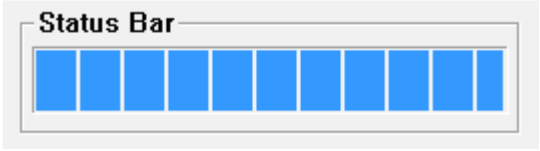


Figure 3-6：Parameter Transmission status bar

◆ Display Firmware Information

The following figures display the firmware's version and date created inside the I-7540D-WF.

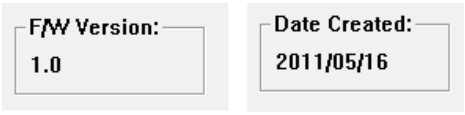


Figure 3-7 Firmware version and Date created

◆ Parameter reading function

I-7540D-WF utility provides parameters download function for I-7540D-WF by the RS-232 interface. It allows user to download the parameters form I-7540D-WF.

Figure 3-8: Parameter reading button

◆ Parameter writing function

I-7540D-WF utility provides parameters upload function for I-7540D-WF by the RS-232 and Wi-Fi interfaces to allow users to upload the parameters to I-7540D-WF.

Figure 3-9: Parameter writing button

◆ Exit parameter setting

Press this button to exit I-7540D-WF Utility of the parameter setting interface and return to the main screen.

Figure 3-10: Exit parameter setting button

3.2.2 CAN ID Filter Settings Screen

If the filter without setting any rules, the default is allowed to receive all CAN messages. In CAN ID Filter setting screen, users can set which CAN ID able to be received by I-7540D-WF module.

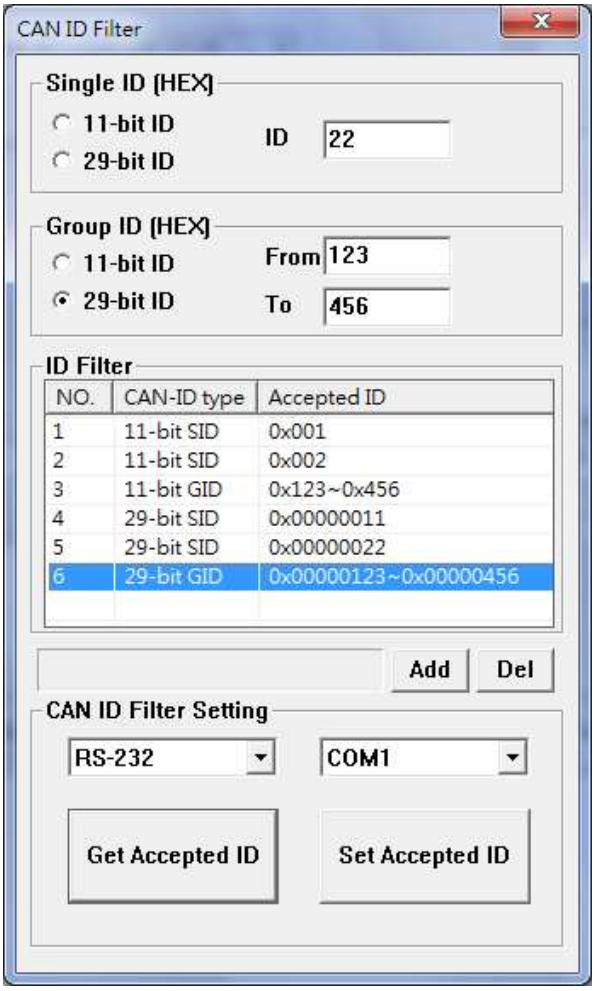


Figure 3-11: CAN ID Filter Settings Screen

- Single ID frame

By clicking “Add” button to add the assigned single CAN ID to “ID Filter” table to set these assigned single CAN ID able to be received.

- Group ID frame

By clicking “Add” button to add the assigned group CAN ID to “ID Filter” table to set these assigned group CAN ID able to be received.

- Add button

It is used to add the CAN Filter-ID data to the “ID Filter” table.

- Del button

It is used to delete the CAN Filter-ID data of the assigned row in “ID Filter” table.

- Get Accepted ID button

It is used to get CAN Filter-ID data from I-7540D-WF and showed in the “ID Filter” table.

- Set Accepted ID button

It is used to set CAN Filter-ID data to I-7540D-WF according to the “ID Filter” table content.

