

工業級 4G 模組

I-8213W-4G 系列

使用者手册

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本手冊的技術服務與操作資訊適用於



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1. 產品簡介

I-8213W-4G 系列為工業級 4G LTE 模組並帶有 GPS 功能。I-8213W-4GE 支援 FDD LTE B1/B3/B5/B7/B8/B20 頻段·而I-8213W-4GC 則支援 FDD LTE B1/B3/B8 與 TDD LTE B38/B39/B40/B41 頻段。 WCDMA 方面支援 850/900/2100 MHz 與 GSM 850 MHz, EGSM 900 MHz, DCS 1800 MHz, PCS 1900 MHz。這些模組皆可經由便利的 2G/3G/4G 網路來收集遠端資料‧包含各種流量計或者及時的遠端控制。這些模 組也內建 TCP/IP stack 只需搭配簡單的控制命令即可連線上網或簡訊收送。並且 可以搭配本公司的 PAC 系列產品作 SMS、GPRS 和 3G/4G 的應用‧例如 WinPAC-8000, LinPAC-8000 or XP-8000 等。



2. 硬體介紹





2.1. 規格

型號	I-8213W-4GE	I-8213W-4GC		
4G 系統	4G 系統			
頻段(FDD)	B1/B3/B5/B7/B8/B20	B1/B3/B8		
頻段(TDD)		B38/B39/B40/B41		
3G 系統				
頻段 (WCDMA)	850/900/2100 MHz	900/2100 MHz		
頻段(TDSCDMA)		1900/2100 MHz		
GSM/GPRS 系統				
頻段	850/900/1800/1900 MHz	900/1800MHz		
GPRS 連結	GPRS class 33; GPRS station class B	GPRS class 12; GPRS station class B		
資料傳輸速度	GPRS (Kbps): max. 107 (DL) / 85.6 (UL) WCDMA (Kbps): max. 384 (DL) / 384 (UL) DC-HSPA (Mbps): max. 42 (DL) / 5.76 (UL) LTE-FDD (Mbps): max. 150 (DL) / 50 (UL) LTE-TDD (Mbps): max. 130 (DL) / 50 (UL)	GPRS (Kbps) : max. 107 (DL) / 85.6 (UL) DC-HSPA+ (Mbps): max. 42 (DL) / 5.76 (UL) TD-SCDMA(Mbps): max. 4.2 (DL) / 2.2 (UL) CDMA2000 EVDO(Mbps): max. 3.1 (DL) / 1.8 (UL) LTE-FDD (Mbps): max. 150 (DL) / 50 (UL) LTE-TDD (Mbps): max. 130 (DL) / 30 (UL)		
編碼	CS 1, CS 2, CS 3, CS 4			
SMS				
SMS	MT, MO, CB, Text and PDU mode			
連接介面				
USB	USB 2.0 (high speed)			
GPS 介面				

支援通道數	32	
支援協議	NMEA 0183	
LED 指示燈		
電源	紅燈	
GPRS	黃燈	
電源		
保護	ESD, Surge, EFT, Hi-Pot	
功耗	閒置: 0.15 A @ 5 VDC; 運轉: 0.2 ~ 1.62 A (peak) @ 5 VDC	
機體		
外殼	塑膠	
尺寸(W x L x H)	30mm x 85mm x 114mm	
環境		
工作溫度	-25°C ~ +75 °C	
存放溫度	-30°C ~ +80 °C	
濕度	5~95% RH, non-condensing	

2.2. I-8213W-4G 特色

- I-8213W-4GE 支援 FDD LTE B1/B3/B5/B7/B8/B20 頻段而
 I-8213W-4GC 則支援 FDD LTE B1/B3/B8 與 TDD LTE
 B38/B39/B40/B41 頻段。WCDMA 方面支援 850/900/2100 MHz 與
 GSM 850 MHz, EGSM 900 MHz, DCS 1800 MHz, PCS 1900 MHz。
 可應用在 LTE/WCDMA/GPRS 資料傳輸、簡訊傳輸
 提供 4G/3G/GPRS 的 TCP Server, TCP Client, UDP Client 連線
 支援標準 AT Commands
 支援 32-channels GPS 與 NMEA 協議 v0183 v3.01
- 支援 XP-8000, WinPAC-8000, LinPAC-8000, ViewPAC

