

User Manual

Version 1.0.1 October 2021

GRP-500M

Ethernet / Serial / CAN to Ethernet / 4G Gateway



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1. Introduction

The GRP-500M provided by ICP DAS is a gateway for Ethernet, serial port and CAN. With the optional 4G / NB communication module, the GRP-500M can be used for wireless data transmission. With the optional GPS module, the GRP-500M can also be used as a GPS tracking system for vehicle management or maritime system. The GRP-500M can be used in M2M application to transmit remote I/O, Modbus data or camera video. Within the high-performance CPU, the GRP-500M can process large amounts of data and is suitable for harsh industrial environments.



Application

Control Center



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2. Hardware Specification

2.1 GRP-500M Specifications

Item	GRP-500M	
Software		
Gateway Function	Ethernet and Serial port (RS-232 x1, RS-485 x1) to Ethernet / 4G / NB-IoT	
Embedded service	Web Server, Router function	
System		
CPU	ARM CPU	
EEPROM	16 KB (Data Retention: 40 years; 1,000,000 erase/write cycles)	
Expansion Flash Memory	SD Card (Max. 32GB SDHC)	
RTC (Real Time Clock)	Provide seconds, minutes, hours, day of week/month, month and year	
64-bit Hardware Serial Number	Yes	
Watchdog Timer	Yes	
LED Indicator	4 LEDs (RUN/PWR, L1, L2, L3)	
Rotary Switch	Yes (0~9)	
Comm. Interface		
Ethernet	RJ-45, 10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)	
COM1	RS-232 (RxD, TxD and GND); Non-isolated (Console, Debug)	
COM2 RS-232 (RxD, TxD and GND); Non-isolated		
COM3	RS-485 (D2+, D2-); 3000 VDC isolated	
CAN	CAN Bus (CAN_H, CAN_L)	
Mechanism		
Casing	Metal	
Dimensions(W x L x H)	117 mm x 126 mm x 58 mm (W x L x H)	
Installation	DIN-Rail / Screw	
Power		
Protection	Power reverse polarity protection	
Frame Ground Protection	ESD, Surge, EFT, Hi-Pot	
Required Supply Voltage	+10 V _{DC} ~ +48 V _{DC}	
Power Consumption	4.8W (200 mA @ 24 V _{DC})	
Environment		
Operation Temp.	-25℃ to 75℃	
Storage Temp.	-30°C to 80°C	
Humidity	5~95% non-condensing	

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2.2 Accessories Specifications

Module (Optional)	LE910C4-AP	EC25-E	BG96
Category	LTE category 4	LTE category 4	LTE Cat-M1/NB1/EGPRS
	Frequen	cy Bands	
LTE-FDD	B1/B3/B5/B8/B9/B18/B19/ B26/B28	B1/B3/B5/B7/B8/B20	B1/B2/B3/B4/B5/B8/B12/B 13/B18/B19/B20/B26/B28
LET-TDD	-	B38/B40/B41	B39 (For Cat M1 Only)
WCDMA	B1/B5/B6/B8/B19	B1/B5/B8	-
GSM/EGPRS	-	900/1800Mhz	850/900/1800/1900MHz
	Ar	ea	
Region	Asia-Pacific	EMEA, Korea, Thailand, India	Global
Certification	Carrier: NTT Docom, au KDDI, Telstra Regulatory: JRL / JTBL, RCM, CE	Carrier: Vodafone, Deutsche Telekom, SKT, Telefónica, T-Mobile, KT / LGU+ Regulatory: GCF, CE, KC, NCC, RCM, FAC, NBTC, ICASA Others: WHQL	Carrier: Vodafone, Deutsche Telekom, Telefónica, Verizon, AT&T, T-Mobile, Sprint, Telus, U.S. Celluar, Rogers, Bell, SKT, LGU+, NTT DOCOMO, SoftBank, KDDI, Telstra Regulatory: GCF, CE, FCC, PTCRB, IC, IFETEL, CCC, KC, NCC, JATE, TELEC, RCM, NBTC, IMDA Others: ROHS Compliant
Tomporature Dance			40°C 100°C
	-40 ⁻ C ~ +85 ⁻ C	$-40^{\circ} \text{C} \sim +85^{\circ} \text{C}$	-40 ⁻ C ~ +80 ⁻ C
Dimensions		51.0mm × 30.0mm × 4.9mm	

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3. Application Architecture

3.1 4G / Ethernet Gateway



Application

Control Center

3.2 Remote Video Monitor



3.3 Serial Port to 4G / Ethernet Gateway Application



3.4 Data Collection and Remote Control (with NB-DA Server)



3.5 Data Collection and Remote Control (with MQTT Broker)



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4. Hardware

4.1 Pin Assignment



4.2 Dimension



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4.3 LED Indicators



There are four LED indicators to help users to judge the various conditions of device. The description is as follows :

A. **PWR** (Green) : Indicates whether there is an external power input.

Normal	Abnormal
Always ON	Always OFF

B. **RUN** (Red) : Indicates whether the operating system is normal.

Normal	Abnormal
250ms ON / 250ms OFF	Always ON / OFF

C. L1 (Green/Red) : Indicates the status of RTU Client.

Normal	Abnormal
500ms ON / 500ms OFF	Always ON / OFF

D. L2 (Green / Red) : Reserve.

E. L3 (Green / Red) : Indicates the status of optional communication module.

Optional Module : LE910C4-AP

Registered	Unregistered
1800ms ON / 200ms OFF	Always ON

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Optional Module : EC25-E

Registered	Network Search	Data Transmission
1800ms ON / 200ms OFF	200ms ON / 1800ms OFF	125ms ON / 125ms OFF

Optional Module : BG96

Registered	Network Search	Data Transmission
1800ms ON / 200ms OFF	200ms ON / 1800ms OFF	125ms ON / 125ms OFF

4.4 Rotary Switch

There are some functions of rotary switch. The description is as follows :

- (1) **0** : Normal mode, default position.
- (2) 9 : If the user sets the rotary switch to 9 and then restarts the device, the Ethernet IP will be set to "192.168.255.1". It is useful when users forget the Ethernet IP.

4.5 Mounting the Accessories

GRP-500M has one PEIe socket to expand the wireless communication function.



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4.5.1 Mounting the communication module



(1) Remove stripped screws and then remove the cover

- (2) Hold the communication module , and then carefully insert it into the PCIe slot.
- (3) Fasten the communication module using the screws supplied.



(4) Connect the communication module using the ipex connector supplied



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(5) Close the cover and then fasten the screws.



4.5.2 Installing the antenna

The Mobile network expansion card has two antenna connector that can be used to connect the 3G/4G and GPS antenna. To install the antenna, just screw the antenna tightly into the connector, and put the antenna in the purpose place.



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5. Web Utility

5.1 Login the Utility

Please login before using the web utility:

- Default IP is "192.168.255.1".
- Default Mask is "255.255.0.0".
- · Default username & password is "admin".

The web page after login is as follows.

Ethernet		
Mode static		
MAC address 68:c9:0b:7c:37:89		
IP Address 192.168.255.1		
Mask 255.255.0.0		

WLAN information		
Mode	Closed	

Mobile Network information	
Status	connected
IP Address	10.97.25.192
P-t-P	10.64.64

	Modem information	1
IMEI	861075022019632	
PIN Code	+CPIN: READY	
Register Status	Registered	
Signal Quality	68%	

GPS information	
GPS Status	GPS is ready, @(22.6202772833, 120.30106635)> <u>show map</u>
GPS Data	\$GPRMC,012958.0,A,2237.216637,N,12018.063981,E,0.0,84.8,150917,,,A*5A

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5.2 Information

5.2.1 Device Information

The "Device Information" page provides basic device information.

Device Information		
Serial Number	9F6E4BA10000	
Kernel Version	3.2.14	
Firmware Version	GRP-500M_V1.2.2_20200415	

· Serial Number: Serial number of ICPDAS product.

- · Kernel Version: Linux kernel version.
- Firmware Version: Firmware version.

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5.2.2 Network Information

The "Network Information" page provides basic network information.

	Ethernet	
Mode	static	
MAC address	68:c9:0b:7c:37:89	
IP Address	192.168.255.1	
Mask	255.255.0.0	

WLAN information		
Mode	Closed	

Mobile Network information		
Status	connected	
IP Address	10.97.25.192	
P-t-P	10.64.64.64	

Modem information	
IMEI	861075022019632
PIN Code	+CPIN: READY
Register Status	Registered
Signal Quality	68%

	GPS information
GPS Status	GPS is ready, @(22.6202772833, 120.30106635)> <u>show map</u>
GPS Data	\$GPRMC,012958.0,A,2237.216637,N,12018.063981,E,0.0,84.8,150917,,A*5A

· Ethernet: Ethernet information

- Mode: Only support static IP.
- MAC Address: Unique identifier assigned to the network interface.
- IP Address: Computer address under Internet protocol.
- Mask: The mask will be provided by the gateway provider.

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· WLAN information^[1]

· Mobile Network information^[2]

- Status: "connected" means the modem dialed successfully.
- IP Address: IP address provided by ISP provider.
- P-t-P: Gateway IP provided by ISP provider.
- IP Address for VPN: IP address provided by VPN Server.
- P-t-P for VPN: Gateway IP provided by VPN Server.

• Modem information^[3]

- IMEI: IMEI number of communication module.
- PIN Code: The status of the PIN code.
 - ♦ READY: PIN code is ready.
 - ♦ SIM PIN: Need PIN code.
 - SIM PUK: Need PUK code.
 - ♦ SIM failure: Access to SIM card failure.
- Register Status: Indicates whether the machine is successfully connected to the mobile network.
- Signal Quality: 3G / 4G signal quality.

 \cdot GPS information

- GPS Status: GPS positioning status.
 - ♦GPS is ready: Click "Show Map" to show the location of the GRP device.
 - ♦ No GPS data: Unable to locate.
- GPS Data: The "GPRMC" data of GRP device.
- × [1] GRP-500M does not support WLAN
- * [2] Display information after dialing.
- * [2] Display information after installing the communication module.

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5.2.3 Storage Information

The "Storage Information" page provides information about "SD Card" and "USB Disk".

USB Disk		
Size	3936220 KB	
used	2584 KB	
Available	3933636 KB	
Path (Mount Point)	/media/usbhd-sda1	

Micro SD Card		
Size	31154688 KB	
used	25344 KB	
Available	31129344 KB	
Path (Mount Point)	/media/mmcblk0p1	

 $\cdot\,\text{USB}$ Disk / Micro SD card

- Size: Total storage size
- used: Used size
- Available: Free space in the storage
- Path: The mount point in the file system.

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5.3 Network

5.3.1 Ethernet

The "Ethernet" page provides basic settings for Ethernet:

Ethernet		
IP Address	192.168.27.31	
Mask	255.255.0.0	
Gateway	192.168.0.254	
Modify		

- (1) IP Address: Ethernet IP.
- (2) Mask: Gateway mask.
- (3) Gateway: Gateway IP.

5.3.2 PIN / APN Configure

The "PIN / APN Configure" page provides the basic settings of 3G / 4G network:

PIN / APN Configure		
PIN Code	0000	
Phone Number	*99***1#	(1)
APN	internet	(2)
User Name		(2)
Password		(2)
Modify		
 (1):usually use *99# or *99***1# (2):please ask your SIM Card provider 		

- PIN Code: The PIN code is a 4-character number provided by the SIM card provider.
- Phone Number: It is generally filled in as "*99***1#" or "*99#", depending on the SIM card provider.
- APN: Access point name. Please consult the SIM card provider.
- · User Name: Dial-up user name. Please consult the SIM card provider.
- Password: Dial-up password. Please consult the SIM card provider.

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5.3.3 Network Reconnection

The "Network Reconnect" page provides a function to keep the device on the mobile network at all times, but it will send an ICMP signal to check the mobile network. The default setting is "Enable" to ensure that the device is always online.

Network Reconnection		
Server IP	8.8.8.8	
Max. Retry	5	
Retry Interval Time	30	
Enable Funcion	🗹 Enable	
Modify		
 (1):This function will run immediately after you press "Modify" button (2):GSM module will be reset after Max. retry (3):System will reboot after GSM module reset 100 times 		

- Server IP: The destination IP or URL of the ICMP signal.
- Max. Retry: If the number of system retries exceeds this number, the 3G / 4G module will be reset and dialed again.
- · Interval Time: System retry interval.
- · Enable Function: Whether to Enable this function. This setting will run immediately.

5.3.4 DNS

The "DNS" page provides the settings of the DNS server IP.

DNS Server			
Primary DNS Server	168.95.1.1		
Alternate DNS Server 8.8.8.8			
Modify			

• Primary DNS Server: The device will first use it to obtain DNS service.

· Alternate DNS Server: If the "primary DNS server" is invalid, the device will use it to

obtain DNS service

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5.3.5 DDNS Client

The "DDNS Client" page provides a real-time update of the dynamic domain name server to point to the changing IP address on the Internet

DDNS Configure		
Server	default@no-ip.com	
Domain Name	yourDomain.no-ip.org	
Username	yourUserName	
Password	yourPassword	
Period	0 seconds, 0 to disable function	
Modify		

• Server: The domain name of the DDNS service provider.

• Domain: The domain name registered by the user.

· Username: The username of DDNS service.

· Password: The password of DDNS service.

• Period: The time period (in seconds) to update the address^[1].

× [1] Filling in 0 will disable this function.

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5.3.6 VPN

The "VPN" page provides the function of creating a VPN connection (in PPTP protocol).

VPN Configure		
VPN Server	vpnServerIP	
VPN Username	yourUserName	
VPN Password	yourPassword	
DDNS	Enable T	
DDNS Server	dynupdate.no-ip.com 🔻	
DDNS Domain Name	yourDomain.no-ip.org	
DDNS Username	yourUserName	
DDNS Password	yourPassword	
DDNS Period	60	
FTP	Enable •	
FTP Server	ftpServerIP	
FTP Port	ftpServerPort	
FTP Username	yourUserName	
FTP Username FTP Password	yourUserName yourPassword	
FTP Username FTP Password FTP File Name	yourUserName yourPassword vpn_ip.txt	
FTP Username FTP Password FTP File Name FTP Period	yourUserName yourPassword vpn_ip.txt 60	
FTP Username FTP Password FTP File Name FTP Period FTP Passive Mode	yourUserName yourPassword vpn_ip.txt 60 Enable	
FTP Username FTP Password FTP File Name FTP Period FTP Passive Mode VPN Enable	yourUserName yourPassword vpn_ip.txt 60 Enable	
FTP Username FTP Password FTP File Name FTP Period FTP Passive Mode VPN Enable	yourUserName yourPassword vpn_ip.txt 60 Enable Modify	

· VPN:

- VPN Server: The IP of the VPN service provider
- VPN Username: The username of the VPN service.
- VPN Password: The username of the VPN service.