3.2.3 Main Screen

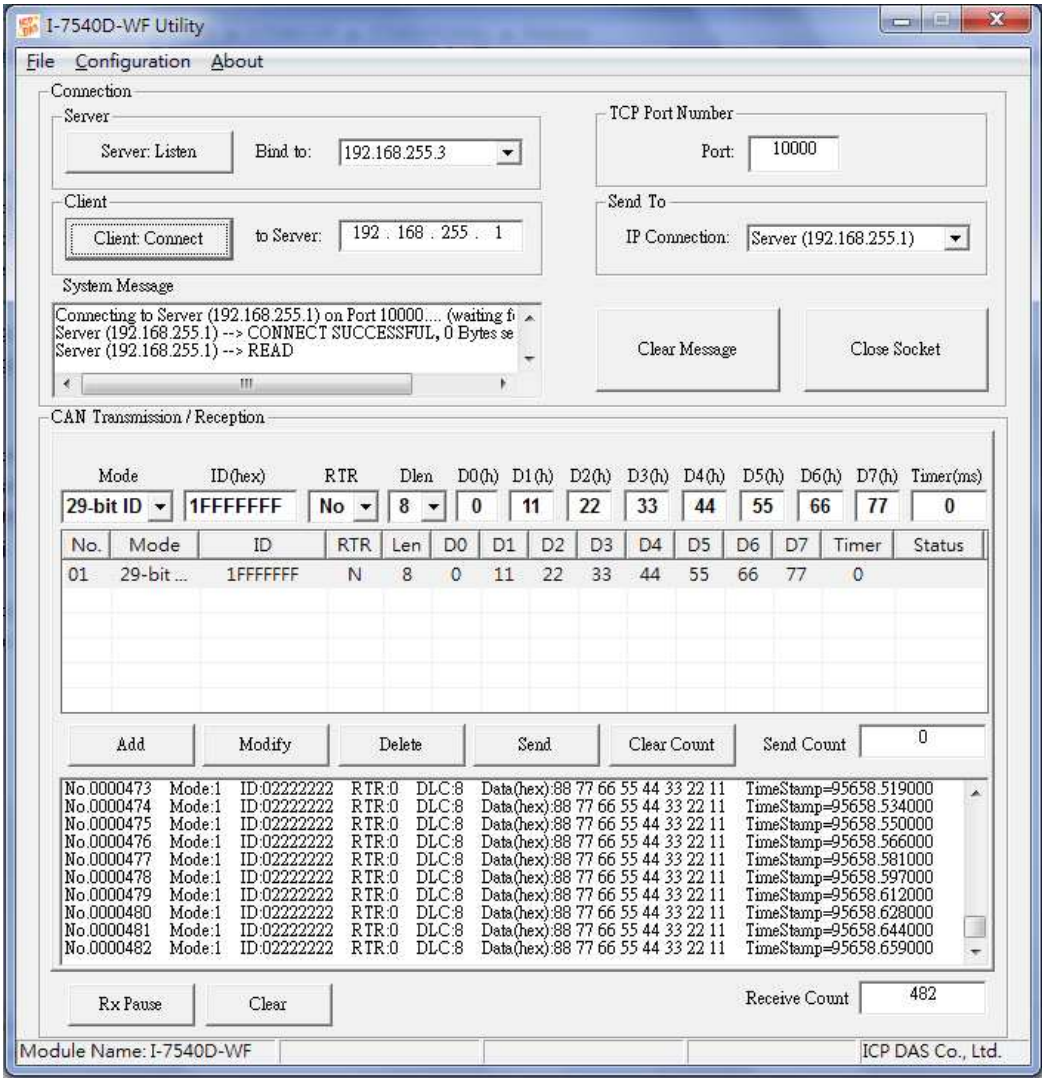


Figure 3-12**:** I-7540D-WF Utility Main Screen

Main functional areas:

[1] **Connection**

- Server

  Designate I-7540D-WF Utility connections as the TCP Server mode, enter the Server's IP, and press the "Server Listen" button. I-7540D-WF Utility will enter server listening mode, and waiting for client connection.

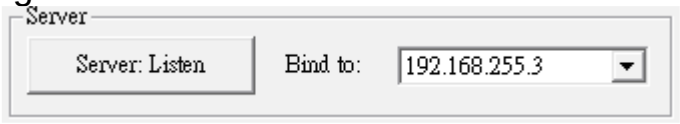


Figure 3-13**:** Server Connection Settings area

- Client

  Designate I-7540D-WF Utility connections for the TCP Client mode, enter the Server's IP, and press the "Client Listen" button. I-7540D-WF Utility will connect with the Server.

Figure 3-14**:** Client Connection Settings area

- TCP Port Number

  Set I-7540D-WF Utility TCP connection Port Number, and this setting must the same with the I-7540D-WF's Port Number for normal connections.

Figure 3-15**:** TCP Port Number Settings area

- Send To

  Specify the IP location for CAN data to be sent via the WLAN. This setting can only be specified in the connection status.