3. 應用架構

產品應用 範例一:

Industrial 4G LTE module



產品應用 範例二:



Application

Control Center

4. 硬體外觀

● 腳位圖







模組上設有兩個 LED 指示燈,幫助使用者判斷系統目前的狀態,其說明如下:

A. 電源(紅燈):此電源指示燈能顯示機組之電源狀況。

電源正常	電源異常
恆亮	恆滅

B. 4G (黃燈):顯示 4G 運作狀況



4.3. 硬體安裝

● I-8213W-4G 安裝



- 1. 將 I-8213W-4G 安裝至你的主機上
- 2. 插入 SIM 卡
- 3. 連接 USB
- 4G 與 GPS 天線安裝



5. USB 驅動程式安裝

5.1 範例: XP-8000 (Microsoft Windows OS)

步驟 1: 雙擊 "I-8213W-4G USB driver V1.00.exe" 開始安裝驅動程式

步驟 2:點擊"Next"



步驟 3:點擊 "Next"

Setup - I-8213W-4G	
Select Destination Location Where should I-8213W-4G be	e installed?
Setup will install I-82	13W-4G into the following folder.
C:\ICPDAS\I-8213W-4G	Browse
At least 1.2 MB of free disk sp	pace is required.
	< Back Next > Cancel

步驟 4:選擇 "Install"

Setup - I-8	213W-4G	
Ready to In Setup is no	stall w ready to begin installing I-8213W-4G on you	r computer.
Click Insta change an	l to continue with the installation, or click Back i y settings.	f you want to review or
Destinati C:\IC	on location: PDAS\I-8213W-4G	
<		<u>×</u>
	< <u>B</u> ack	Install Cancel

步驟 5:點擊 "Finish"



步驟 6:透過 USB 連接線連接 I-8213W-4G 及 PAC

步驟 7:彈出"Found New Hardware Wizard"視窗要您安裝 "Quectel LTE Module" 的驅動程式,請點擊"Next"至下一步



步驟 7-1: 點擊 "Continue Anyway"

Har dwa	re Installation
~	ß
1	The software you are installing for this hardware:
	I-8213W-4G USB Modem
	has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
	Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
-	Continue Anyway STOP Installation

步驟 7-2:若您接收到安裝成功的訊息,請點擊"Finish"結束安裝

Hardware Update Wizard	
	Completing the Hardware Update Wizard
	The wizard has finished installing the software for:
	GTM-204M-4G USB Modem
	Click Finish to close the wizard.
	< Back Finish Cancel

步驟 7-3:若您接收到安裝失敗的訊息,請點選 "Install from a list or specific location",並點擊 "Next"至下一步



步驟 7-4: 點擊 "Browse" 瀏覽與選擇您的安裝資料夾,點擊 "Next" 至下一步

ardware Up	odate Wizard
Please cho	pose your search and installation options.
💿 Sear	ch for the best driver in these locations.
Use path:	the check boxes below to limit or expand the default search, which includes local s and removable media. The best driver found will be installed.
C	Search removable media (floppy, CD-ROM)
	Include this location in the search:
	C:\ICPDAS\I-8213W-4G\X86
⊙ Don'	t search. I will choose the driver to install.
Choo the o	ise this option to select the device driver from a list. Windows does not guarantee tha river you choose will be the best match for your hardware.
	(Back Next) Cancel

步驟 8:彈出"Hardware Installation"視窗要您安裝"I-8213W-4G Wireless Ethernet Adapter"的驅動程式,請點擊"Continue Anyway"



步驟 9:彈出 "Hardware Installation" 視窗要您安裝 "I-8213W-4G USB AT Port" 的驅動程式,請點擊 "Continue Anyway"

Hardwa	are Installation
1	The software you are installing for this hardware: I-8213W-4G USB AT Port has not assed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.) Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
1	Continue Anyway STOP Installation

