GPRS Data Logger Technical Guide

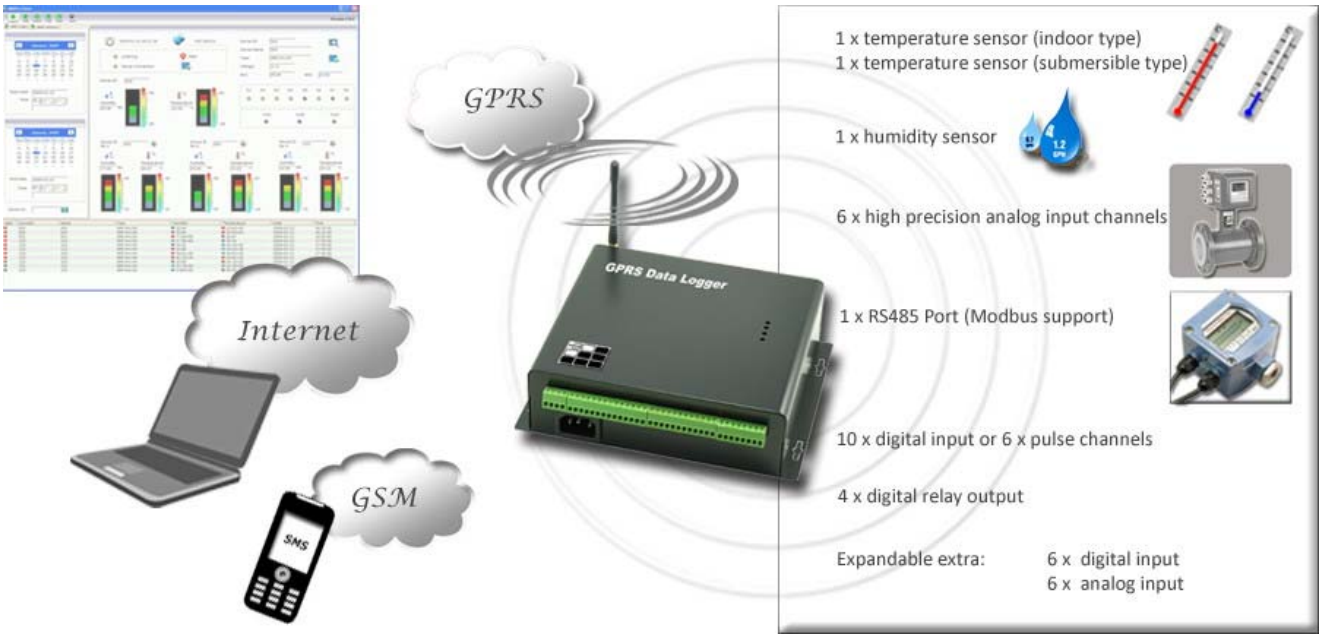
GS828H, H2, HX [Version 6]

Standard GPRS Data Logger

- GS828H (AC/DC Power Version)
- GS828L (Low Power Version)

Temperature & Humidity GPRS Data Logger

- GS828-H2 / HX (AC/DC Power Version)
- GS828-L2 (Low Power Version)



Revision 110108 [V16C]

Contents

1. Overview

GS828H/L GPRS Data Logger is a standalone RTU integrated with a 16 bit ARM MCU and low power consumption design. It's built in digital processor, external interface, hardware watchdog, digital input, digital output, analog input and GPRS communication module. Wide operating temperature, electromagnetic resistant, anti-vibrant and numerous interface protocols provide a highly reliable design for industrial application.

- GS828-H is powered by 110/220VAC or 12VDC, and backup by internal rechargeable battery. Internal rechargeable battery maintains data and continuous operation when power loss.

- GS828-H2 is enhanced version of GS828H with 2 x temperature sensors and 1 x humidity sensor bundled, and dedicatedly designed for temperature & humidity measurement.

- GS828-L is powered by 12VDC, and featured with sleep mode allowing its continuous operation for more than 2 years with hi-capacity battery, or solar panel. It resumes normal mode only when scheduled to upload data.

- GS828-L2 is enhanced version of GS828L with 2 x temperature sensors and 1 x humidity sensor bundled, and dedicatedly designed for temperature & humidity measurement.