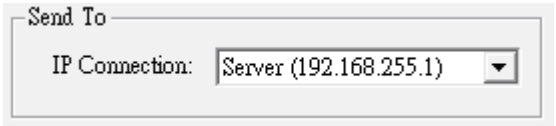


Figure 3-16**:** IP designated area for CAN data transmission

- System Message

  This area will display information for the system connection, such as waiting for the connection, the connection is successful, read data, and etc.

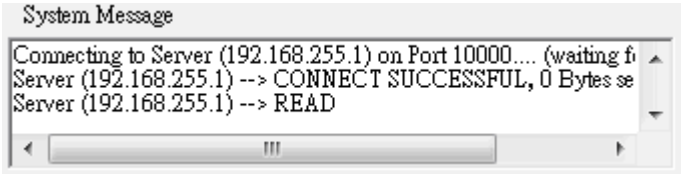


Figure 3-17**:** System message display area

- Clear Message
  Press this button to clear the contents of system message display area.

Figure 3-18**:** Clear button for message display area

- Close Socket
  Press this button to close the currently open Socket.

Figure 3-19**:** Close TCP connection button

[2] **CAN Transmission / Reception**

- CAN Transmission
  In the CAN port transmitting page as the following figure, there are five functions to use, such as Add, Modify, Delete, Send and Clear Count.

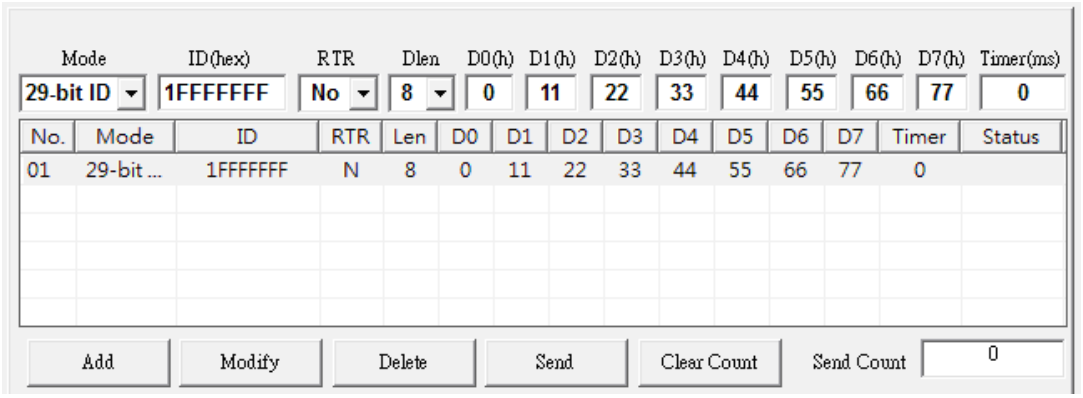


Figure 3-20**:** CAN data transfer settings and operating area

Add:

User can key in the CAN message into the text boxes above the transmission list. Click “Add” button to insert this CAN message into transmission list. The transmission list can include maximum 20 CAN messages. After adding the message into transmission list,

users can send this message to CAN network via WLAN by using “Send” button.

Modify:

If users want to modify the content of some CAN message in the transmission list, they can select this CAN messages in the transmission list firstly. Then, this CAN message information will be shown in the text boxes above the transmission list. Users can modify the CAN message in these text boxes directly. Finally, click “Modify” button to save the modification in the list.

Delete:

If some CAN message in the transmission list is useless, users can select it and click “Delete” button to delete this CAN message from transmission list.

Send:

After users select one CAN message from transmission list, click “Send” button to send this CAN message once from the selected CAN port. If the timer parameter of this CAN message is not 0, the CAN message will be sent depending on this timer parameter periodically. In this case, the status filed of this CAN message in transmission list will display “Running”, and the text shown on the Send button will be changed to “Pause”. If uses want to stop the message transmission, click this button again. There are only 5 CAN messages can be sending cyclically at the same time.

Clear Count:

Right of the display area will record the counter of CAN transfer packets. If users want to clear this transfer count, click on "Clear Count" button.

- CAN Reception
  The following figure shows the receive part of a selected CAN port. There are two function buttons for reception list, such as Rx Pause and Clear。

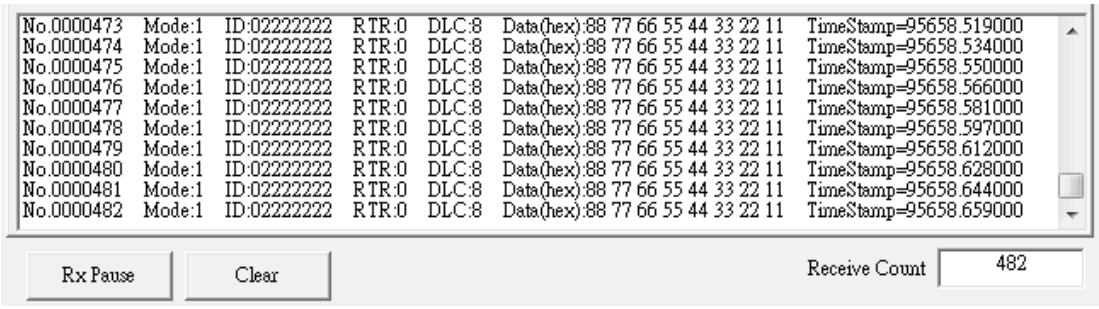


Figure 3-21**:** CAN data receive settings and operating area

Rx Pause:

Click this button to stop the CAN message reception from WLAN. Click it again to continue the message reception.