步驟 10:彈出 "Hardware Installation" 視窗要您安裝 "I-8213W-4G USB NMEA Port" 的驅動程式,請點擊 "Continue Anyway"



步驟 11:彈出 "Hardware Installation" 視窗要您安裝 "I-8213W-4G USB DM Port"

的驅動程式,請點擊 "Continue Anyway"



步驟 12:完成安裝步驟後·請開啟 "裝置管理員" ·確認已新增 8 個裝置項目· 如下圖所示:



5.2 範例: LinPAC (Linux OS)

● i-8213W-4G 驅動程式安裝

Linux 可以為 I-8213W-4G 安装驅動模組 "選項",請參考下面的 Linux 命令 步驟。

步驟 1: 輸入命令"modprobe option"

步驟 2: 再輸入"echo "2c7c 0125" > /sys/bus/usb-serial/drivers/option1/new_id"

步驟3:安裝完成後會顯示ttyUSBn

root@icpdas:~# modprobe option			
root@icpdas:~#			
root@icpdas:~# echo "2c7c 0125" > /sys/bus/usb-serial/drivers/option1/new id			
root@icpdas:~#			
root@icpdas:~# dmesg grep ttyUSB			
[107.252859] usb 2-1.2: GSM modem (1-port) converter now attached to ttyUSB0			
[107.254599] usb 2-1.2: GSM modem (1-port) converter now attached to ttyUSB1			
[107.256577] usb 2-1.2: GSM modem (1-port) converter now attached to ttyUSB2			
[107.260277] usb 2-1.2: GSM modem (1-port) converter now attached to ttyUSB3			
[107.261822] usb 2-1.2: GSM modem (1-port) converter now attached to ttyUSB4			
root@icpdas:~#			
root@icpdas:~#			

i-8213W-4G 的串列對應功能請參考下表

Port Name	Interface Function
ttyUSB1	GPS/GNSS interface
ttyUSB2	AT Command interface
ttyUSB3	2G/3G/4G system interface

● i-8213W-4G 驅動程式解除安裝

步驟1:如需解除安裝,可輸入命令"modprobe --r option"

6. GPRS 連線方式



6.1. 範例: XP-8000 (Windows Embedded Standard 2009)

- ▶ 硬體設備需求
 - 1) I-8213W-4G
 - 2) USB 連接線(CA-USB18)
 - 3) XP-8000



WinPAC-8000

+ CA-USB18



I-8213W-4G

▶ 新增新數據機連結

步驟 1. 控制台→點兩下"Phone and Modem",如下圖所示:



步驟 2. 檢視"Modems"選項→於"I-8213W-4G USB Modem"點選"Properties"



步驟 3. 檢視"Modem"分頁中的"Maximum Port Speed"是否為 115200,若不是, 請設為 115200。

I-8213W-4G USB Modem Properties				
Driver	Details		Power	Management
General	Modem	Di	agnostics	Advanced
Port: COM34 Speaker volume Off Maximum Port 3	Speed	-	Hgh ▼	
Dial Control	it for dial tone be	efore dia	ing	
			ОК	Cancel

步驟 4. 於"Diagnostics"分頁點選"Query Modem",請等待數秒後查看內容是否有 讀 值,若無讀值,請先確認 USB Driver 是否正確。

Driver	Detaile		Power N	anagement
General	Modem	Diagnosti	cs	Advanced
Modem Informatio	on	-		
Field V	alue			
Hardware ID U	SB\VID 05C68PID	92158REV	02328M	1.0
•				- P-
				_
Command	Response			<u>^</u>
ATQ0V1E0	Success			
AT+GMM	EC20			
AT+FCLASS=?	0,2.0			
AT#CLS=?	COMMAND NOT	SUPPORTED		-
			ioni Med	lam
		GR	Jery Mou	em
Logging				
Append to Lo	D		View log	1
	-			

步驟 5. 於"Advanced"分頁→輸入額外的撥號指令,如下圖所示:

備註:GPRS的 APN 由您當地的電信業者提供。

例如:

在台灣即輸入:AT+CGDCONT=1, "IP", "INTERNET" 在中國大陸輸入:AT+CGDCONT=1, "IP", "CMNET"