· DDNS:

- DDNS Server: The IP of the DDNS service provider.
- DDNS Domain Name: The domain name registered by the user.

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- DDNS Username: The username of the DDNS service.
- DDNS Password: The password of the DDNS service.
- DDNS Period: The time period (in seconds) to update the address.

· FTP:

- FTP Server: The IP of the FTP service provider.
- FTP Port: The port of the FTP service provider.
- FTP Username: The username of the FTP service.
- FTP Password: The password of the FTP service.
- FTP File Name: The file used to save the user's address on the server.
- FTP Period: The time period (in seconds) to update the address.
- FTP Passive Mode: Whether to enable passive mode.

· VPN Enable: Whether to Enable this function. This setting will run after reboot.

5.3.7 DHCP Server

The "DHCP Server" page provides the function of dynamically assigning IP.

DHCP Server		
Ethernet Subnet	192.168.255.0	
Ethernet Netmask	255.255.255.0	
Ethernet Router	192.168.255.1	
Ethernet Range	192.168.255.100 ~ 192.168.255.125	
WLAN Subnet	10.10.0.0	
WLAN Netmask	255.255.255.0	
WLAN Router	10.10.0.1	
WLAN Range	10.10.0.100 ~ 10.10.0.125	
Enable	□ Enable	
Modify		

• Ethernet Subnet: The DHCP server subnet of the Ethernet interface.

• Ethernet Netmask: The DHCP server mask of the Ethernet interface.

- Ethernet Router: The router IP of the Ethernet interface.
- Ethernet Range: Dynamic IP range of the Ethernet interface.
- WLAN Subnet: The DHCP server subnet of the Wi-Fi interface.
- \cdot WLAN Netmask: The DHCP server mask of the Wi-Fi interface.

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- WLAN Router: The router IP of the Wi-Fi interface.
- WLAN Range: Dynamic IP range of the Wi-Fi interface.

5.3.8 Routing & Port Mapping (Port Forwarding)

The "Routing Rule" page provides setting of routing rules.

	ROUTING Rule		
Rule NO.	IP	Mask	Target
0	192.168.27.1	24 💌	ppp0 🔽
1			~
2			~
3			~
4			~
5			~
6			~
7			~
8			~
9			~

· Routing Rule

- IP: IP address.
- Mask: The mask will affect the number of IPs managed by this rule.
 - ◆"24" means "255" IP.
 - ◆"28" means "16" IP.
 - ◆"32" means "1" IP.
- Target: The target interface of the rule.
 - ◆ "eth0" is "Ethernet"
 - ◆ "ppp0" is "3G / 4G network"
 - ♦ "ppp1" is "VPN"

*** For example:**

Rule 0 will push socket data packets with addresses from 192.168.27.1 to 192.168.27.255 to "ppp0" (3G / 4G network).

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Port Mapping Rule					
Rule NO.	Туре	From	Port	Target IP	Target Port
0	TCP 💌	ppp0 🔽	10080	192.168.27.140	80
1	~	~			
2	~	~			
3	~	~			
4	~	~			
5	~	~			
6	~	~			
7	~	~			
8	~	~			
9	~	~			
Modify					

The "Routing Mapping Rule" page provides setting of port forwarding.

· Routing Rule

■ Type: Protocol type supports "TCP" and "UDP"

■ From: The interface from which the socket comes.

■ Port: The port from which the socket comes.

■ Target IP: The forward IP of the socket.

■ Target Port: The forward port of the socket.

*** For Example:**

Rule 0 will bind sockets from "ppp0" and port "10080" to "192.168.27.140:80".

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5.3.9 Diagnostic

The "Diagnostic" page provides tools for checking network issues.

	Ping Test	
Target IP	8.8.8.8	
Result		
ping		

	Traceroute
Target IP	8.8.8.8
Result	
	traceroute
This function will take time more than 2 minute.	

	Route Information
Result	
	route

- Ping Test: This tool will ping the "Target IP" and display the result below.
- Traceroute: This tool will trace the routing path to the "Target IP" and display the results below.
- \cdot Route Information: This tool will show route settings below.

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5.3.10 Reset Network

The "Reset Network" page provides the function of resetting all Ethernet, DHCP, routing rules and port forwarding settings.

	Notice!!	
Are you s It will reset your Ethernet, WLAN, Please wait a minute for syst	ure to reset network? DHCP Server, and ROUTING Rule conf em rebooting after you press reset button.	igure.
	Reset	
(1):The default Ethernet IP is 192.168.2 (2):The default WLAN IP is 10.10.0.1	55.1	

5.4 System

5.4.1 Password

The "Change Password" page provides password settings.

Change Password		
New Password		
Confirm		
Modify		
The length of password must be more then 4 characters that limited in a~z, A~Z, 0~9.		

· Password: Enter the new password.

· Confirm: Confirm the new password.

5.4.2 Reboot

The "Reboot" page provides the function of restarting the device.

Notice!!
Are you sure to reboot? plese wait a minute for system rebooting after you press reboot button.
Reboot

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5.4.3 Reboot Timer

The "Restart Timer" page provides the function of automatically restarting the system.

Reboot Timer (Reboot system automatically)		
Reboot Time (everyday)	0 : 0 (hour:minute)	
Enable Funcion	Enable	
Modify		
(1):This function will run immediately after you press "Modify" button		

- · Reboot Time (everyday): Time to reboot the system.
- Enable: Whether to Enable this function. This setting will run immediately.

5.4.4 Backup & Restore

The "Backup and Restore" page provides backup and restore of settings.

Backup & Restore		
Backup	Backup	
Restore	瀏覽… Restore	

- Backup: Press the "Backup" button to back up the settings to the user's PC.
- Restore: Press the "Browse" button to select the file, and then press the "Restore" button to store your settings.

5.4.5 Update

The "Update" page provides a firmware update function. Users can download the update file (".tarc") from the IPCDAS website, and then put it into the SD card. Please back up the configuration before updating and restore it after the update.

Update	
Are you sure to update? It may reset some configure file.	
Update	0
 (1):Must put "updateFile.tarc" file in SD card. (2):Need to wait several minutes for update. (3):It will reboot after update. 	

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5.4.6 Restore Factory

The "Restore Factory" page provides the function to restore the settings to the factory settings.

Restore Factory Setting	
The device will reboot after restoring factory settings.	
Restore	

5.4.7 Time

The "Time" page provides the time information of the device.

Time Configure		
Device Time (24-hour)	2015 / 11 / 06 10 : 23 : 38 Set Time	
NTP Server (Time Server)	tock.stdtime.gov.tw Ex: tock.stdtime.gov.tw	
Timezone	+8 🖌 check timezone	
Enable NTP Funcion	☑ Enable	
Modify		

· Set Time:	Set the device's time to be the same as your computer.
·NTP Server:	The device will connect to the NTP server to synchronize
	the time.
· Timezone:	If the user does not know your time zone, please click the
	"Check Time Zone" link to find it.
\cdot Enable NTP Function:	If this function is enabled, the device will automatically
	update the time.

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5.5 VxServer

Through "VxServer" and "VxComm Utility", users can create a virtual COM port on a remote PC to communicate with the COM port of the device.

5.5.1 VxServer

The "VxServer" page provides the function of establishing a connection with the VxServer.

Virtual COM Function (VxServer)		
Server IP	192.168.12.2	
Server Port	11000	default=11000
Heartbeat Time	10	10~65535 seconds
Device ID	1	1~255, unique ID for device
Alias	GRP-530	Max. Length = 8
Time Interval	50	1~5000 ms, default=50
Data Length	1000	10~1000 bytes, default=1000
Modbus TCP to RTU (Port1)	Enable, COM2> TCP Port 10001	
Modbus TCP to RTU (Port2)	Enable, COM3> TCP Port 10002	
Default Baudrate (Port1)	115200 🖌 bps	
Default Baudrate (Port2)	115200 🖌 bps	
	🛚 🛛 🖌 (Data bit, Parity, Stop bit)	
Default Format (Port1)	🛛 🛛 (Data bit, Parit	ty, Stop bit)
Default Format (Port1) Default Format (Port2)	8N1 🖌 (Data bit, Parif 8N1 🖌 (Data bit, Parif	ty, Stop bit) ty, Stop bit)
Default Format (Port1) Default Format (Port2) Enable Funcion	8N1 ✔ (Data bit, Parit 8N1 ✔ (Data bit, Parit □Enable	ty, Stop bit) ty, Stop bit)
Default Format (Port1) Default Format (Port2) Enable Funcion Firmware Version	8N1 ♥ (Data bit, Parif 8N1 ♥ (Data bit, Parif ■Enable v1.0.0	ty, Stop bit) ty, Stop bit)
Default Format (Port1) Default Format (Port2) Enable Funcion Firmware Version	8N1 ✔ (Data bit, Parif 8N1 ✔ (Data bit, Parif Enable v1.0.0 Modify	ty, Stop bit) ty, Stop bit)

(1)Heartbeat Time: if this value is small, it is sensitive to detect network disconnecte
 (2)Virtual IP: please set it different from other virtual COM device

- Server IP: VxServer IP or domain name.
- Server Port: VxServer port number.
- Heartbeat Time: The time interval for sending heartbeat packets to VxServer.^[1]
- Device ID: The unique ID used to identify the device.
- Alias: The alias of the device. The maximum length is 8 characters.
- Time Interval: The time interval for sending serial port data to VxServer.^[2]

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- Data Length: The data length of the serial port data sent to the VxServer.^[3]
- Modbus TCP to RTU: Modbus TCP to Modbus RTU gateway function.
 - "Port1" = "COM2 (RS-232)"
 - "Port2" = "COM3 (RS-485)"
- Default Baudrate: This value depends on your Modbus RTU device.
- Default Format: The configuration of "data bit", "parity" and "stop bit".
 - Data bit support
 - ♦ "8" means "8-bits"
 - ♦"7" means "7-bits"
 - Parity bit support
 - ♦"N" means "None"
 - ♦"O" means "Odd"
 - ♦"E" means "Even"
 - Stop bit support
 - ♦"2" means "2-bits"
 - ♦"1" means "1-bit"

• Enable Function: Whether to Enable this function. This setting will run after reboot.

- * [1] VxServer will detect the disconnection in advance and terminate the connection.
- * [2] If the time interval between two serial data is greater than this value, the data will be divided into two network packets. If there is not enough time interval, but the data length exceeds the "Data Length", the data is still divided into two network packets.
- * [3] If the serial port data length exceeds this value, the data will be divided into two data packets. If this function is not needed, users usually only need to set this value to 1000 bytes (default). This value is restricted by the network protocol.

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5.6 RTU Client

The RTU device uploads its I/O information, Modbus RTU/TCP device I/O information and GPS information to the RTU Center.

5.6.1 RTU Client

The "RTU Client" page provides the function of establishing a connection with RTU Center and the setting of Modbus communication

Main Info.	Modb	ous Device	FTP / Email
Server Address		192.168.12.2	
Server Port		10000	default=10000
Station ID		1	1~65535
Data Update Period(s	ec.)	3	0~86400 (0=disable)
Heartbeat Period(sec.)	0	1~86400 (a day)
Baud Rate (RS-485 fo Modbus/RTU)	r	9600 🔽 bps	
Data Bit		8 💌	
Parity		N 🕶	
Stop Bit		1 🛩	
Modbus Timeout (ms)		1000 default=1000	50~99999,
Enable Firmware		Enable	
Firmware Version		v1.0.0	
		Modify	

Main Info. tab

· Server Address:	RTU Center IP or domain name.
· Server Port:	RTU Center port number.
Station ID:	The unique ID used to identify the device.
· Data Update Period (sec.):	The time interval for sending data packet.
Heartbeat Period (sec.):	The time interval for sending heartbeat packet. ^[1]
\cdot Baud Rate (RS-485 for Modbus/RTU):	The baud rate of RS-485 (COM3).
· Data bit:	The data bit of RS-485 (COM3).
· Parity:	The parity bit of RS-485 (COM3).

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- Stop bit: The stop bit of RS-485 (COM3).
- · Modbus Timeout (ms): Modbus communication timeout value.
- Enable Function: Enable this feature.
- * [1] The RTU center will detect the disconnection in advance and terminate the connection. The "Heartbeat Period" must be less than "Data Update Period".

Modbus Number tab

Main Info.	Mo	dbus Device Email/FTP
Modbus Device Number : 0		Add ET-7050 🔻
1 Name :		Edit Delete
Device Name	ET-7050	Max Length=20
Device ID	1	1~255
IP	192.168.11.25	empty for Modbus/RTU
Port	502	Default=502, 1~65535
DI Number	12	0~32
DO Number	6	0~32
AI Number	0	0~16
AO Number	0	0~16
DI Address	0	0~65535
DO Address	0	0~65535
AI Address	0	0~65535
AO Address	0	0~65535
Modify Cancel		

· Modbus Device Number: The modbus device number is displayed here.

Users can select a model in the list, and then click "Add" to add a new modbus device.

- \cdot Device Name: The name of the Modbus device is displayed in the RTU Center.
- · Device ID: Modbus ID.
- IP: The IP of Modbus TCP device.^[1]

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- Port: The Port of Modbus TCP device.
- · DI Number: The number of DI channel.
- · DO Number: The number of DO channel.
- · AI Number: The number of AI channel.
- $\cdot\,\text{AO}$ Number: The number of AO channel.
- · DI Address: The start address for reading DI value.
- $\cdot\,\text{DO}$ Address: The start address for reading DO value.
- · AI Address: The start address for reading AI value.
- · AO Address: The start address for reading AO value.

* [1] For Modbus RTU device, leave it blank.