GS828H / GS828-H2

GS828L / GS828-L2

2. Features [GS828H]

- 6 x High Precision A/D Channels
- 10 x DI [Digital Input] or 6DP [Digital Pulse] Channels
- 4 x DO [Digital Output] Channels
- Power loss alert
- Programmable Upload Interval (5 seconds ~ one day)
- Programmable Logging Interval (1 minute ~ 60 minutes)
- Supports data upload via GPRS and SMS on schedule
- Supports data upload via GPRS and SMS triggered by alarm, or manual check
- Real Time Alarm Report via GSM SMS and/or GPRS Data
- Device setup, parameter check and status report via GSM SMS and/or GPRS Data
- Support local and remote setup via SMS / GPRS
- Programmable data capturing type, range, start point, threshold hi/low and pulse level
- 1 x RS232 Port for local setup or data transmission
- 1 x RS485 Port for device measurement supporting Industrial ModBus Protocol
- Support Dynamic Domain Name or Fixed IP
- Support UDP or TCP protocol data transmission
- 4MB Non-volatile Memory storing data logged and setup parameters on power loss
- 35000 data records logged - max. 120 days historical records when data is logged every 5 minutes

3. Additional Features [GS828-H2]

- 6 x High Precision A/D Channels
- 10 x DI [Digital Input] or 4DP [Digital Pulse] Channels
- 4 x DO [Digital Output] Channels
- ▶ 2 x Temperature Sensor [1 x indoor type, 1 x submersible type]
- ▶ 1 x Humidity Sensor

4. Extended Features [GS828-HX]

- ▶ 12 x High Precision A/D Channels
- ▶ 16 x DI [Digital Input] or 6DP [Digital Pulse] Channels
- ▶ 2 x Temperature Sensor [1 x indoor type, 1 x submersible type]
- ▶ 1 x Humidity Sensor
- 4 x DO [Digital Output] Channels

5. Safety

- Do not touch the antenna
- GSM 900MHz, 2W max. / GSM 1800MHz, 1W max.
- Not designed for medical equipment or aerospace application

6. Specification

GS828H, GS828-H2, GS828-HX

AC Power Input:	Auto 90~260VAC
Internal Backup:	Rechargeable Battery DC7.4V, 2Ah
DC Power Source:	10 ~ 24VDC, max. 3A
Enclosure:	Metal Casing, 172 x 155 x 54 mm

GS828L, GS828-L2

Power Input:	DC 6.5 ~ 10V
Internal Battery:	High Capacity Battery DC7.2V, 4Ah
Enclosure:	Aluminum IP67, 280 x 199 x 90 mm

Current	500mA (SMS Send/Receive)
	20mA (standby)
Peak Pulse Current	< 1A
Operating Temp:	-50˚C ~ +70˚C
Standby Temp:	-50˚C ~ +80˚C