Clear:

Click this button to delete all CAN messages shown in the reception list.

Menu Function:

[1] **File**

- Load Configuration
  If users have saved the configuration by using I-7540D-WF Utility before, users can click Load Configuration function to load the older records into these lists of I-7540D-WF Utility.

- Save Configuration
  The function is used for saving the transmission list to a txt file.

- Save Reception List
  Save Receive List, is used for saving the CAN messages that is received on the reception list. The data in the reception list will be saved into txt file.

[2] **Configuration**

- Module Configuration
  This function can enter the basic configuration interface, as shown in Figure 3-1.

- CAN ID Filter
  This function can enter the CAN ID Filter setting interface, as shown in Figure 3-11

[3] **About:** The function can show the version information of I-7540D-WF Utility as shown below.

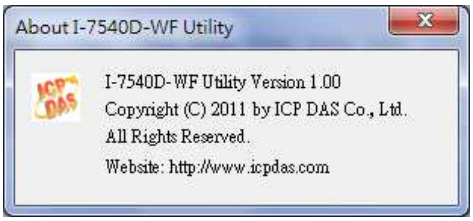


Figure 3-22**:** I-7540D-WF Utility Version Information

4. Application Notes

In practice, users can use the two I-7540D-WF or a set of I-7540D-WF with the computer (with supporting for wireless network) connection structure in the application. It can complete the purpose of transferring CAN data to wireless network by this way. I-7540D-WF wireless connection can replace the cable, for some hard wiring or the CAN data transmission distance requirements, that is a very good option.

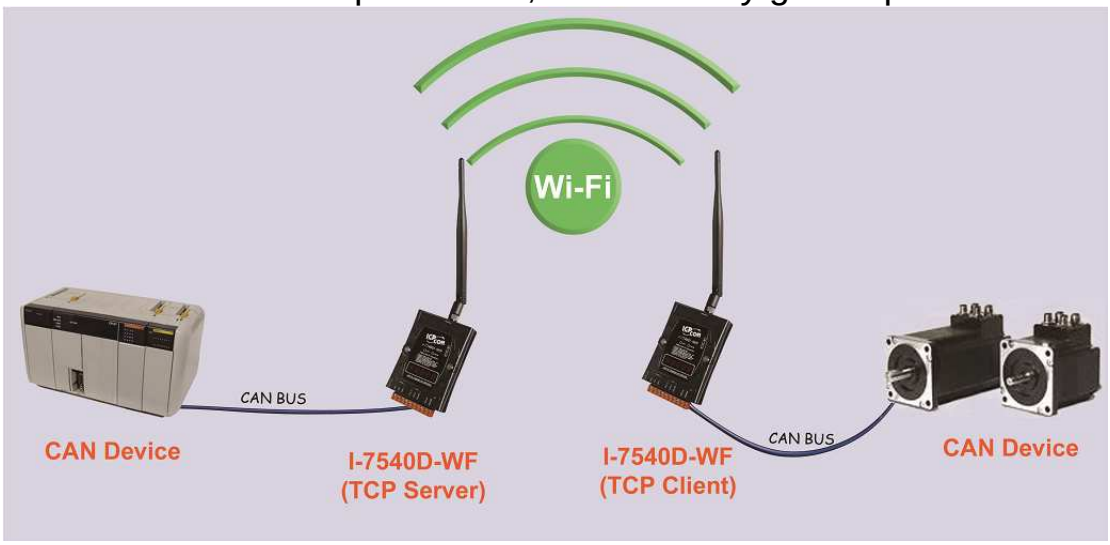


Figure 4-1**:** I-7540D-WF application architecture (two I-7540D-WF)