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FTP / Email tab

Main Info.		Modbus Device	FTP / Email	
Data Log Interval (sec.)		5	0~86400 (0=disable)	
Max. Time per Log File (n	uin.)	3	3~1440 minutes	
FTP Server Address		61.219.167.34	empty> disable FTP	
FTP Port		221	default=21	
FTP Username		test		
FTP Password		test		
Enable FTP Funcion		🗹 Enable		
Email From		abc@gmail.com Ex: abc@gmail.com	empty> disable Email	
Email To		xyz@gmail.com	Ex: xyz@gmail.com	
Example for 2 or more contact		xx@gmail.com,yy@gmail.com		
Email Samar				
Email Server		smtp.gmail.com	Ex: smtp.gmail.com	
Email Server Port		smtp.gmail.com 25	Ex: smtp.gmail.com Ex: 25	
Email Server Port Email Username		smtp.gmail.com 25 abc	Ex: smtp.gmail.com Ex: 25 Ex: abc	
Email Server Port Email Username Email Password		smtp.gmail.com 25 abc 123abc	Ex: smtp.gmail.com Ex: 25 Ex: abc Ex: 123abc	
Email Server Port Email Username Email Password Enable Email Funcion		smtp.gmail.com 25 abc 123abc Enable	Ex: smtp.gmail.com Ex: 25 Ex: abc Ex: 123abc	

- Data Log Interval (sec.): The time interval for recording I / O data.^[1]
- · Max. Time per Log File (min.): The time interval for spliting new log files.^[2]
- FTP Server Address: FTP Server IP or Domain name.
- FTP Port: FTP server port number.
- FTP Username: The username of FTP account.
- FTP password: The password of FTP account.
- Enable FTP Function: Enable FTP report function.
- Email From: The email will be sent from this address.
- Email To: The email will be sent to this address.^[3]
- Email Server: The server address of the email server.
- Email Server Port: The server port of the email server.^[4]

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- Email Username: The username of email account.
- Email Password: The password of email account.
- Enable Email Function: Enable email report function.
- * [1] Setting to "0" will disable all functions in this tab.
- * [2] The interval at which log files are sent via email or FTP. When the log file exceeds 3 MB or the new file split interval exceeds this value, the log file will be treated as an old log file and moved to the "LOGFILE" folder.
 If users enable the "Enable FTP Function" / "Enable Email Function", these old log files will be copied to "FTP_UPLOAD" / "MAIL_UPLOAD" and sent.
- × [3] Use "," to separate each email address
- * [4] Usually 25, 465, or 587.

5.6.2 FTP Test

The "FTP Configuration Test" page provides a tool to send test files to the FTP server.

FTP Configure Test		
FTP Server Address	192.168.12.2	empty> disable FTP
FTP Port	21	default=21
FTP Username	test	
FTP Password	test	
Result		
Test		

- FTP Server Address: FTP Server IP or Domain Name.
- FTP Port: FTP server port number.
- FTP Username: The username of FTP account.
- FTP password: The password of FTP account.

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5.6.3 Email Test

Email Configure Test			
Email From	abc@gmail.com	Ex: abc@gmail.com	
Email To	xyz@gmail.com	Ex: xyz@gmail.com	
Email Server	smtp.gmail.com	Ex: smtp.gmail.com	
Email Server Port	25	Ex: 25 or 587	
Email Username	abc	Ex: abc	
Email Password	123abc	Ex: 123abc	
Result			
Test			

The "FTP Configuration Test" page provides tools for sending test emails.

- Email From: The email will be sent from this address.
- Email To: The email will be sent to this address.^[1]
- Email Server: The email server IP.

· Email Server Port: The email server port number.^[2]

· Email Username: The username of email account.

- Email Password: The password of email account.
- "Test" button: Press this button to send test emails.

× [1] Using "," to separate each mail address.

* [2] Usually 25, 465, or 587.

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5.6.4 Modbus Test

The "Modbus Configure Test" page provides tools for polling Modbus devices.

The following is an example of ET-7026.

Modbus Configure Test modbus debug start DEBUG [2014-08-15 17:20:57] [1] DI value= (0, 0) Result DEBUG [2014-08-15 17:20:57] [1] DO value= (0, 1) DEBUG [2014-08-15 17:20:57] [1] AI value= (65535, 65535, 65535, 65535, 65535, 65535) DEBUG [2014-08-15 17:20:57] [1] AO value= (0, 273) Test MODBUS Exception Codes: 01: ILLEGAL FUNCTION 02: ILLEGAL DATA ADDRESS 03: ILLEGAL DATA VALUE 04: SLAVE DEVICE FAILURE 05: ACKNOWLEDGE 06: SLAVE DEVICE BUSY 08: MEMORY PARITY ERROR 0A: GATEWAY PATH UNAVAILABLE 0B: GATEWAY TARGET DEVICE FAILED TO RESPOND

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5.7 RTU CAN Client

The RTU device uploads its I/O information, Modbus RTU/TCP device I/O information and GPS information to the RTU Center.

In this function, the GRP device will treat the CAN data as the Modbus device AI value and upload it to the RTU center.

5.7.1 RTU CAN Client

The "RTU CAN Client" page provides the function of establishing a connection with RTU Center and the setting of CAN communication

Main Info.		
Server Address	172.18.12.2	
Server Port	10000	default=10000
Station ID	1	1~65535
Data Update Period(sec.)	1	0~86400 (0=disable)
Heartbeat Period(sec.)	0	1~86400 (a day)
Enable Firmware	🗷 Enable	
Firmware Version		
Modify		

Main Info. tab

Server Address:	RTU Center IP or domain name.

Server Port: RTU Center port number.

• Station ID: The unique ID used to identify the device.

• Data Update Period (sec.): The time interval for sending data packet.

- · Heartbeat Period (sec.): The time interval for sending heartbeat packet.^[1]
- Enable Function: Enable the RTU Client function.

* [1] The RTU center will detect the disconnection in advance and terminate the connection. The "Heartbeat Period" must be less than "Data Update Period".

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CAN Configure tab

	CAN Configure		
CAN B	CAN Baud Rate 1000K please reboot after changing baudrate		r changing baudrate
Group:		1 •	
ai- index	CAN mode(0/1:11/29bits)	CAN ID	CAN data index
0	0	1	0
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
	Modify		

· CAN Baud Rate: Configure the baud rate here.

• Group: There are 10 groups in RTU function, from 1 to 10.

• ai-index: There are 16 AI points in a group, from 0 to 15.

- · CAN mode: Arbitration field type
 - "0" means "Standard identifier (11-bits)"
 - "1" means "Extended identifier (29-bits)"
- · CAN ID: The identifier of the CAN data.
- \cdot CAN data index: The data index of the CAN data, from 0 to 7.

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FTP/ Email tab

Main Info.		Modbus Device	FTP / Email
Data Log Interval (sec.)		5	0~86400 (0=disable)
Max. Time per Log File (m	iin.)	3	3~1440 minutes
FTP Server Address		61.219.167.34	empty> disable FTP
FTP Port		221	default=21
FTP Username		test	
FTP Password		test	
Enable FTP Funcion	🗹 Enable		
Email From		abc@gmail.com Ex: abc@gmail.com	empty> disable Email
Email From Email To		abc@gmail.com Ex: abc@gmail.com xyz@gmail.com	Ex: xyz@gmail.com
Email From Email To Example for 2 or more con	tact	abc@gmail.com Ex: abc@gmail.com xyz@gmail.com xx@gmail.com,yy@gmail.co	empty> disable Email Ex: xyz@gmail.com m
Email From Email To Example for 2 or more con Email Server	tact	abc@gmail.com Ex: abc@gmail.com xyz@gmail.com xx@gmail.com,yy@gmail.co smtp.gmail.com	empty> disable Email Ex: xyz@gmail.com om Ex: smtp.gmail.com
Email From Email To Example for 2 or more con Email Server Email Server Port	tact	abc@gmail.com Ex: abc@gmail.com xyz@gmail.com xx@gmail.com,yy@gmail.co smtp.gmail.com	empty> disable Email Ex: xyz@gmail.com om Ex: smtp.gmail.com Ex: 25
Email From Email To Example for 2 or more con Email Server Email Server Port Email Username	tact	abc@gmail.com Ex: abc@gmail.com xyz@gmail.com xx@gmail.com,yy@gmail.co smtp.gmail.com 25 abc	empty> disable Email Ex: xyz@gmail.com m Ex: smtp.gmail.com Ex: 25 Ex: abc
Email From Email To Example for 2 or more con Email Server Email Server Port Email Username Email Password	tact	abc@gmail.com Ex: abc@gmail.com xyz@gmail.com xx@gmail.com,yy@gmail.co smtp.gmail.com 25 abc 123abc	empty> disable Email Ex: xyz@gmail.com m Ex: smtp.gmail.com Ex: 25 Ex: abc Ex: 123abc
Email From Email To Example for 2 or more con Email Server Email Server Port Email Username Email Password Enable Email Funcion		abc@gmail.com Ex: abc@gmail.com xyz@gmail.com xx@gmail.com,yy@gmail.co smtp.gmail.com 25 abc 123abc Enable	empty> disable Email Ex: xyz@gmail.com m Ex: smtp.gmail.com Ex: 25 Ex: abc Ex: 123abc

- Data Log Interval (sec.): The time interval for recording I / O data.^[1]
- · Max. Time per Log File (min.): The time interval for spliting new log files.^[2]

FTP server port number.

- FTP Server Address: FTP Server IP or Domain name.
- FTP Port:
- FTP Username: The username of FTP account.
- FTP password: The password of FTP account.
- Enable FTP Function: Enable FTP report function.
- Email From: The email will be sent from this address.
- Email To: The email will be sent to this address.^[3]
- Email Server: The server address of the email server.
- Email Server Port: The server port of the email server.^[4]

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- Email Username: The username of email account.
- Email Password: The password of email account.
- Enable Email Function: Enable email report function.
- * [1] Setting to "0" will disable all functions in this tab.
- * [2] The interval at which log files are sent via email or FTP. When the log file exceeds 3 MB or the new file split interval exceeds this value, the log file will be treated as an old log file and moved to the "LOGFILE" folder.
 If users enable the "Enable FTP Function" / "Enable Email Function", these old log files will be copied to "FTP_UPLOAD" / "MAIL_UPLOAD" and sent.

× [3] Use "," to separate each email address

* [4] Usually 25, 465, or 587.

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5.8 NB-IoT Client

5.8.1 NB-IoT Client

The "NB-IoT Client" page provides the function of establishing a connection with the user's MQTT Broker or NB-DA Server provided by ICPDAS.

	Main	Info.	Tab	(in	UDP	mode)
--	------	-------	-----	-----	-----	-------

Main Info.	Modbus Device		I/O Mapping
APN Config		internet.iot	
Data Update Period (sec.)		5	5~86400
Modbus Response Timeout (msec.)		1000	
Send Mode		UDP V	
Server IP/Domain		192.168.12.2	
Server Port		5394	default=5394
Enable Firmware		🗷 Enable	
Firmware Version		V1.02 2019/05/06	5
		Modify	3

• APN Config: Access point name. Please consult the SIM card provider.

Data Update Period (sec.): The time interval for sending data to the NB-DA Server or the MQTT Broker.

- · Modbus Response Timeout (msec.): Modbus communication timeout value.
- Send Mode: Support UDP or MQTT.^[1]

· Server IP/Domain: MQTT Broker IP or domain name.

- Server Port: MQTT Broker port number.^[2]
- Enable Function: Whether to Enable this function. This setting will run after reboot.
- * [1] UDP mode With SMS4 security.

* [2] Default 1883.

* Note. If there is an SD card, this function will also save the log data to it.

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Main Info tab (in MQTT mode)

Main Info.	M	Iodbus Device	I/O Mapping	
APN Config		internet.iot		
Data Update Period (sec.)	5	5~86400	
Modbus Response Timeo	out (msec.)	1000		
Send Mode		MQTT •		
Server IP/Domain		iot.eclipse.org		
Server Port		1883	default=1883	
Buffer Size		512	default=512	
Keep Alive		1000	default=1000, 0~65535	
MQTT Version	-	3	default=3, can set 3 or 4	
User Name			if have user name	
Password	4		if have password	
		1st Session		
Subscribe DO		.cloud.ICPDAS.USER/0/0/	0(
Subscribe AO		.cloud.ICPDAS.USER/0/0//	40	
Publish DEVINFO		.cloud.ICPDAS.UE/0/0/DE	/1	
Publish DI		.cloud.ICPDAS.UE/0/0/DI		
Publish AI		.cloud.ICPDAS.UE/0/0/AI		
Publish GPS		.cloud.ICPDAS.UE/0/0/GPS	3	
Publish ACK		.cloud.ICPDAS.UE/0/0/AC	ACK for DO/AO	
Use CHT platform		Enable		
CHT Device ID			if use CHT platform	
CHT Sensor ID			if use CHT platform	
		2nd Session		
Subscribe DO		.cloud.ICPDAS.USER/0/1/[
Subscribe AO		.cloud.ICPDAS.USER/0/1/A(
Publish DEVINFO		.cloud.ICPDAS.UE/0/1/DEVI		
Publish DI		.cloud.ICPDAS.UE/0/1/DI		

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Publish AI	.cloud.ICPDAS.UE/0/1/AI
Publish GPS	.cloud.ICPDAS.UE/0/1/GPS
Publish ACK	.cloud.ICPDAS.UE/0/1/ACK ACK for DO/AO
Use CHT platform	Enable
CHT Device ID	if use CHT platform
CHT Sensor ID	if use CHT platform
Enable Firmware	🗹 Enable
Firmware Version	V1.02 2019/05/06
	Modify

- APN Config: Access point name. Please consult the SIM card provider.
- Data Update Period (sec.): The time interval for sending data to the NB-DA Server or

the MQTT Broker.

- · Modbus Response Timeout (msec.): Modbus communication timeout value.
- Send Mode: Support UDP or MQTT.^[1]
- · Server IP/Domain: MQTT Broker IP or domain name.
- Server Port: MQTT Broker port number.^[2]
- Buffer Size: The size of the buffer used to store MQTT messages.^[3]
- Keep Alive: The period of the MQTT PINGREQ message.
- \cdot MQTT Version: Set the MQTT version to be used.
- · User Name: The username for MQTT connection (if any).
- Password: The password for MQTT connection (if any).
- SubscribeDO: The MQTT topic used to receive DO messages.
- SubscribeAO: The MQTT topic used to receive AO messages.
- Publish DEVINFO: The MQTT topic used to send DEVINFO messages.
- Publish DI: The MQTT topic used to send DI messages.
- Publish AI: The MQTT topic used to send AI messages.
- Publish GPS: The MQTT topic used to send GPRMC messages.
- Publish ACK: The MQTT topic used to respond when a DO or AO message is received.
- \cdot Use CHT platform: Whether to use the CHT IoT platform.
- · CHT Device ID: Set the Device ID obtained from CHT IoT Platform.
- · CHT Sensor ID: Set the Sensor ID obtained from CHT IoT Platform.