步驟 6. 點擊"OK"

▶ 新增撥號網路

🕞 💭 🗢 📴 🕨 Control Panel 🕨 All Control Panel Items 🕨 ✓ Search Control Panel Q Adjust your computer's settings View by: Large icons 🔻 Display Ease of Access Center Folder Options HomeGroup Indexing Options Fonts R Location and Other 7 Internet Options Keyboard Sensors Network and Sharing 1 Mouse Notification Area Icons 0:00 Center Performance Information Parental Controls Personalization and Tools Phone and Modem Programs and Features **Power Options** Phone and Modem Configure your telephone dialing rules and modem settings. RemoteApp and Desktop Recover Region and Language 4 Connections 0 Sound Speech Recognition Sync Center System Taskbar and Start Menu Troubleshooting

步驟 1. 控制台 → 點選"Network and Sharing Center"

步驟 2. 點選"Set up a new connection or network"至下一步

Control Panel Home	View your basic network information and set up connections
Change adapter settings Change advanced sharing settings	XP8X31-2VJENIV1 Internet
	View your active networks Connect to a networks.
	 Set up a new connection or network Set up a wireless, broadband, dial-up, ad hoc, or VPN connection; or set up a router or acces point. Connect to a network Connect to a network
	Choose homegroup and sharing options Access files and printers located on other network computers, or change sharing settings.
	Troubleshoot problems Diagnose and repair network problems, or get troubleshooting information.
See also	
HameGroup	
Homeoroup	
Internet Options	

步驟 3. 點選 "Set up a dial-up connection" → 按下"Next"至下一步

	- 0 🛋
👰 Set Up a Connection or Network	
Choose a connection option	
Connect to the Internet Set up a wireless, broadband, or dial-up connection to the Internet.	
Set up a new network Configure a new router or access point.	
Connect to a workplace Set up a dial-up or VPN connection to your workplace.	
Set up a dial-up connection Connect to the Internet using a dial-up connection.	
	Next Cancel
	Next Cancel

步驟 4. 於 "Dial-up phone number"中填入電話號碼 → 按下"Next"至下一步 備註:該電話號碼由您當地的電信業者提供,例如台灣為*99#

Dial-up phone number:	*99#	Dialing Rules
User name:	[Name your ISP gave you]	
Password:	[Password your ISP gave you]	
	Show characters	
	Remember this password	
Connection name:	I-8213-4G	
🛞 📃 Allow other people to	o use this connection	
Connection name: 🛞 🥅 Allow other people to	I-8213-4G	

步驟 5. 開始連線,請等待

r

🕞 🧮 Create a Dial-up Connection	
Connecting to I-8213-4G	
i i i i i i i i i i i i i i i i i i i	
Registering your computer on the network	
Skip	Cancel

1

C

步驟 6. 連上網路會先測試連線狀態

🚱 🔚 Create a Dial-up Connection	
Testing your Internet connection	
i i i i i	
Sk	ip Cancel

步驟 7. 確認已連上網路

Create a Dial-up Connection	
You are connected to the Internet	
i i i i i i i i i i i i i i i i i i i	
Browse the Internet now	
To connect to the Internet next time, left-click the network icon in the taskbar and click the connection you just created.	
	Close

6.2. 範例: LinPAC (Linux OS)

使用者可以使用 Linux 命令" wvdial "通過 i-8213W-4GE 的 "ttyUSB3 "串 列阜連接網路。

步驟 1: 輸入命令 "cat /etc/wvial.conf",修改 ISR 的 wvdial.conf 檔案, 設定 ISP 的網路配置後儲存,可參考下圖範例

步驟 2: 輸入命令" wvdial & "啟動 2G/3G/4G

步驟 3: 檢查網路提供商提供的 IP 位址後,查看 "ppp0"網路介面是否處於 活動狀態。



7. GPS 快速測試

7.1. 範例: XP-8000 (Windows Embedded Standard 2009)