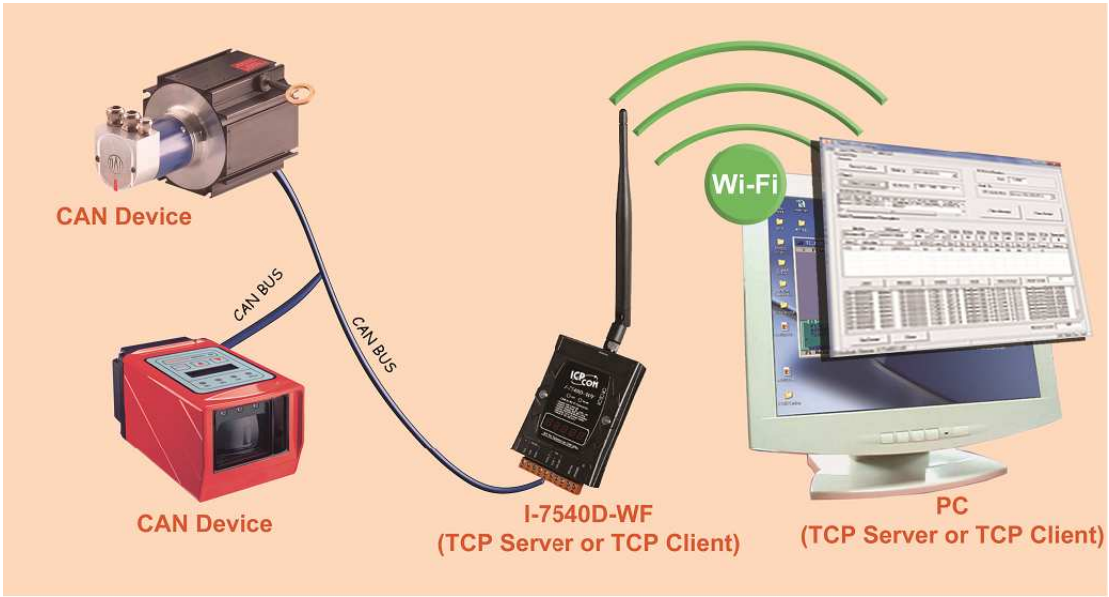


Figure 4-2**:** I-7540D-WF application architecture (I-7540D-WF + PC)

4.1 Hardware Installation

Before use, associated hardware configuration, the steps described as follows：

Step 1: Checking the I-7540D-WF firmware operation mode

In the operation mode, the user can complete the wireless CAN data transmission via the I-7540D-WF. It needs to set the DIP switch to the Normal position (operating mode) as Figure 2-14; as resetting the power, I-7540D-WF will be in the operation mode.

Step 2: Enabling 120Ω termination resistors (if I-7540D-WF is a terminal in the CAN network)

Please open the I-7540D-WF cover and use the JP2 to activate the 120Ω terminal resistor built in the module, as the Figure 2-7, After finishing set the JP2, 120 ohm termination resistors can be enabled.

Step 3: CAN bus network connection

Refer to Figure 2-4 for wiring structure, and connect the I-7540D-WF's CAN interface with other devices.

Step 4: Serial port connection

I-7540D-WF supports RS-232 serial communication. The circuit configuration is as shown in Figure 2-5.

Step 5: Power connection

Connect the power supply to I-7540D-WF's power terminator, as shown in Figure 4-3.