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• Enable Function: Whether to Enable this function. This setting will run after reboot.

- * [1] UDP mode With SMS4 security.
- * [2] Default 1883.
- × [3] The message including topics and data.

MQTT Message Format:

Message format for normal MQTT Broker:

Торіс	For subscription or publication, DEVINFO / GPS / DO / DI / AO / AI / ACK can use different topics.
	* Note. Must include "Session ID/Type" in the end of topic. For example: ".cloud.ICPDAS.USER/0/0/DO".
Data	All message types have different data formats.

· Message format for CHT Platform:

Topic	For subscription or publication, DEVINFO / GPS / DO / DI / AO / AI / ACK can use
-	different topics.
Data	All message types have different data formats.
	* Note. DO / DI / AO / AI data will be "Session ID/ Type/Data".
	· "Session ID" is from 0 to 1999.
	· "Type" is "DO", "DI", "AO" or "AI".
	* Note, JSON format defines by the CHT Platform include time. Device ID.
	Sensor ID and data.

· Data Type:

Туре	Application	Data	Data Example
DEVINFO	Publish	RSRP, ECL, SNR, Bat level	-80,0,16,0
GPS	Publish	 \$GPRMC data. NMEA 0183 protocol. 	GPRMC,121252.000,A,3958.3032 ,N,11629.6046,E,15.15,359.95,070306,, ,A*54

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		MQTT Broker:
		0001000100010001000100
	 1 byte per DO. 	01000100010001
Subscribe	\cdot The maximum length is 32.	
	\cdot The data format is HEX.	CHT Platform:
		0/DO/00010001000100010001000100
		01000100010001
		MQTT Broker:
		000100010001000100010001
	•1 byte per DI.	00010001000100010001
Publish	\cdot The maximum length is 32.	
	\cdot The data format is HEX.	CHT Platform:
		0/DI/0001000100010001000100010001
		000100010001000100010001
		MQTT Broker:
		00000010002000300040005
		0006000700080009002000210022
.	\cdot 2 bytes per AO.	0023002400250026002700280029
Subscribe	• The maximum length is 32.	
	\cdot The data format is HEX.	
		0/AC/00000010002000300040003
		0008000700080009002000210022
		0023002400250026002700280029
		With normal MQTT Broker:
		000000100020003000400050006
	· 2 bytes per Al	00070008000900100011001200130014
Dublich	The maximum length is 22	00150016001700180019
FUDIISII	The data format is UEV	With CHT Platform:
		0/AI/000000100020003000400050006
		00070008000900100011001200130014
		00150016001700180019
	If DO / AO is received	
Publish	DO ACK / AO ACK will be	DO ACK
	Subscribe Publish Subscribe Publish	Subscribe· 1 byte per DO. · The maximum length is 32. · The data format is HEX.Publish· 1 byte per DI. · The maximum length is 32. · The data format is HEX.Subscribe· 2 bytes per AO. · The maximum length is 32. · The data format is HEX.Subscribe· 2 bytes per AO. · The maximum length is 32. · The data format is HEX.Publish· 2 bytes per AO. · The maximum length is 32.

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· DEVINFO data:

Data Type	Data Range
RSRP	-140 ~ -44dBm
ECL	0 ~ 2
SNR	-20 ~ 30 dB
Battery level	0 ~ 100 %

Modbus Device tab

Main Info.			Modbus De	vice	•	I/O Mapping	
Modbus Device Number : 3						Add Custom •	
0	Name : SA	R-71	3-1			Edit Delete	
1	Name : SA	R-71	3-2			Edit Delete	
2	Name : PM	[-311]	2-100			Edit Delete	
3	Name :					Edit Delete	
Device	Name	3_Cu	istom	Ma	x Length=	20	
Device	ID	1		1~	255		
IP				en	pty for Mo	odbus/RTU	
Port	5	502		De	efault=502,	1~65535	
DI Nur	nber	0		0~	32	C C C C C C C C C C C C C C C C C C C	
DO Nu	mber	0		0~32			
AI Nur	nber	0		0~16			
AO Nu	mber	0		0~	0~16		
DI Add	lress	0		0~	0~65535		
DO Ad	ldress	0		0~	65535		
AI Add	lress	0		0~65535			
AO Ad	ldress	0		0~65535			
COMP	Port	CON	13 (RS-485) ▼				
Baud Rate 9600) 🔹 bps				
Data Bit 8 •							
Parity		N ¥					
Stop Br	it	1 •					
Read D	Read DO Enable						
Read A	0	E	nable				
	Modify Cancel						

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• Modbus Device Number: The modbus device number is displayed here.

Users can select a model in the list, and then click "Add" to add a new modbus device.

- Device Name: The name of the Modbus device is displayed in the RTU Center.
- Device ID: Modbus ID.
- · IP: The IP of Modbus TCP device.^[1]

Port: The Port of Modbus TCP device.

- · DI Number: The number of DI channel.
- · DO Number: The number of DO channel.
- ·AI Number: The number of AI channel.
- · AO Number: The number of AO channel.
- $\cdot\,\text{DI}\,$ Address: The start address for reading DI value.
- · DO Address: The start address for reading DO value.
- · AI Address: The start address for reading AI value.
- · AO Address: The start address for reading AO value.
- · COM Port: Select COM port.
- · Baud Rate: The baud rate of COM port.
 - Data Bit: The data bit of COM port.
 - Parity: The parity bit of COM port.
 - Stop Bit: The stop bit of COM port.
- Read DO: Whether to append DO value after DIvalue.
- Read AO: Whether to append AO value after AI value.

* [1] For Modbus TCP devices, leave it blank.

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I/O Mapping tab

Main Info.		Mo	dbus De	vice			I/O Map	ping
Auto Mapping	🗷 Enable							
1st Session ID	0		(0~1999				
DO	DO01 1-1 DO09 1-9 DO17 2-7 DO25 3-5	DO02 1-2 DO10 1-10 DO18 2-8 DO26 3-6	DO03 1-3 DO11 2-1 DO19 2-9 DO27 3-7	DO04 1-4 2-2 DO20 2-10 DO28 3-8	DO05 1-5 DO13 2-3 DO21 3-1 DO29 3-9	DO06 1-6 DO14 2-4 DO22 3-2 DO30 3-10	DO07 1-7 DO15 2-5 DO23 3-3 DO31 4-1	DO08 1-8 DO16 2-6 DO24 3-4 DO32 4-2
DI	DI01 1-1 DI09 1-9 DI17 2-7 DI25 3-5	DI02 1-2 DI10 1-10 DI18 2-8 DI26 3-6	DI03 1-3 DI11 2-1 DI19 2-9 DI27 3-7	DI04 1-4 DI12 2-2 DI20 2-10 DI28 3-8	DI05 1-5 DI13 2-3 DI21 3-1 DI29 3-9	DI06 1-6 DI14 2-4 DI22 3-2 DI30 3-10	DI07 1-7 DI15 2-5 DI23 3-3 DI31 4-1	DI08 1-8 DI16 2-6 DI24 3-4 DI32 4-2
AO	A001 1-1 A009 1-9 A017 2-7 A025 3-5	AO02 1-2 AO10 1-10 AO18 2-8 AO26 3-6	A003 1-3 A011 2-1 A019 2-9 A027 3-7	AO04 1-4 AO12 2-2 AO20 2-10 AO28 3-8	A005 1-5 A013 2-3 A021 3-1 A029 3-9	AO06 1-6 AO14 2-4 AO22 3-2 AO30 3-10	AO07 1-7 AO15 2-5 AO23 3-3 AO31 4-1	AO08 1-8 AO16 2-6 AO24 3-4 AO32 4-2
AI	AI01 1-1 AI09 1-9 AI17 2-7 AI25 3-5	AI02 1-2 AI10 1-10 AI18 2-8 AI26 3-6	AI03 1-3 AI11 2-1 AI19 2-9 AI27 3-7	AI04 1-4 2-2 AI20 2-10 AI28 3-8	AI05 1-5 AI13 2-3 AI21 3-1 AI29 3-9	AI06 1-6 AI14 2-4 AI22 3-2 AI30 3-10	AI07 1-7 AI15 2-5 AI23 3-3 AI31 4-1	AI08 1-8 AI16 2-6 AI24 3-4 AI32 4-2

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2nd Session ID	1		()~1999				
	DO01	DO02	DO03	D004	DO05	D006	D007	D008
	4-3	4-4	4-5	4-6	4-7	4-8	4-9	4-10
	D009	DO10	DO11	DO12	DO13	D014	D015	DO16
DO	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0
DO	DO17	DO18	DO19	DO20	DO21	DO22	DO23	DO24
	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0
	DO25	DO26	DO27	DO28	DO29	DO30	DO31	DO32
	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0
	DI01	DI02	DI03	DI04	DI05	DI06	DI 07	DI08
	4-3	4-4	4-5	4-6	4-7	4-8	4- 9	4-10
	DI09	DI10	DI11	DI12	DI13	DI14	DI15	DI16
DI	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0
DI	DI17	DI18	DI19	DI20	DI21	DI22	DI23	DI24
	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0
	DI25	DI26	DI 27	DI28	DI29	DI30	DI31	DI32
	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0
	AO01	A002	AO03	A004	AO05	A006	A007	AO08
	4-3	4-4	4-5	4-6	4-7	4-8	4-9	4-10
	A009	AO10	A011	A012	A013	A014	A015	A016
10	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0
AO	A017	A018	AO19	AO20	AO21	AO22	AO23	AO24
	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0
	AO25	AO26	AO27	AO28	AO29	AO30	AO31	AO32
	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0
	AI01	AI02	AI03	AI04	AI05	AI06	AI 07	AI08
	4-3	4-4	4-5	4-6	4-7	4-8	4-9	4-10
	AI09	AI10	AI11	AI12	AI13	AI14	AI15	AI16
AT	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0
AI	AI17	AI18	AI19	AI20	AI21	AI22	AI23	AI24
	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0
	AI25	AI26	AI27	AI28	AI29	AI30	AI31	AI32
	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0
			Mod	ify				
. Please enter all o . The valuable I/O . format example	device's I/O) positions n	to the m nust be c	apping t continuo	able. us.				

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- Auto Mapping: Whether to automatically check all Modbus devices and map all I/O.
- Session ID: The unique ID used to identify the device.
- · DO / DI / AO / AI: The mapping format is "[DEV_NO]-[IO_NO]".[1]
- * [1] "DEV_NO" is the number of modbus device, starting from 1."IO_NO" is the number of modbus device I/O, starting from 1.
- * Note. If "Read DO" / "Read AO" is enabled, in addition to filling in the DO / AO mapping table, the DO / AO mapping data also needs to fill in the DI / AI mapping table.

Example:

If the 1st Modbus Device (DEV_NO is 1) has 2 AI and 5 AO, in addition to fill in the "1-1" and "1-2" to the AO mapping table, also need to fill in the "1-3", "1-4", "1-5", "1-6", and "1-7" to the AI mapping table. In this case, GRP-500M will send DEVINFO, AI (include 2 AI and 5 AO), and GPS messages.

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6. Example

6.1 3G / 4G Router Application

This example shows the steps to share 3G/4G network to 3 XPAC8000.



(1) The Ethernet configuration of XPAC8000 is as follows:

- · IP is from "192.168.0.10" to "192.168.0.12".
- Mask is "255.255.0.0".
- ·Gateway is "192.168.27.31".

(2) Fill in the Ethernet IP and mask. After finishing all the settings, click "Modify".

Ethernet					
IP Address	192.168.27.31				
Mask	255.255.0.0				
Gateway					
Modify					

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(3) If necessary, fill in "PIN Code", "APN", "User Name" and "Password". After finishing all the settings, click "Modify".

PIN / APN Configure				
PIN Code	0000			
Phone Number	*99***1# (1)			
APN	internet (2)			
User Name	(2)			
Password	(2)			
Modify				
(1):usually use *99# or *99***1# (2):please ask your SIM Card provider				

(4) Enable the "Network Reconnect" function to ensure that the mobile network is always online (usually, the ISP will disconnect once every 1 to 3 days).

Server IP can fill in user server IP or Google DNS server IP (8.8.8.8).

If the user uses MDVPN, please make sure that the server IP does not deny the ICMP service (Ping). After finishing all the settings, click "Modify".

Network Reconnection					
Server IP	8.8.8.8				
Max. Retry	5				
Retry Interval Time	30				
Enable Funcion	Enable Funcion 🖉 Enable				
Modify					
(1):This function will run immediately after you press "Modify" button (2):GSM module will be reset after Max. retry (3):System will reboot after GSM module reset 100 times					

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(5) Fill in the routing rules to share the 3G/4G network. Rule 0 will share the 3G/4G network to IP addresses from 192.168.0.1 to 192.168.0.255. After finishing all the settings, click "Modify".

	ROUTING Rule					
Rule NO.	IP		Mask	Target		
0	192.168.0.1		24 💌	ppp0 🔽		
1			*	~		
2			*	~		
3			*	~		
4			*	~		
5			*	~		
6			¥	~		
7			¥	~		
8			~	~		
9			*	~		

(6) Please reboot the device to enable the setting.

Information		
<u>Device Info</u>	Г	
<u>Network Info</u>		Notice!!
Storage Info		Are you sure to reboot? please wait a minute for system rebooting after you press
Network		reboot button.
<u>Ethernet</u> 2G/3G		Reboot
DNS		
<u>DDNS</u>	-	
DHCP Server		
<u>Routing</u>	/	
<u>Port Mapping</u>	/	
Process		
<u>System</u> <u>User</u>		
System Password Reboot		

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6.2 Web Server and IP Camera Application

This example shows the steps to share 3G/4G network to ET-7044 and IP camera.



- (1) The Ethernet configuration of ET-7044 is as follows:
 - ·IP is from "192.168.0.20" to "192.168.0.22".
 - Mask is "255.255.0.0".
 - ·Gateway is "192.168.27.31".
- (2) Fill in the Ethernet IP and mask. After finishing all the settings, click "Modify".