步驟 1: 至官網下載 XP-8000 Tool

https://www.icpdas.com/tw/download/show.php?num=6626&model=I-8213W-4GE 步驟 2: 或是從 CD 中拷貝 "Send232.exe" 到 XP-8000 路徑: CD:\ I-8213W-4G\Software\XP-8000\GPSTest

步驟 3: 執行測試軟體並且選擇您的 AT Port Number



步驟 4: 輸入以下命令: AT+OGPS=1

Send232_Binary v1.4.8 (ICPDAS)	
COM Port Baud Line Control Com8 115200 n,8,1	Connect State : Opposite Breaking Close COM
How Control: Image: None HW SW CTS: True DSR: True DCD: False	Auto Connect Detection DTR_Disable
End char of String	Auto-Send 7188
○ None ○ LF_CR(0x0a 0x0d)	Period : 500 Setting Set_Net
CR(0x0d) CR_LF(0x0d 0x0a)	
C LF(0x0a) C Def 1A (HEX)	Send Stop END
Send232_SEND (ASCII Mode)	Send232_RECV (Auto-Recv)(ASCII Mode)
Send ASCII Clear Text	Manual Recv Clear Input Buffer
Binary	Auto Recv Clear Text Binary
Send_Len: 10 10	Recv_Len: 16 16
AT+QGPS=1	AT+QGPS=1 OK
-	
	🔽 ShowData 📃 Enlarge
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步驟 5: 重新打開 Com Port (NMEA Port) Number · 就可以取得 GPS 資料 · 如下圖:

Ports (COM & LPT) Communications Port (COM1) Communications Port (COM2) I-8213W-4G USB AT Port (COM8) I-8213W-4G USB DM Port (COM3) I-8213W-4G USB NMEA Port (COM9)	
Send232_Binary v1.4.8 (ICPDAS)	
COM Port Baud Line Control Com9 115200 n.8,1 Flow Control : None Hw Sw CTS : True DSR : True DCD : True	Connect State : Connecting Close COM Auto Connect Detection DTR_Disable
End char of String	Auto-Send 7188
C None C LF_CR(0x0a 0x0d)	Period : 500 Setting Set_Net
CR(0x0d) C CR_LF(0x0d 0x0a) C LF(0x0a) C Def 1A (HEX)	Send Stop END
- Send232_SEND (ASCII Mode)	- Send232_RECV (Auto-Recv)(ASCII Mode)
ASCII Clear Text	Manual Recv Clear Input Buffer
Binary	Auto Recv Clear Text Binary
Send_Len: 0 0	Recv_Len: 429 13194
AT+QGPS=1	\$GPVTG,,T,0.0,M,0.0,N,0.0,K,A*0D \$GPRMC,073633.0,A,2237.180782,N,1 2018.102092,E,0.0,,300317,0.0,E,A*2D \$GPGSA,A,2,08,09,16,21,27,31,,1.4, 1.1,0.9*3D
	I Enlarge

7.2. 範例: LinPAC (Linux OS)

要從 i-8213W-4G 介面"/dev/ttyUSB1"讀取 GPS NMEA 資料流程·請 按照以下步驟操作:

步驟 1. 輸入命令 echo -e "AT+QGPS=1 \r\n" > /dev/ttyUSB2

步驟 2. 輸入命令 cat /dev/ttyUSB1, 結果如下圖, 會不斷輸出 GPS 資訊

root@icpdas:~# echo -e "AT+QGPS=1 \r\n" > /dev/ttyUSB2 root@icpdas:~# root@icpdas:~# cat /dev/ttyUSB1 \$GPVTG,,T,,M,,N,,K,N*2C \$GPGSA,A,1,,,,,,,,,,,,,,,*1E \$GPGGA,,,,,0,,,,,,,*66 \$GPRMC,,V,,,,,,,,,,N*53 \$GPVTG,,T,,M,,N,,K,N*2C

修訂說明

版本	作者	日期	描述
1.0	Eddie	2017-03-30	Release
1.1	Eddie	2017-09-05	Update Hardware Specifications
1.2	Eddie	2018-04-19	Update Dial-up Connection
1.3	Patty	2023-08-09	Add LinPAC Example