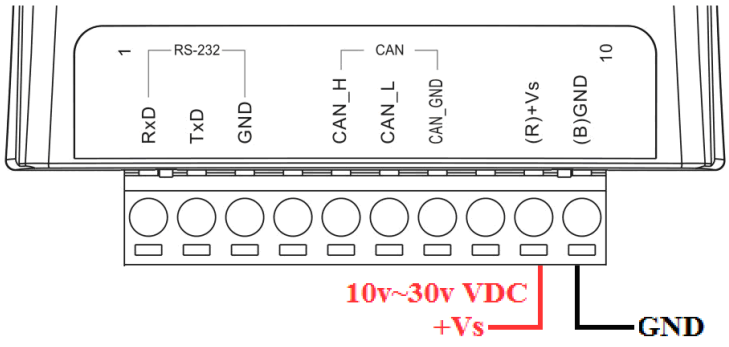


Figure 4-3**:** Power Wiring

4.2 I-7540D-WF connection mode

4.2.1 **Server connection mode**

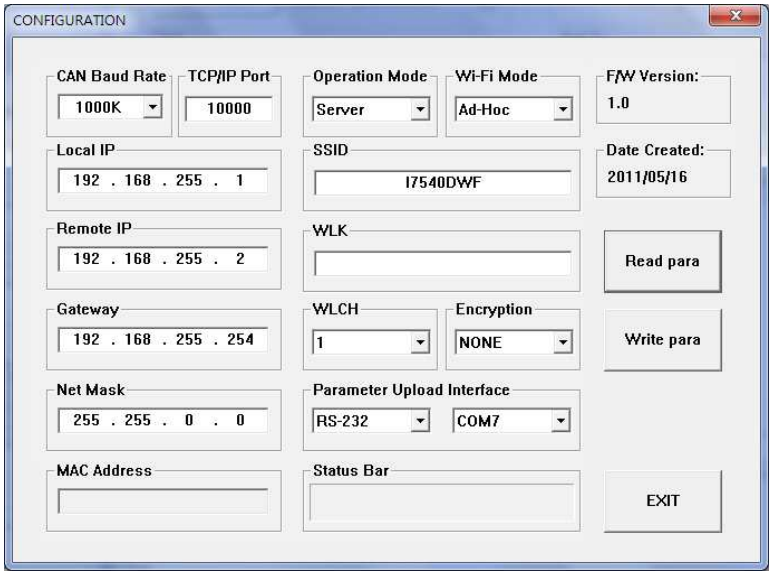


Figure 4-4**:** Server connection mode

01、CAN Baud Rate ：It can help users to set the CAN bus baud rate according to the actual connection. The case is set as 1000K bps in Figure 4-4

02、TCP/IP Port ：This field is used to set TCP/IP port of Connection according to the actual conditions. The case is set TCP/IP port as 10000 in Figure 4-4

03、Local IP ：Set the local machine's wireless IP. Here set to 192.168.255.1

04、Remote IP ：Set the remote connection device's IP. Here set to 192.168.255.2

05、Gateway ：Gateway settings (Here set to 192.168.255.254)

06、Net Mask ：Net Mask settings (Here set to 255. 255.0.0)

07、Operation Mode ：I-7540D-WF's operation mode settings (Here set to Server mode)

08、Wi-Fi Mode ：Wireless network connection mode settings (Here set to Ad-Hoc mode. If the mode is AP mode, wireless AP devices is needed)

09、SSID ：Service set identifier (Here set to I7540DWF)

10、WLK ：Key of encryption (Here does not have the setting)

11、WLCH ：Wi-Fi connection channel settings (In Ad Hoc mode, can

not be set 0 (Auto), here set to 1)

12、Encryption : Encryption mode setting (Here set NONE (without encryption))

Upload the parameters

After completing the settings above, select the RS-232 interface and connections Port Num. Press "Write para" Button to upload the parameters, If the connection settings and the wiring are correct, the transmission process status bar will show the transmission state below. As uploading is successful, the upload window will appear as shown below.

Figure 4-5**:** Parameter transmission status and upload successfully screens

4.2.2 **Client connection mode**

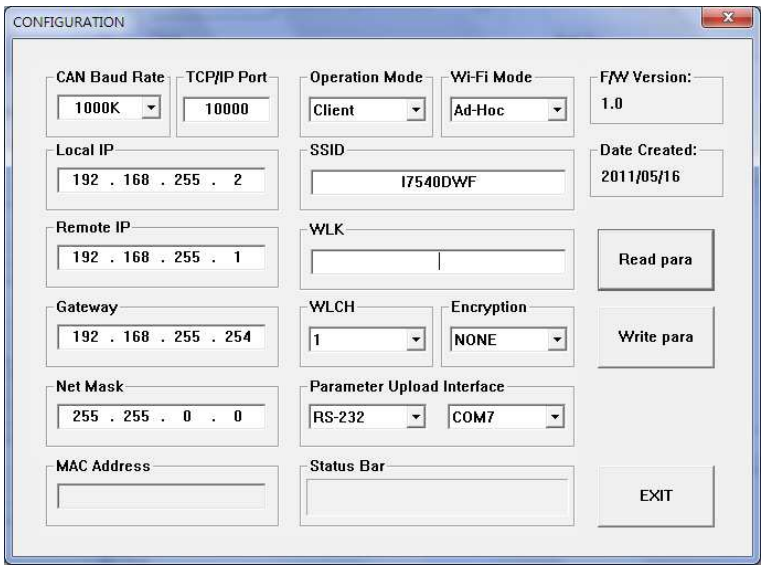


Figure 4-6**:** Client connection mode

01、CAN Baud Rate ：It can help users to set the CAN bus baud rate according to the actual connection. The case is set as 1000K bps

in Figure 4-6

02、TCP/IP Port ：This field is used to set TCP/IP port of Connection according to the actual conditions. The case is set TCP/IP port as 10000 in Figure 4-6

03、Local IP ：Set the local machine's wireless IP. Here set to 192.168.255.2

04、Remote IP ：Set the remote connection device's IP (Server). Here set to 192.168.255.1

05、Gateway ：Gateway settings (Here set to 192.168.255.254)

06、Net Mask ：Net Mask settings (Here set to 255. 255.0.0)

07、Operation Mode ：I-7540D-WF's operation mode settings (Here set to Client mode)

08、Wi-Fi Mode ：Wireless network connection mode settings (Here set to Ad-Hoc mode. If the mode is AP mode, wireless AP devices is needed)

09、SSID ：Service set identifier (Here set to I7540DWF)

10、WLK ：Key of encryption (Here does not have the setting)

11、WLCH ：Wi-Fi connection channel settings (In Ad Hoc mode, can not be set 0 (Auto), here set to 1)

12、Encryption : Encryption mode setting (Here set NONE (without encryption))

Upload the parameters

After completing the settings above, select the RS-232 interface and connections Port Num, press "Write para" button to upload the parameters. If the connection settings and the wiring are correct, it will appear the screen as Figure 4-5.