Ethernet				
IP Address	192.168.27.31			
Mask	255.255.0.0			
Gateway				
Modify				

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(3) If necessary, fill in "PIN Code", "APN", "User Name" and "Password". After finishing all the settings, click "Modify".

PIN / APN Configure					
PIN Code	0000				
Phone Number	*99***1# (1)				
APN	internet (2)				
User Name	(2)				
Password	(2)				
Modify					
(1):usually use *99# or *99***1# (2):please ask your SIM Card provider					

(4) Enable the "Network Reconnect" function to ensure that the mobile network is always online (usually, the ISP will disconnect once every 1 to 3 days).

Server IP can fill in user server IP or Google DNS server IP (8.8.8.8).

If the user uses MDVPN, please make sure that the server IP does not deny the ICMP service (Ping). After finishing all the settings, click "Modify".

Network Reconnection					
Server IP	8.8.8.8				
Max. Retry	5				
Retry Interval Time	30				
Enable Funcion	🗹 Enable				
Modify					
(1):This function will run immediately after you press "Modify" button (2):GSM module will be reset after Max. retry (3):System will reboot after GSM module reset 100 times					

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- (5) Fill in the routing rules to enable users to access the devices behind the GRP device through the Internet. Rules 0 to 3 bind the ports of the 3G/4G network interface to the "Target IP" and "Target port". After finishing all the settings, click "Modify".
 - · Bind port 12080 of 3G / 4G network interface to "192.168.0.20:80".
 - · Bind port 12180 of 3G / 4G network interface to "192.168.0.21:80".
 - · Bind port 12280 of 3G / 4G network interface to "192.168.0.22:80".

Information									
<u>Device Info</u>									
<u>Network Info</u>			Port Mapping Rule						
<u>Storage Info</u>		Rule NO.	Туре	From	Port	Target IP	Target Port		
Network		0	TCP 🔽	ppp0 🗸	12080	192.168.0.20	80		
<u>Ethernet</u>		1			12180	192168.021	<u>.</u>		
<u>20/30</u>					12100	192.100.0.21			
DNS	Λ	2	TCP 💌	ppp0 🐱	12280	192.168.0.22	80		
DHCP Server		3	~	~					
-Routing Port Mapping		4	~	~					
<u>Diagnostic</u>		5	~	~					
Process		6	~	~					
<u>System</u> <u>User</u>		7	~	~					
System		8	~	~					
<u>Password</u> Reboot		9	~	~					
Backup/Restore		Modify							
<u>Restore Hactory</u>									

(6) Please reboot the device to enable the setting.

IF.

Information		
<u>Device info</u> Network info		Notice!!
Storage Info		Are you sure to reboot? please wait a minute for system rebooting after you press
Network		reboot button.
<u>Ethernet</u>	Γ	Reboot
DNS		
DDNS		
<u>DHCP Server</u>		
<u>Routing</u>	/	
<u>Port Mapping</u> <u>Diagnostic</u>		
Process		
<u>Sγstem</u> <u>User</u>		
System		
Password Reboot		
<u>Backup/Restore</u>		

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(7) To view the IP camera image from a web browser, please enter the IP address or domain name of the GRP device in the 3G / 4G network.



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6.3 Remote I/O Control / Temperature Monitor

This example shows the remote control application through "Serial port to 3G / 4G gateway function".



- (1) Connect the device (DL-100 or PLC) to the serial port of the GRP device.
- (2) Open VxServer and VxComm Utility software.
- (3) If necessary, fill in "PIN Code", "APN", "User Name" and "Password". After finishing all the settings, click "Modify".

PIN / APN Configure					
PIN Code	0000				
Phone Number	*99***1# (1)				
APN	internet (2)				
User Name	(2)				
Password	(2)				
Modify					
(1):usually use *99# or *99***1# (2):please ask your SIM Card provider					

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(4) Enable the "Network Reconnect" function to ensure that the mobile network is always online (usually, the ISP will disconnect once every 1 to 3 days).
Server IP can fill in user server IP or Google DNS server IP (8.8.8.8).
If the user uses MDVPN, please make sure that the server IP does not deny the ICMP service (Ping). After finishing all the settings, press the "Modify" button.

Network Reconnection					
Server IP	8.8.8.8				
Max. Retry	5				
Retry Interval Time	30				
Enable Funcion	🗹 Enable				
Modify					
 (1):This function will run immediately after you press "Modify" button (2):GSM module will be reset after Max. retry (3):System will reboot after GSM module reset 100 times 					

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(5) Fill in the "Server IP" and "Server Port" (default 11000).

After finishing all the settings, check the "Enable" field, and then press the "Modify" button.

Virtual COM Function (VxServer)					
Server IP	192.168.12.2				
Server Port	11000	default=11000			
Heartbeat Time	10	10~65535 seconds			
Device ID	1	1~255, unique ID for device			
Alias	GRP-530	Max. Length = 8			
Time Interval	50 1~5000 ms, default=50				
Data Length	1000 10~1000 bytes, default=1000				
Modbus TCP to RTU (Port1)	Enable, COM2>	TCP Port 10001			
Modbus TCP to RTU (Port2)	Enable, COM3>	TCP Port 10002			
Default Baudrate (Port1)	115200 🔽 bps				
Default Baudrate (Port2)	115200 💌 bps				
Default Format (Port1)	🛛 🛛 🔁 (Data bit, Pari	ty, Stop bit)			
Default Format (Port2)	🛛 🛛 🛛 (Data bit, Pari	ty, Stop bit)			
Enable Funcion	Enable				
Firmware Version	v1.0.0				
Modify					
(1)Heartbeat Time: if this value is small, it is sensitive to detect network disconnected (2)Virtual IP: please set it different from other virtual COM device					

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(6) Please reboot the device to enable the setting.

Information		
Device Info	l п	
<u>Network Info</u>		Notice!!
Storage Info		Are you sure to reboot? please wait a minute for system rebooting after you press
Network		reboot button.
<u>Ethernet</u>		Reboot
<u>DNS</u>		
<u>DDNS</u>		
DHCP Server		
<u>Routing</u>		
<u>Port Mapping</u>		
<u>Diagnostic</u>		
Process		
<u>System</u>		
<u>User</u>		
System 🥖		
Password		
Reboot		
Backup/Restore		

(7) After rebooting, the GRP device will automatically connect to VxServer.

V	🎸 VxServer Ver1.02 2014/07/21							
	Setti	ngs Help	Exit					
		Virtual IP	Module	Alias	Com Number	Heartbeat	Remote Client IP	Remote Client Port
	0	127.53.0.1	GRP-520_GRP-530	GRP-530	2	10	192.168.27.31	51776

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- (8) After the GRP device is connected to VxServer, follow the steps below.
 - A. Press the "Search Server" button to get the device list.
 - B. Right-click on "GRP-520_GRP-530"
 - C. Click "Add Server".
 - D. Select the starting number of the virtual serial port.
 - E. Change the settings tab to "Server Options" and set it as a screenshot. The polling timeout must exceed 3 seconds.
 - F. Click "OK".

🧭 VxComm Utility [v2.12.03	, Oct.30, 2013]					- • •
File Server Port Tools						
	P	Configure Server			Configure	Port
Add Server(s)	GRP-520 (1 GRP-520 (1 GRP-520 (1 GRP-520 (1 GRP-520 (1 GRP-520 (1	27.0.0.2) 27.0.0.3) 27.0.0.4] 27.0.0.5] 27.0.0.6] 27.0.0.7]	•	Port I/O Port I/O Port 1 Port 2	Virtual COM Reserved COM30 COM31	Baudrate N/A Dynamic Dynamic
(a) Web	GRP-520 (1 GRP-520 (1 GRP-520 (1	27.0.0.8) 27.0.0.9) 27.0.0.10)	E			
Search Servers	- GRP-520 (1 - GRP-520 (1	127.0.0.11] 127.53.0.3]				
Configuration (UDP)	Name (b)	Alias	IP Addres	s	Sub-net Mask	Gateway
Exit	GRP-520_(////	Ping Server		1	255.255.255.255	127.53.0.1
	IET-P2R2 GRP-520	Diagnostic		1.1 4:92 5.224	255.255.0.0 255:255:0:0 255.255.0.0	192.168.0.2 192.168.0.1
	FCM-MTCF	Configure Server (UI	OP)	0.37	255.255.0.0	192.168.0.254
	CMCU-03-	Add Server(s)	(c)	.16	255.255.0.0	192.168.0.254
		ACS-11-ME	192 168	.49 110 1	255.255.0.0	192.168.0.254
	ACS-11-MF	ACS-11-MF	192.168.	110.5	255.255.0.0	192.168.110.254
Status	•	m				Þ
status						

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Adding Servers			×
IP Range Server Options Port O	ptions		1
Server Information Server Name : GRP-520_GRP	-530	name automati	cally
IP Range End : 127.53.0.1	№ Зкір	aupiicated iP	
□ 0 (Net) 🔽 254 (Gateway)	🗆 255 (Broadcas	st)	
Virtual COM and I/O Port Mappin	ngs		
COM Port : COM32]		
☐ Fixed baudrate, use current s	settings of server	s.	
☐ Maps virtual COM ports to "F	ort I/O'' on server	′S.	
		ОК	Cancel
			-
Adding Servers			
IP Range Server Options	Port Options		

The following items are all PC side settings, not device settings.

1

1

10000

9999

Keep Alive Time (Seconds) :

Connect Timeout (Seconds) :

Command Port (TCP):

Virtual I/O Port (TCP):

Connection Broken (Seconds) : 3

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- (9) The user will see the virtual COM ports (COM32 and COM33 in this example) but can not open them. Please follow the steps below to open the virtual COM port.
 - A. Click "Tools / Restart Driver" to restart the driver.
 - B. Open the com port to connect your device.

🥩 VxComm Utility [v2.12.03	, Oct.30, 2013]					- • •	
File Server Port Tools							
	ystem Information Lestart Driver			Configure Port			
Add Server(s) Remove Server Web Search Servers	GRP-520 (127.0.0.3) - GRP-520 (127.0.0.4) - GRP-520 (127.0.0.5) - GRP-520 (127.0.0.6) - GRP-520 (127.0.0.7) - GRP-520 (127.0.0.8) - GRP-520 (127.0.0.9) - GRP-520 (127.0.0.10) - GRP-520 (127.0.0.11) - GRP-520 (127.53.0.3) - GRP-520 (127.		E	Port I/O Port I/O Port 1 Port 2	Virtual COM Reserved COM32 COM33	Baudrate N/A Dynamic Dynamic	
Configuration (UDP)	Name Alias IP Add			ss Sub-net Mask Gateway			
Exit	GRP-520_GRP-530 tET-P2R2 GRP-520 IR-712-MTCP FCM-MTCP CMCU-03-Test CMCU-03-Test ACS-11-MF ACS-11-MF	GRP-530 EtherIO N/A iDCS-8830 SMART_IO SMART_IO ACS-11-MF	127.53.0. 192.168. 192.168. 192.168. 192.168. 192.168. 192.168. 192.168. 192.168.	.1 54:92 15.224 50.37 0.16 0.49 110.1 110.5	255.255.255.255 255.255.0.0 255:255.0.0 255.255.0.0 255.255.0.0 255.255.0.0 255.255.0.0 255.255.0.0 255.255.0.0 255.255.0.0	127.53.0.1 192.168.0.2 192.168.0.1 192.168.0.254 192.168.0.254 192.168.0.254 192.168.110.254 192.168.110.254	
Status: OK	AC3*11*MF	жсэ-тт-мг Ш	192.100.	110.5	233.233.0.0	132.100.110.232	

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6.4 Modbus TCP to Modbus RTU over 3G / 4G, and card reader monitor

After completing the following steps, please set the "IP:Port" of the Modbus TCP program to "127.0.20.1:10001" in your control center (port 10001 is RS-232; port 10002 is RS-485)



- (1) Please connect your device (M-7017 or PLC) to RS-485 of GRP device.
 - The baudrate of Modbus device is 9600 bps and the data format is 8N1.
 - The baudrate of Card Reader is 115200 bps and the data format is 8N1.
- (2) Open VxServer and VxComm Utility software.
- (3) If necessary, fill in "PIN Code", "APN", "User Name" and "Password". After finishing all the settings, click "Modify".

PIN / APN Configure					
PIN Code	0000				
Phone Number	*99***1# (1)				
APN	internet (2)				
User Name	(2)				
Password	(2)				
Modify					
 (1):usually use *99# or *99***1# (2):please ask your SIM Card provider 					

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(4) Enable the "Network Reconnect" function to ensure that the mobile network is always online (usually, the ISP will disconnect once every 1 to 3 days).Server IP can fill in user server IP or Google DNS server IP (8.8.8.8).If the user uses MDVPN, please make sure that the server IP does not deny the ICMP

service (Ping). After finishing all the settings, click "Modify".

Network Reconnection					
Server IP	8.8.8.8				
Max. Retry	5				
Retry Interval Time	30				
Enable Funcion	🗹 Enable				
Modify					
(1):This function will run immediately after you press "Modify" button					
(2):GSM module will be reset after Max. retry(3):System will reboot after GSM module reset 100 times					

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(5) Fill in the "Server IP" and "Server Port" (default 11000).

For the card reader, set Port1 (RS-232) as the default value.

For Modbus RTU devices, set Port2 (RS-485) as follows.

After finishing all the settings, check "Enable Function", and then click"Modify".

Virtual COM Function (VxServer)						
Server IP	192.168.12.2					
Server Port	11000	default=11000				
Heartbeat Time	10	10~65535 seconds				
Device ID	1	1~255, unique ID for device				
Alias	GRP-530	Max. Length = 8				
Time Interval	50	1~5000 ms, default=50				
Data Length	1000	10~1000 bytes, default=1000				
Modbus TCP to RTU (Port1)	o RTU (Port1) 🔲 Enable, COM2> TCP Port 10001					
Modbus TCP to RTU (Port2)	☑ Enable, COM3> TCP Port 10002					
Default Baudrate (Port1)	115200 🖌 bps					
Default Baudrate (Port2)	9600 🔽 bps					
Default Format (Port1)	8N1 🚽 (Data bit, Parity, Stop bit)					
Default Format (Port2)	8N1 💌 (Data bit, Parity, Stop bit)					
Enable Funcion	Enable					
Firmware Version	v1.0.0					
Modify						
(1)Heartbeat Time: if this value is small, it is sensitive to detect network disconnected (2)Virtual IP: please set it different from other virtual COM device						

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(6) Please reboot the device to enable the setting.

Information		
Device Info	l li	
<u>Network Info</u>		Notice!!
Storage Info		Are you sure to reboot? please wait a minute for system rebooting after you press
Network		reboot button.
<u>Ethernet</u> 2G/3G		Reboot
<u>DNS</u>		
<u>DDNS</u>	-	
DHCP Server		
<u>Routing</u>		
Port Mapping	/	
<u>Diagnostic</u>		
Process		
<u>System</u> User		
System		
Password <u>Reboot</u> <u>Backup/Restore</u>		

(7) After rebooting, the GRP device will automatically connect to VxServer.

🎸 V×9	erver Ver1.02 2014/	/07/21					
Set	tings Help E	Exit					
	Virtual IP Module		Alias Com Number		Heartbeat	Remote Client IP	Remote Client Port
0	127.53.0.1	GRP-520_GRP-530	GRP-530	2	10	192.168.27.31	51776
•				ш			

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- (8) After the GRP device is connected to VxServer, follow the steps below.
 - A. Press the "Search Server" button to get the device list.
 - B. Right-click on "GRP-520_GRP-530".
 - C. Click "Add Server".
 - D. Select the starting number of the virtual serial port.
 - E. Change the settings tab to "Server Options" and set it as a screenshot. The polling timeout must exceed 3 seconds.
 - F. Click "OK"

🥩 VxComm Utility [v2.12.03	3, Oct.30, 2013]					- • •
File Server Port Tools						
	P	Configure Server			Configure	Port
Where remote sene dence become part of your PC	GRP-520 (1 GRP-520 (1 GRP-520 (1 GRP-520 (1	27.0.0.2) 27.0.0.3) 27.0.0.4) 27.0.0.5)	Â	Port Port I/O Port 1 Port 2	Virtual COM Reserved COM30 COM31	Baudrate N/A Dynamic Dynamic
Add Server(s)	GRP-520 (1 GRP-520 (1 GRP-520 (1	27.0.0.6) 27.0.0.7) 27.0.0.8)	E			
(a) Web	GRP-520 (1 GRP-520 (1 GRP-520 (1	27.0.0.9) 27.0.0.10) 27.0.0.11)				
Search Servers	GRP-520 (1	27.53.0.3]	-			
Configuration (UDP)	Name (b)	Alias	IP Addres	s	Sub-net Mask	Gateway
Exit	GRP-520_(tET-P2R2 GBP-520	Ping Server		1.1 4·92	255.255.255.255 255.255.0.0 255.255.0.0	127.53.0.1 192.168.0.2
	IR-712-MT	Configure Server (UI	OP)	5.224 0.37	255.255.0.0 255.255.0.0 255.255.0.0	192.168.0.1 192.168.0.254 192.168.0.254
	CMCU-03-1	Add Server(s)	192,168	.49	255.255.0.0 255.255.0.0 255.255.0.0	192.168.0.254 192.168.110.254
	ACS-11-MF	ACS-11-MF	192.168.	110.5	255.255.0.0	192.168.110.254
	•					Þ
Status						1.

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	r Options Port Options	
- Server Inform	ation	
Server Name :	GRP-520_GRP-530	Get name automatically
IP Range Star	t: 127.53.0.1	✓ Skip duplicated IP
IP Range End	: 127.53.0.1	
Includes the fo)llowing special IP : 254 (Gateway) 🛛 255	ō (Broadcast)
	nd I/O Port Mannings —	
- Virtual COM a	na ito i ortinappings	
- Virtual COM a		
COM Port :	COM32	s of servers.

4	dding Servers							
	IP Range Server Options Port Options							
	The following items are all PC side settings, not device settings.							
	Keep Alive Time (Seconds) : 1							
	Connection Broken (Seconds) : 3							
	Connect Timeout (Seconds) : 1							
	Command Port (TCP): 10000							
	Virtual I/O Port (TCP): 99999							

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(9) The user will see the virtual COM ports (COM32 and COM33 in this example) but can not open them. Please follow the steps below to open the virtual COM port.

A. Click "Tools / Restart Driver" to restart the driver.

B. Open the com port to connect your device.

🥩 VxComm Utility [v2.12.03	, Oct.30, 2013]					- • ×
File Server Port Tools						
	ure Server		Configure Port			
Add Server(s) Content of the server Content of the	GRP-520 (127.0 GRP-520 (127.0 GRP-520 (127.0 GRP-520 (127.0 GRP-520 (127.0 GRP-520 (127.0 GRP-520 (127.0 GRP-520 (127.0 GRP-520 (127.0 GRP-520 (127.5 GRP-520 (127.5 GRP-520 (127.5	0.3) I.0.4) I.0.5) I.0.6) I.0.7) I.0.8) I.0.9) I.0.9) I.0.10) I.0.11) 53.0.3) 530 (127.53.0.	.1]	Port I/O Port I/O Port 1 Port 2	Virtual COM Reserved COM32 COM33	Baudrate N/A Dynamic Dynamic
Configuration (UDP)	Name	Alias	IP Address	3	Sub-net Mask	Gateway
Exit	GRP-520_GRP-530 tET-P2R2 GRP-520 IR-712-MTCP FCM-MTCP CMCU-03-Test CMCU-03-Test ACS-11-MF ACS-11-MF	GRP-530 EtherIO N/A iDCS-8830 SMART_IO SMART_IO ACS-11-MF ACS-11-MF	127.53.0.1 192.168.11 192:168:54 192.168.19 192.168.50 192.168.0. 192.168.0. 192.168.0. 192.168.11	1.1 4:92 5.224 0.37 .16 .49 10.1 10.5	255.255.255.255 255.255.0.0 255.255.0.0 255.255.0.0 255.255.0.0 255.255.0.0 255.255.0.0 255.255.0.0 255.255.0.0 255.255.0.0	127.53.0.1 192.168.0.2 192.168.0.2 192.168.0.254 192.168.0.254 192.168.0.254 192.168.110.254 192.168.110.254

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6.5 RTU Client for Remote Control Application with RTU

API.

This example shows how to use RTU API to collect and control remote Modbus RTU and Modbus TCP I / O with RTU client/server. This system has ET-7017, M-7045 and PLC.



- (1) Please connect the RS-485 or Ethernet of the device (ET-7k or M-7k module) to GRP-500M
- If necessary, fill in "PIN Code", "APN", "User Name" and "Password". After finishing all the settings, click "Modify".

PIN / APN Configure						
PIN Code	0000					
Phone Number	*99***1#	(1)				
APN	internet	(2)				
User Name		(2)				
Password		(2)				
Modify						
(1):usually use *99# or *99***1# (2):please ask your SIM Card provider						

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(2) Enable the "Network Reconnect" function to ensure that the mobile network is always online (usually, the ISP will disconnect once every 1 to 3 days).
Server IP can fill in user server IP or Google DNS server IP (8.8.8.8).
If the user uses MDVPN, please make sure that the server IP does not deny the ICMP

service (Ping). After finishing all the settings, click "Modify".

Network Reconnection						
Server IP	8.8.8.8					
Max. Retry	5					
Retry Interval Time	30					
Enable Funcion 🖉 Enable						
Modify						
 (1):This function will run immediately after you press "Modify" button (2):GSM module will be reset after Max. retry (3):System will reboot after GSM module reset 100 times 						

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(3) Select "ET-7050" in the list, and then click "Add", the web will display all I/O number information, as shown below.

Modify the "Device Name", "Device ID", "IP" and "Port" of ET-7050, and then click "Modify".

Main Info.	Mo	dbus Device Email/FTP					
Modbus Device Num	ber:0	Add ET-7050 V					
1 Name :		Edit Delete					
Device Name	ET-7050	Max Length=20					
Device ID	1	1~255					
P	192.168.11.25	empty for Modbus/RTU					
Port	502	Default=502, 1~65535					
DI Number	12	0~32					
DO Number	6	0~32					
AI Number	0	0~16					
AO Number	0	0~16					
DI Address	0	0~65535					
DO Address	0	0~65535					
AI Address	0	0~65535					
AO Address	0	0~65535					
	Mod	dify Cancel					

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(4) Select "M-7022" in the list, and then press the "Add" button, the web will display all I/O number information, as shown below.

Modify the "Device Name" and "Device ID" of M-7022 (keep the default values of "IP" and "Port"), and then click "Modify".

Main Info.			Modbus D	Device FTP / Email			Email		
Modbus Device Number : 1				Add M-7022 V					
1 Na	[ame : 1_E	ET-70:	50				Edit	Delete	
2 N	2 Name :						Edit	Delete	
Device Na	ame	2_M-	7022		Maz	x Length=20			
Device ID	C	1] 1~2	255			
IP		· ·			empty for Modbus/RTU				
Port		502			Default=502, 1~65535				
DI Numbe	er	0]0~32				
DO Numb	ber	0			0~32				
AI Numb	er	0			0~16				
AO Numb	ber	2			0~16				
DI Addres	SS	0			0~65535				
DO Addre	ess	0			0~65535				
AI Addres	SS	0			0~65535				
AO Address 0 0~65535									
				Modify	Can	cel			

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(5) Select "Custom" in the list, and then press the "Add" button, the web will display all I/O number information, as shown below.

Modify the "Device Name", "Device ID", "DI Number", "AI Number" of PLC, and then click "Modify".

Main Info. Modbus I			Modbus I)evice	Email/FTP		
Mođbu	odbus Device Number : 2			Add Custom •			
1	Name : ET-	7050		Edit Delete			
2	Name : M-7	7022		E	dit Delete		
3	Name :			E	dit Delete		
Devic	e Name	myPLC	M	ax Length=20			
Devic	e ID	1	1-	-255			
IP			er	npty for Modbus/F	tu		
Port		502	D	Default=502, 1~65535			
DI Nı	umber	4	0-	0~32			
DON	Tumber	0	0-	-32			
AI Nu	umber	4	0-	-16			
AON	Tumber	0	0-	0~16			
DI A	ddress	0	0-	0~65535			
DO A	DO Address 0.04			0~65535			
AI A	AI Address 0 0-			0~65535			
AO Address 0 0				0~65535			
			Modify	Cancel			

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(6) Select the "Modbus Test" function, and then press the "Test" button to test the settings. If the result is successful, follow the next step.

<u>Time</u>	^	success							
<u>System Service</u>									
VxServer									
<u>VxServer</u>			Modbus Configure Test						
RTU Client			invalid object in data, converting to string						
RTU Client			invalid object in data, converting to string						
<u>FTP Test</u>			moabus debug start DEBUG [2014-08-18 15:55:56] [1] DI value= (0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0)						
<u>Email Test</u>		Result	DEBUG [2014-08-18 15:55:56] [1] DO value= (0, 0, 0, 0, 0, 0)						
<u>Modbus Test</u>			DEBUG [2014-08-18 15:55:56] [2] AO value= (291, 256)						
V112B07			DEBUG [2014-08-18 15:55:56] [3] DI value= (1, 1, 0, 0)						
2014/07/28			DEBUG [2014-08-18 15:55:56] [3] AI value= (0, 0, 0, 0)						
2014/07/20									
			Test						

If the result failed, please check your settings or wiring.

fails								
Modbus Configure Test								
invalid object in data, converting to string invalid object in data, converting to string modbus debug start ERROR [2014-08-18 16:10:55] MB[1] poll_modbus(): timed out DEBUG [2014-08-18 16:10:55] [2] AO value= (291, 256) DEBUG [2014-08-18 16:10:55] [3] DI value= (1, 1, 0, 0) DEBUG [2014-08-18 16:10:55] [3] AI value= (0, 0, 0, 0) [2014-08-18 16:10:54] modbus error [ET-7050,1] Exception: timed out								
Test								

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(7) Configure "Main Info." Tab.

- · Fill in the "Server Address" and "Server Port" of RTU Center.
- \cdot Fill in the "Station ID" (different from other RTU equipment).
- · Fill in the "Data Update Period" and "Heartbeat Period" (0 disable).
- Fill in the RS-485 configuration of the Modbus RTU device.

Main Info.	Modb	ous Device	FTP / Email			
Server Address						
Server Port		10000	default=10000			
Station ID		1	1~65535			
Data Update Period(s	ec.)	3	0~86400 (0=disable)			
Heartbeat Period(sec.)	0	1~86400 (a day)			
Baud Rate (RS-485 fo Modbus/RTU)	r	9600 🔽 bps				
Data Bit		8 🕶				
Parity		N				
Stop Bit						
Modbus Timeout (ms)		1000 50~99999, default=1000				
Enable Firmware		Enable				
Firmware Version		v1.0.0				
		Modify				

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- (8) Open the RTU Center, and then follow the steps below to add RTU devices.
 - A. Click the "New Device" icon.
 - B. Enter the alias of the GRP device
 - C. Select the module type as "GRP-520".
 - D. Fill in the "Station ID" as the "Station ID" of GRP device.

M2M RTU Center <u>File Settings Help</u>	3		
Device Presenti	~	Parameter	Status
Device Propert Device Name Module Set Module Station II Describe	myGRP520 (Type:Unicode, Max. size: 2 ing GRP-520 1 1 (1 ~ 6553	x0)	OK Cancel

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(9) After reboo, the GRP device will automatically connect to RTU Center.

🙀 M2M RTU Center				
<u>F</u> ile <u>S</u> ettings <u>H</u> elp				
6	Ê		ك ال	
⊟- ⊖ <mark>myGRP520</mark>			Parameter	Status
Local IO			Device Name	myGRP520
ET-7050			Module	GRP-520
mvPLC			Station ID	1
IIIyi EO			Describe	
			Connected Priority	GPRS Master, Ethernet Slave
			Connected Method	Ethernet
			Date&Time	2014/08/20 15:37:34
			Remote Client IP	192.168.27.50
			Remote Client PORT	44665
			Send once time (unit: sec)	5
			Heartbeat time (unit: sec)	0
			Modbus module number	3

(10) Double-click "ET-7050" to call up the "Output Control Panel", and press "DO1" to control the remote DO.



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(11) Download the RTU API from the RTU center webpage and unzip it. There are RTU API library and some C#, VB.Net, VC6 demos, as shown below.