4.3 Connection test

4.3.1 **Two I-7540D-WF connection application architecture**

1、Power on the two I-7540D-WF (TCP Client / TCP Server).

2、After about 10 seconds, two I-7540D-WF will first establish Ad-Hoc connection. WLAN LED on the front panel will be form flashing state to normally ON.

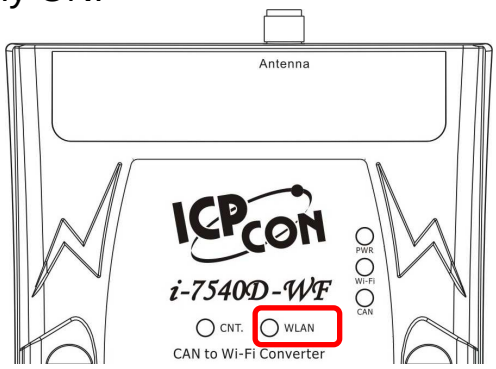


Figure 4-7**:** Ad-Hoc connection LED

3、After about 5 seconds, two I-7540D-WF will further establish TCP connection. The CNT. LED on the front panel will also form flashing state to normally ON.

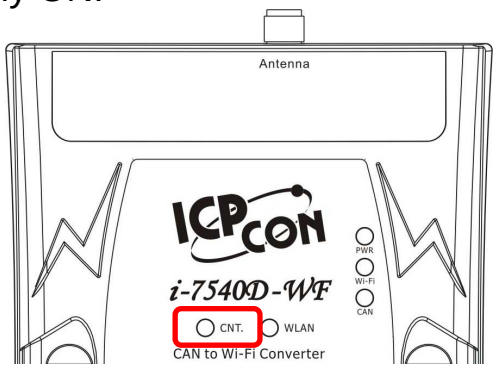


Figure 4-8**:** TCP connection LED

4、As WLAN LED and CAN. LED are always turned on, it means the two I-7540D-WF connection established successfully. This can be for CAN wireless transmission.

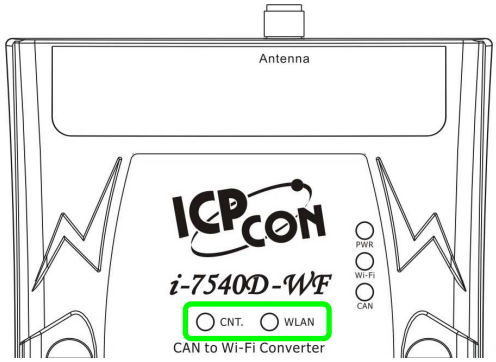


Figure 4-9**:** I-7540D-WF successful connection LED

5、When CAN and Wi-Fi connection are under normal conditions, the CAN LED will show flashing light with CAN data transmitting or receiving; The Wi-Fi LED will also show flashing light with Wireless data communicating.

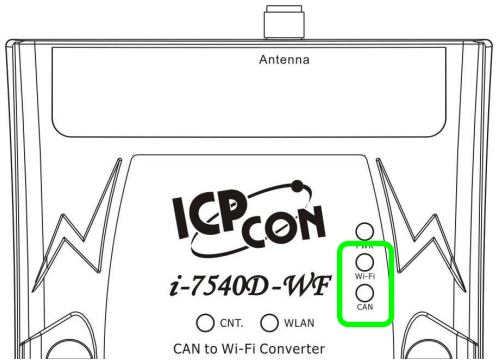


Figure 4-10**:** I-7540D-WF CAN and Wi-Fi Transmission LED

4.3.2 **I-7540D-WF and PC connection application architecture**

(PC must have Wi-Fi connectivity)

I-7540D-WF - TCP Server

1、I-7540D-WF is set to TCP Server mode, and then turn on the power to wait for I-7540D-WF Utility to connect.
2、Between PC and I-7540D-WF, it needs to first establish a WLAN connection (please refer to the contents of the computer wireless network settings).
3、After confirming the WLAN connection is established, set the port number in the I-7540D-WF Utility's "TCP Port Number" area and I-7540D-WF's IP address in the "Client" area. Then press "Client: Connect" button and the message window will show "Connecting

to Server (192.168.255.1) on Port 10000.... (waiting for CONNECT)" message. If the "Server (192.168.255.1) -> CONNECT SUCCESSFUL, 0 Bytes sent" messages is shown, it means that the TCP connection has been successfully.