名稱	[2013/11/05]	
퉬 demo 퉬 Lib 📄 readme	\Lib \Demo \RTU_CS_Net_demo \RTU_VB_Net_demo \RTU_VC6_demo	< Ver1.3.1 < 2013/11/01

(12) Copy the pre-built demo to the folder in the RTU Center.

The demo must be in the same folder as RTU Center, because the same memory is shared in "M2M_RTU.dll".

Here we copied "RTU_CS_demo.exe" and "M2M_RTU_NET.dll" from the C# demo.



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(13) Execute "RTU_CS_Demo.exe".

- A. Press "Get Information" to get all station information.
- B. Fill in the "Station ID" as the "Station ID" of GRP device.
- C. Press the "Read Data" button to read the local IO data. Because the GRP device has no local IO, we get the error code here.
- D. Fill in "Modbus ID" as "Modbus ID" of ET-7050, and "Modbus Name" as "ET-7050", and then press "ReadData" to get all IO data.
- E. Press the "Write Dos (add 1)" button to control DO.

(TU API demo (C#) 2013/11/01	
(I) Get Information (I) Get Information (I) Get Information Total Station Number: Initial Success API Version: VI31 2013/11/05 Read RTU Soft WDT Run RTU Close RTU Count x0 enGPS = 0 Modbus(1) Name = ET-7050 sID = 1 DI x12 DO x6 AI x0 AO x0 Count x0 enGPS = 0	(2) Local IO (2) Read Data (3) Write DO ch0 (0 or 1) Station ID= 1 (2) (3) Remote IO (Modbus device) (3) Read Data Write DO ch0 (invert) Write DOs (add 1)
Count x0 enGPS = 0 Modbus(2) Name = M-7022 sID = 2 DI x0 DO x0 AI x0 AO x2 Count x0 enGPS = 0 Modbus(3) Name = myPLC sID = 1 DI x4 DO x0 AI x4 AO x0 Count x0 enGPS = 0 =	(3)ReadData (3)ReadData (3)ReadData (3)ReadData (3) Write DO ch0 (invert) Write DOs (add 1) Write Counter as 0 Modbus ID= 1 Modbus Name= ET-7050 (4) 2014.8/21 15:11:14 Station ID:1, mbSlave ID:1, Modbus Name=ET-7050 DI ch0 =0 DO ch0 =1 DOs =1001 Counter ch0 =9, Error=6 AI ch0 Hex =0, Error=6 AO ch0 =0, Error=6 AO ch0 =0, Error=6

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6.6 RTU Client for Remote Control Application with OPC DA Server.

- (1) For RTU Client and RTU Center, please refer to the previous section.
- (2) Open NAPOPC.M2M DA Server, and then click "Search" to automatically add all the tags of the device.



ICPDAS NAPOPC.M2M DA Server - 未命名 File Add Edit View Options Help

	M	B		2			•	G		<u>Se</u>	3<	F
New	Open	Save	Save as	Device	Group	Таа	Produc	e Search	Monitor	Debua	Cut	Cor
⊡¦				Name		Device	Туре	Location	Cha	annel Type		Chanr
	ET-7050			🕀 Ch00)	ET-70	50	1		Bit Input		0
	🔁 DI			the Choi	L	ET-70	50	1		Bit Input		1
	🔁 DO			🗛 Chữ	2	ET-70	50	1		Bit Input		2
	🖆. DIs			the ChO	3	ET-70	50	1		Bit Input		3
	DOs			the Chool	1	ET-70	50	1		Bit Input		4
	M-7022			the Chos	5	ET-70	50	1		Bit Input		5
				😓 ChO	5	ET-70	50	1		Bit Input		6
	myPLC			😓 Ch07	7	ET-70	50	1		Bit Input		7
	AI-			🕀 Ch08	3	ET-70	50	1		Bit Input		8
				Ch09)	ET-70	50	1		Bit Input		9
				🖧 Ch1()	ET-70	50	1		Bit Input		10
	🔁 DIs			م به آها!!								

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(3) Double-click the device node to modify the device name.

New	Open	Save	Save as	Device	Group	Таа	Produc	e Search	Moni
	. (1) Doub	le Clieck			Name	[Device Type	
<u>ما ن</u>	ET-7050	(2) 2004	ne encen						
÷ Ē	a M-7022								
÷ t	🖢 myPLC								
E	🖢 Unknown	Device							
	Device Prope	erties							8
	Device Name	GRP-5	20.1					OK	
		10111 3					-1		
	⊙ M2M Ma	odules	(,	2) Input N	ew Nam	e		Cancel	
	- Module Se	etting —							
	Module	G-4500	-						
		,							
	Location	1	• (1~6	5535)					

(4) Now users can use OPC Client to read I/O data from NAPOPC.M2M DA Server, or use

the client "Monitor" to monitor all I/O data.

💯 IC	🖞 ICPDAS NAPOPC.M2M DA Server - 未命名.tdb															
<u>F</u> ile	<u>File Add Edit View</u> Options <u>H</u> elp															
	1 📴	B			۷		9	•	G		<u>Se</u>	3<	P	f	X	
Nev	v Open	Save	Save a	is 🗌	Device	Group	Таа	Produce	Search	Monitor	Debua	Cut	Сару	Paste	Delete	F
Ð	GRP-520_1				Name	,	Device	•Туре	Location	Cł	nannel Type		Channel		Value	,
ļ 🔅	- 🖆 ET-705	D			🕀 Chữ	0	ET-7	050	1		Bit Output		0		OFF	_
	🚽 🔁 DI				🛛 🕀 Chữ)1	ET-7	050	1		Bit Output		1		ON	
	🔁 DO				🛛 🕀 Chữ)2	ET-7	050	1		Bit Output		2		OFF	
	📑 DIs				🛛 🕀 Chữ)3	ET-7	050	1		Bit Output		3		ON	
					🛛 🕀 Chữ	4	ET-7	050	1		Bit Output		4		OFF	
ŧ	M-7022	2			A Ch)5	ET-7	050	1		Bit Output		5		OFF	

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6.7 RTU Client for Remote Control Application with InduSoft.

This example shows how to use SCADA "InduSoft" to control/monitor the remote I/O.

- (1) For RTU Client, RTU Center and OPC Server, please refer to the previous section.
- (2) Right-click the OPC DA 2.05 folder and insert a new worksheet.



(3) Select OPC Server from the "Server Identifier", and then select the "NAPOPC.M2M" item from the combo box.

	ST OPCCL00	1.0PC ×							
F F	Description: Server Identifier: Disable: Read Update Rate (ms): NAPOPC.M2M Status: NAPOPC.Svr Studio.Scada.HDA.OPC Status: Remote Server Name: Read before writing Stada.OPC.2 Browse Read after writing Accept T ag Name in the Item column								
	Tag Name	Item		Scan		(Project Texts)		Add	
	🔍 Filter tex	🔍 Filter text	🔍 (All)		\checkmark	🔍 Filter text	🔍 Filter text		
*			Always		~				
*			Always		*				
*			Always		~				
*			Always		~				
*			Always		~				

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- (4) Configure label names and item columns
 - A.Fill in the "Tag Name".

B.Double-click the "Item" column and select the point from the pop-up window.

C. Click "OK".

3 OPCCL001.OPC ×		
Description: Server Identifier: NAPOPC.M2M Read Update Rate (ms): Percent Deadband:	Disable:	
Remote Server Name: Read before Browse Read after Accept Ta	oPC Browser: 'NAPOPC.M2M' [LOCAL] re writing rg writing rg Nami Gree List of Items in GT-540_0 GT-540_0 GT-540_0 GT-540_0 GT-540_0 GT-540_0	OK Cancel
Tag Name Item Filter tex Filter text 1 DO[0] GT-540_0.DOs.Ch00 2 DO[1] GT-540_0.DOs.Ch01 3 DI[0] GT-540_0.DOs.Ch01 4 DI[1] GT-540_0.DIs.Ch00 4 DI[1] GT-540_0.DIs.Ch01 5 DI[2] GT-540_0.DIs.Ch02 6 DI[3] GT-540_0.DIs.Ch03 7 DI[4] GT-540_0.DIs.Ch04 8 DI[5] GT-540_0.DIs.Ch05 9 Al Al	Alwa Alwa Alwa Alwa Alwa Alwa Alwa Alwa	Filter: Pread Write Both

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6.8 Email or FTP report I/O logger file.

This example shows how to use GRP devices to periodically report I/O recorder files.



(1) For Modbus configuration, please refer to section 4.5.

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- (2) Configure Email / FTP function in "Email / FTP" tab.
 - A. Fill in "Data Log Interval" to record I/O data to the log file.
 - B. Fill in "Max. Time per log file" to report log files.
 - C. To use FTP function, fill in all setting and check "Enable FTP Function". To use Email function, fill in all setting and check "Enable EmailFunction".
 - D. Click "Modify"

Main Info.		Modbus Device	FTP / Email			
Data Log Interval (sec.)		5	0~86400 (0=disable)			
Max. Time per Log File (m	uin.)	3	3~1440 minutes			
FTP Server Address		教会公司表 "终于"的系	empty> disable FTP			
FTP Port		221	default=21			
FTP Username		test				
FTP Password		test				
Enable FTP Funcion		🗹 Enable				
Email From		abc@gmail.comempty> disable Email Ex: abc@gmail.com				
Email From		Ex: abc@gmail.com				
Email From Email To		Ex: abc@gmail.com xyz@gmail.com	Ex: xyz@gmail.com			
Email From Email To Example for 2 or more con	tact	Ex: abc@gmail.com xyz@gmail.com xx@gmail.com,yy@gmail.com	Ex: xyz@gmail.com m			
Email From Email To Example for 2 or more con Email Server	tact	Ex: abc@gmail.com xyz@gmail.com xx@gmail.com,yy@gmail.com smtp.gmail.com	Ex: xyz@gmail.com m Ex: smtp.gmail.com			
Email From Email To Example for 2 or more con Email Server Email Server Port	tact	Ex: abc@gmail.com xyz@gmail.com xx@gmail.com,yy@gmail.com smtp.gmail.com	Ex: xyz@gmail.com m Ex: smtp.gmail.com Ex: 25			
Email From Email To Example for 2 or more con Email Server Email Server Port Email Username	tact	Ex: abc@gmail.com xyz@gmail.com xx@gmail.com,yy@gmail.com smtp.gmail.com 25 abc	Ex: xyz@gmail.com m Ex: smtp.gmail.com Ex: 25 Ex: abc			
Email From Email To Example for 2 or more con Email Server Email Server Port Email Username Email Password	tact	Ex: abc@gmail.com xyz@gmail.com xx@gmail.com,yy@gmail.com smtp.gmail.com 25 abc 123abc	Ex: xyz@gmail.com m Ex: smtp.gmail.com Ex: 25 Ex: abc Ex: 123abc			
Email From Email To Example for 2 or more con Email Server Email Server Port Email Username Email Password Enable Email Funcion		Ex: abc@gmail.com xyz@gmail.com xx@gmail.com,yy@gmail.com smtp.gmail.com 25 abc 123abc Enable	Ex: xyz@gmail.com m Ex: smtp.gmail.com Ex: 25 Ex: abc Ex: 123abc			

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(3) Finally, enable this function in the "Main Info" tab.

If the user does not need to send data to the RTU Center, set the "Data Update Period" to 0.

Main Info.	M	odbus Device		FTP / Email	
Server Address	26.84.772]		
Server Port		10000		default=10000	
Station ID		1		1~65535	
Data Update Period(sec.)		0		0~86400 (0=disable)	
Heartbeat Period(sec.)	0		1~86400 (a day)		
Baud Rate (RS-485 for M	odbus/RTU)	9600 v bps			
Data Bit		8 •			
Parity		NV			
Stop Bit		1 •			
Modbus Timeout (ms)		1000		50~99999, default=1000	
Enable Firmware		🗹 Enable			
Alive		True			
		Modify			

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6.9 Data Collection and Remote Control (NB-DA Server)

This example shows a data collection and remote control application through the NB-DA server. There are PM-3112 and SAR-713 in this system.



- Please connect the device (PM-3112 and SAR-713) to serial port of the GRP device. The baudrate of the device is 115200 bps and the data format is 8N1.
- (2) Add a device in the "Modbus Devices" tab.

	Main Info.	Modbus Device		I/O Mapping			
Modbu	us Device Number : 3		Add	Custom •			
0	Name : SAR-713-1		Edit Delete				
1	Name : SAR-713-2		Edit Delete				
2	Name : PM-3112-10	0	E	dit Delete			

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In this example, the user want to use the two AO values of SAR-713, but their Modbus addresses are not consecutive. We split the SAR-713 settings into two Modbus settings, as shown below:

Main Info.			Modbus Dev	I/O Mapping			
Modbus	Device Nur	nber : 3			Add Custom •		
0	Name : SA	R-713-1		Edit Delete			
Device	Name	SAR-71	3-1	Max Length=	20		
Device	ID	1		1~255			
IP				empty for Mo	odbus/RTU		
Port		502		Default=502,	1~65535		
DI Nur	nber	0		0~32			
DO Nu	mber	0		0~32			
AI Nur	nber	0		0~16			
AO Number		1		0~16			
DI Add	lress	0		0~65535			
DO Address		0		0~65535			
AI Add	lress	0		0~65535			
AO Ad	dress	9 0		0~65535			
COMF	Port	COM3 (RS-485) ▼					
Baud R	late	115200 V bps					
Data B	it	8 •					
Parity							
Stop Bit							
Read DO		Enable					
Read AO		🗹 Enab	ole				
			Modify	Cancel			
1	Name : SA	R-713-2			Edit Delete		
2	Name : PM-3112-100				Edit Delete		

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For the first setting to read 1 AO at AO address 9 and the second setting to read 1 AO at address 11. In addition, The AO of SAR-713 is required, so "Read AO" should also be enabled.