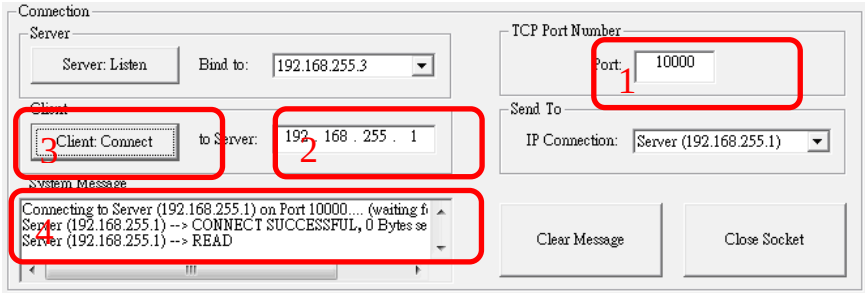


Figure 4-11**:** I-7540D-WFUtility-Client connection procedure

4、If I-7540D-WF WLAN LED and CNT. LED on the panel are always turned on, refer to Figure 4-9, it means the I-7540D-WF and I-7540D-WF Utility connection established successfully. Users can use the I-7540D-WF Utility to transmit or receive CAN data. User can refer to the description in the CAN Transmission / Reception section.

I-7540D-WF - TCP Client

1、I-7540D-WF is set to TCP Client mode, and then turn on the power to wait to connect to the I-7540D-WF Utility.
2、Between PC and I-7540D-WF, it needs to first establish a WLAN connection (please refer to the contents of the computer wireless network settings).
3、After confirm the WLAN connection is established, set the port number in the I-7540D-WF Utility's "TCP Port Number" area and select the Server IP (PC's IP location) In the "Server" area, then press "Server: Listen" button. In this time the I-7540D-WF Utility is in waiting for connection status and the message window will show "Listening (192.168.255.1) on Port 10000.... (waiting for ACCEPT)" message. If the "Client 238 (192.168.255.2) --> ACCEPT" messages is shown, it means that the TCP connection has been successfully.

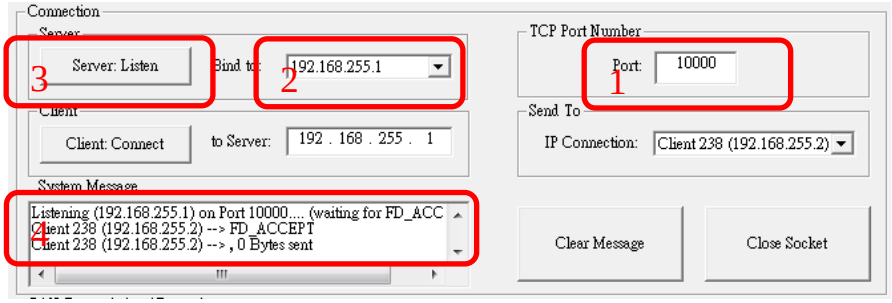


Figure 4-12**:** I-7540D-WFUtility-Server connection procedure

4、If I-7540D-WF WLAN LED and CNT. LED on the panel are always turned on, refer to Figure 4-9, it means the I-7540D-WF and I-7540D-WF Utility connection established successfully. Users can use the I-7540D-WF Utility to transmit or receive CAN data. User can refer to the description in the CAN Transmission / Reception section.

5. Troubleshooting

Item	Problem Description	Solution
1	CAN Bus Transmission Fail (Power LED Blink per 100 ms)	1. Make sure the CAN bus wiring is connected to the correct pin. 2. Make sure the devices is in the same CAN Baud Rate setting.
2	CAN Bus-Off (Power LED Blink per 500 ms)	1. Make sure the CAN bus wiring is not in short-circuit
3	Wi-Fi module communication error (PWR & CNT. LED Blink per 500 ms)	1. Please return to the ICP DAS for inspection and repair
4	Power Failure (PWR LED Off)	1. Please return to the ICP DAS for inspection and repair
5	WLAN connection can not be established (WLAN LED Blink or Off)	1. Make sure that the service set identifier device (SSID) settings are the same. 2. Make sure Wi-Fi transmission Channel settings are the same. 3. Make sure encryption is set, encryption keys are the same way 4. Make sure antenna is good 5. Make sure the connection is too far away, resulting in poor signal quality. (Please shorten the connection from the test) 6. Please confirm whether there are barriers on the scene. That could result in poor signal quality.
6	TCP connection can not be established (CNT. LED Blink)	1. Make sure WLAN connection is established successfully 2. Make sure the network configuration is good (TCP / IP Port, Local IP, Remote IP, Gateway, Net Mask)

● Technical Support

If you have problems about using the I-7540D-WF, please contact ICP DAS Product Support.
Email: service@icpdas.com