Main Info.	Modbus Dev	vice I/O Mapping			
Modbus Device Nu	mber : 3	Add Custom •			
0 Name : SA	R-713-1	Edit Delete			
1 Name : SA	AR-713-2	Edit Delete			
Device Name	SAR-713-2	Max Length=20			
Device ID	1	1~255			
IP		empty for Modbus/RTU			
Port	502	Default=502, 1~65535			
DI Number	0	0~32			
DO Number	0	0~32			
AI Number	0	0~16			
AO Number	1	0~16			
DI Address	0	0~65535			
DO Address	0	0~65535			
AI Address	0	0~65535			
AO Address	11	0~65535			
COM Port	COM3 (RS-485) 🔻				
Baud Rate	115200 v bps				
Data Bit	8 •				
Parity	N V				
Stop Bit	1				
Read DO	🔲 Enable				
Read AO	🗹 Enable				
	Modify	Cancel			
2 Name : PM-3112-100 Edit Delete					

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1	Main Info.	Modbus Device				I/O Mapping	
Modbu	s Device Nu	nber :	: 3		Add	Custom 🔻	
0	Name : SA	R-713	3-1		Edit	Delete	
1	Name : SA	R-713	3-2		Edit	Delete	
2	Name : PM	[-3112	2-100		Edit	Delete	
Devic	e Name	PM-3	112-100	Ma	x Length=20		
Devic	e ID	2		1~	255		
IP				en	pty for Modbus/R	TU	
Port		502		De	fault=502, 1~6553	35	
DI Nu	mber	0		0~32			
DO N	umber	0		0~32			
AI Nu	mber	4		0~16			
AO Number		0]0~16			
DI Ad	dress	0		0~65535			
DO A	ddress	0		0~65535			
AI Ad	dress	4352		0~65535			
AO A	ddress	0		0~65535			
COM	Port	COM3 (RS-485) 🔻					
Baud Rate		115200 v bps					
Data I	Data Bit		8 •				
Parity		N					
Stop I	Bit	1 •					
Read	DO	Enable					
Read .	AO	E	nable				
	Modify Cancel						

The settings of PM-3112 are as follows, there are 4 AIs that need to be read:

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(3) Set I / O mapping table:

- A. Fill in the "Session ID" to let NB-DA Server identify this device.
- B. Because SAR-713 enables "Read AO", the AO mapping data ("1-1" and "2-1") also needs to fill in the AI mapping table.
- C. The AO mapping data of PM-3112 are "3-1", "3-2", "3-3" and "3-4".

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Main Info.		Modbus Device					I/O Mapping		
Auto Mapping	🗷 Enabl	🗹 Enable							
1st Session ID	0	0 0~1999							
DO	DC 0-0 DC 0-0 DC 0-0 DC 0-0	001 DO02 0-0 009 DO10 0-0 017 DO18 0-0 025 DO26 0-0	DO03 0-0 DO11 0-0 DO19 0-0 DO27 0-0	DO04 0-0 DO12 0-0 DO20 0-0 DO28 0-0	DO05 0-0 DO13 0-0 DO21 0-0 DO29 0-0	DO06 0-0 DO14 0-0 DO22 0-0 DO30 0-0	DO07 0-0 DO15 0-0 DO23 0-0 DO31 0-0	DO08 0-0 DO16 0-0 DO24 0-0 DO32 0-0	
DI	DI 0-0 DI 0-0 DI 0-0 DI 0-0	01 DI02 0-0 09 DI10 0-0 17 DI18 0-0 25 DI26 0-0	DI03 0-0 DI11 0-0 DI19 0-0 DI27 0-0	DI04 0-0 DI12 0-0 DI20 0-0 DI28 0-0	DI05 0-0 DI13 0-0 DI21 0-0 DI29 0-0	DI06 0-0 DI14 0-0 DI22 0-0 DI30 0-0	DI07 0-0 DI15 0-0 DI23 0-0 DI31 0-0	DI08 0-0 DI16 0-0 DI24 0-0 DI32 0-0	
AO	AC 1-1 AC 0-0 AC 0-0 0-0	001 AO02 2-1 009 AO10 0-0 0-0 0.0 017 AO18 0-0 025 AO26 0-0	AO03 0-0 AO11 0-0 AO19 0-0 AO27 0-0	AO04 0-0 AO12 0-0 AO20 0-0 AO28 0-0	AO05 0-0 AO13 0-0 AO21 0-0 AO29 0-0	AO06 0-0 AO14 0-0 AO22 0-0 AO30 0-0	AO07 0-0 AO15 0-0 AO23 0-0 AO31 0-0	AO08 0-0 AO16 0-0 AO24 0-0 AO32 0-0	
AI	AI 1-1 0-0 AI 0-0 AI 0-0	01 AI02 2-1 09 AI10 0-0 17 AI18 0-0 25 AI26 0-0	AI03 3-1 AI11 0-0 AI19 0-0 AI27 0-0	AI04 3-2 AI12 0-0 AI20 0-0 AI28 0-0	AI05 3-3 AI13 0-0 AI21 0-0 AI29 0-0	AI06 3-4 AI14 0-0 AI22 0-0 AI30 0-0	AI07 0-0 AI15 0-0 AI23 0-0 AI31 0-0	AI08 0-0 AI16 0-0 AI24 0-0 AI32 0-0	

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(4) If necessary, fill in the "PIN Code", "APN", "User Name" and "Password".Fill in the the "Server IP" and "Server Port as the IP and port of NB-DA Server.After finishing all the settings, press the "Modify" button.

Main Info. Mod		lbus Device	I/O Mapping		
APN Config		internet.iot			
Data Update Period (sec.)		5	5~86400		
Modbus Response Timeou	ut (msec.)	1000			
Send Mode		UDP V			
Server IP/Domain		192.168.12.2			
Server Port		5394 default=5394			
Enable Firmware		🗹 Enable			
Firmware Version		V1.02 2019/05/06			
		Modify			

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- (5) Setting NB-DA Server:
 - A.Fill in the the "UDP Server Port" as the "Server Port" of the GRP device.
 - B.After all the settings are ready, click "Add Server".
 - C. Select th "UDP Port" column, and then click "Start Server".
 - D. After the server is started, if data is received from the GRP device, the "Sessions" column will display the session living status.

3 NB-IoT Server							- 🗆 X
File Open Help							
Total Servers :	3	Data	Base Config		MQTT	Config	_
Add Server	Delete Server		Enable			Enable 🗹	
Start Server	Start Server Stop Server			mysql	М	QTT Broker = iot.ec	lipse.org
Start All Servers	Stop All Server	s	SQL IP =	127.0.0.1			
System Config)	s	OI. Data Base =	gm-540m-nb		MQTT Port = 1883	
Station ID	0		SQL Data Base = grp-340m-nb MQTT Subscribe =			T Subscribe = .cloud	LICPDAS.USEI
UDP Server Port =	5394	(a)	QL Password =	*****	M	QTT Publish = .cloud	LICPDAS.SER\
Modbus Server Port = Session alive time (s) =	120	SQL Siz	e Alarm (MB) =	0	MQTT	User Name =	
Save Log Info		SQL S	ize Limit (MB) =	0	MQT	Password =	
Station	UDP Port	Modbus Port	MQTT	Data Base	Status	Sessions	Log View
• 0	5394	502	Enable	Enable	Online	7	Open
2	5396	504	Disable	Enable	Online	• (d)	Open
99	5493	601	Enable	Enable	Online	0	Open
(c)]						

- (6) If data is received and the server opens MQTT or the database, the user can receive the data by accessing the database or subscribing to MQTT topics. The server also creates a Modbus Server by default. The user can use the local IP and the port set on the server to connect to the Modbus Server, and then use Modbus TCP commands to get data.
- (7) If the user wants to control the remote DO / AO, the user can modify the value on the Modbus Server or publish DO / AO MQTT messages to the topic subscribed by the NB-DA Server.

· [Server Side] Examples of DO / AO MQTT control messages are as follows:

Publish Topic	Publish Data (example)
[Topic of server subscribe]/	
[Station ID]/	00010001000100010001000100010001
[Session ID]/	000100010001000100000000000
DO	
[Topic of server subscribe]/	00000010002000300040005000600070008
[Station ID]/	000900100011001200130014001500160017
[Session ID]/	001800190020002100220023002400250026
AO	002700000000000000000000000000000000000

- Each DO has 1 byte, in hexadecimal format, the data length must be 32 and "00" is set for empty DO.
- Each AO has 2 bytes, in hexadecimal format, the data length must be 32 and "0000" is set for empty AO.

· [Server Side] The DEVINFO / DI / AI / GPS / ACK data like below:

- DEVINFO data include RSRP, ECL, SNR, and Battery level.
- Each DO has 1 byte, in hexadecimal format, the data length must be 32 and "00" is set for empty DO.
- Each AO has 2 bytes, in hexadecimal format, the data length must be 32 and "0000" is set for empty AO.
- GPS data is the "\$GPRMC" message of NMEA 0183 protocol.

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6.10 Data Collection and Remote Control (MQTT Broker)

This example shows an application for data collection and remote control through an MQTT broker. There are PM-3112 and SAR-713 in this system.



- (1) Please connect the device (PM-3112 and SAR-713) to serial port of the GRP device. The baudrate of the device is 115200 bps and the data format is 8N1.
- (2) Add Modbus devices in the "Modbus Devices" tab (same as example 6.9).
- (3) Fill in the I / O mapping table (same as example 6.9).

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Main Info.	M	lodbus Device	I/O Mapping		
APN Config		internet.iot			
Data Update Period (sec.))	5	5~86400		
Modbus Response Timeo	ut (msec.)	1000			
Send Mode		MQTT •			
Server IP/Domain		iot.eclipse.org			
Server Port		1883	default=1883		
Buffer Size		512	default=512		
Keep Alive		1000	default=1000, 0~65535		
MQTT Version		3	default=3, can set 3 or 4		
User Name			if have user name		
Password			if have password		
		1st Session			
Subscribe DO		.cloud.ICPDAS.USER/0/0/D	C		
Subscribe AO		.cloud.ICPDAS.USER/0/0/A	C		
Publish DEVINFO		.cloud.ICPDAS.UE/0/0/DEV	1		
Publish DI		.cloud.ICPDAS.UE/0/0/DI			
Publish AI		.cloud.ICPDAS.UE/0/0/AI			
Publish GPS		.cloud.ICPDAS.UE/0/0/GPS	6		
Publish ACK		.cloud.ICPDAS.UE/0/0/ACK	ACK for DO/AO		
Use CHT platform		Enable			
CHT Device ID			if use CHT platform		
CHT Sensor ID			if use CHT platform		
		2nd Session			
Subscribe DO		.cloud.ICPDAS.USER/0/1/D	C		
Subscribe AO		.cloud.ICPDAS.USER/0/1/A	C		
Publish DEVINFO		.cloud.ICPDAS.UE/0/1/DEVI			
Publish DI		.cloud.ICPDAS.UE/0/1/DI			
Publish AI		.cloud.ICPDAS.UE/0/1/AI			
Publish GPS		.cloud.ICPDAS.UE/0/1/GPS			
Publish ACK		.cloud.ICPDAS.UE/0/1/ACK	ACK for DO/AO		
Use CHT platform		Enable			
CHT Device ID			if use CHT platform		
CHT Sensor ID			if use CHT platform		
Enable Firmware		✓ Enable			
Firmware Version		V1.02 2019/05/06			
		Modify			

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- (4) If necessary, fill in the "PIN Code", "APN", "User Name" and "Password".Fill in the the "Server IP" and "Server Port as the IP and port of MQTT Broker.After finishing all the settings, press the "Modify" button.
- (5) If the user uses the CHT IoT platform, the user also needs to fill in the "Username", "Password", "Device ID" and "Sensor ID", and then enable "Use CHT Platform".

· [GRP Device Side] Examples of DO/AO MQTT control messages for are as follows:

Publish Topic	Publish Data (example)
Set by user for DO	000100010001000100010001000100010001
	000000100020003000400050006000700080009
Set by user for AO	0020002100220023002400250026002700280029

- Each DO has 1 byte, in hexadecimal format, the data length must be 32 and "00" is set for empty DO.
- Each AO has 2 bytes, in hexadecimal format, the data length must be 32 and "0000" is set for empty AO.
- Must include "Session ID/Type" at the end of the topic, such as ".cloud.ICPDAS.USER/0/0/DO".

· [GRP Device Side] Examples of DEVINFO/DI/AI/GPS/ACK datas are as follows:

Publish Data (example)				
-80,0,16,0				
000100010001000100010001000100010001000100010001				
000000000				
000000100020003000400050006000700080009001000110012				
0013001400150016001700180019002000210022002300240025				
002600270000000000000000000000000000000				
\$GPRMC:083559.00:A:4717:11437:N:00833:91522:E:0.004:				
77.52:091202:::A*57				
DO_ACK				

Each DO has 1 byte, in hexadecimal format, the data length must be 32.

■ Each AO has 2 bytes, in hexadecimal format, the data length must be 32.

■ GPS data is "\$GPRMC" message of NMEA 0183 protocol.

■ ACK data is published by GRP when it received DO/AO control message.

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- [GRP Device Side with CHT IoT Platform] Examples of DO/AO MQTT control messages for are as follows:
 - Each DO has 1 byte, in hexadecimal format, the data length must be 32.
 - Each AO has 2 bytes, in hexadecimal format, the data length must be 32.
 - Must include "Session ID/Type" at the end of the topic, such as ".cloud.ICPDAS.USER/0/0/DO".

Publish Topic	Publish Data (example)
DO	[SessionID]/DO/000100010001000100010001000100010001
	[SessionID]/AO/000000100020003000400050006000700080009
AO	0020002100220023002400250026002700280029

 [GRP Device Side with CHT IoT Platform] Examples of DEVINFO/DI/AI/GPS/ACK datas are as follows:

Publish Topic	Publish Data (example)
DEVINFO	-80,0,16,0
וס	[SessionID]/DI/00010001000100010001000100010001000100
וס	0001000000000
	[SessionID]/AI/00000010002000300040005000600070008000900100011
AI	001200130014001500160017001800190020002100220023002400250026
	002700000000000000
CDS	\$GPRMC:083559.00:A:4717:11437:N:00833:91522:E:0.004
GPS	:77.52:091202:::A*57
ACK	DO_ACK

Each DO has 1 byte, in hexadecimal format, the data length must be 32.

Each AO has 2 bytes, in hexadecimal format, the data length must be 32.

■ GPS data is "\$GPRMC" message of NMEA 0183 protocol.

■ ACK data is published by GRP when it received DO/AO control message.

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Appendix A. Revision History

This chapter provides revision history information to this document.

The table below shows the revision history.

Version	Date	Description of changes
1.0.0	2021-10-05	The First Release Revision.
1.0.1	2021-11-01	Update DDNS table picture.
		Add DHCP Server and GPS Information.

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