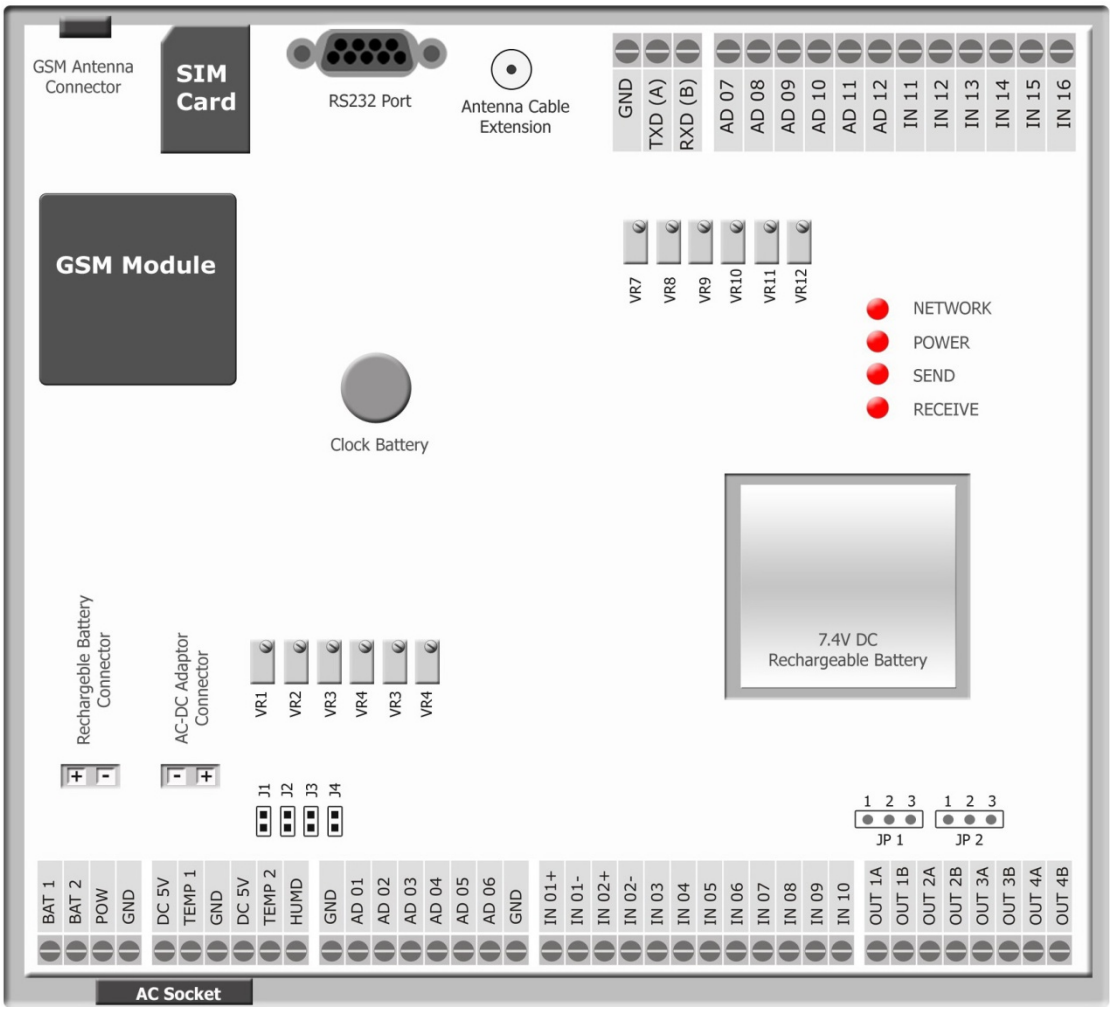
7. Wireless Module

It supports GSM and GPRS class 10.

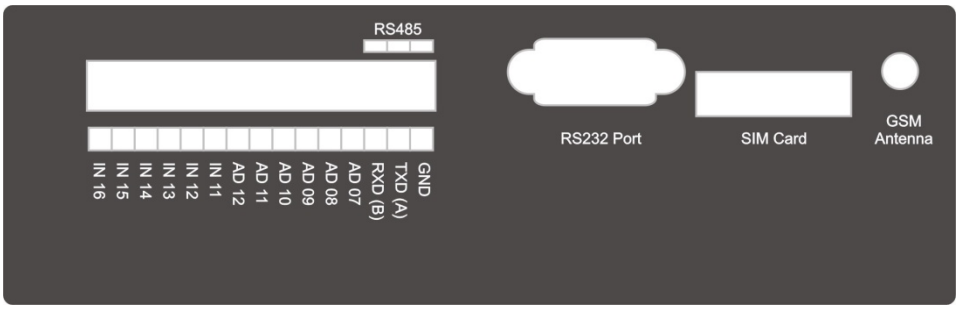
	GSM 850	E-GSM 900	DCS 1800	PCS1900
Rx band (MHz)	869~894	925~960	1805~1880	1930~1990
Tx band (MHz)	824~849	880~915	1710~1785	1850~1910
Rx Sensitivity	-109 dBm	-109 dBm	-108 dBm	-108 dBm
Tx Sensitivity	33 dB	33 dB	30 dB	30dB
RF Rating	2W	2W	1W	1W
Loading Resistance	50 Ohm			
GSM Quad:	Siemens MC55i Quad Band [850/900/1800/1900]			

8. Panel

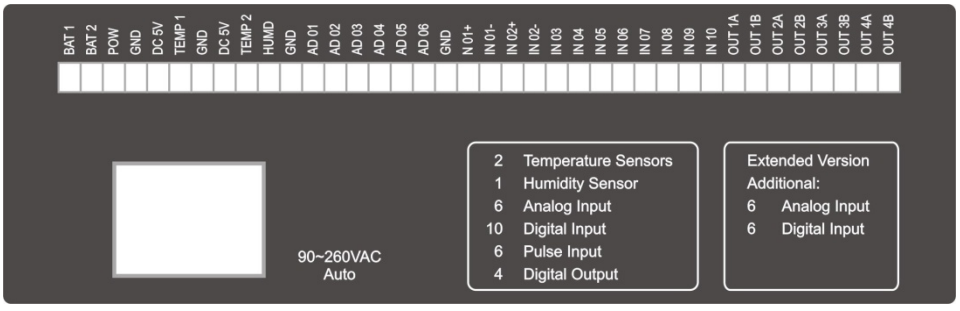
Internal Layout [GS828-H, GS828-H2, GS828-HX]



Front Panel



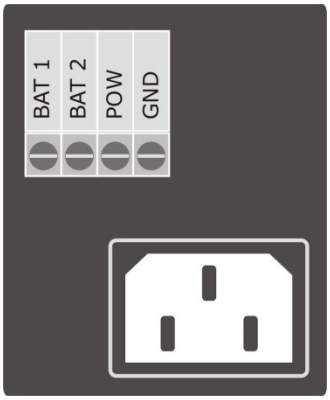
Back Panel



9. Power Input

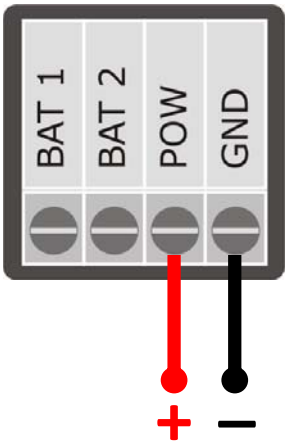
9.1 AC Power Input

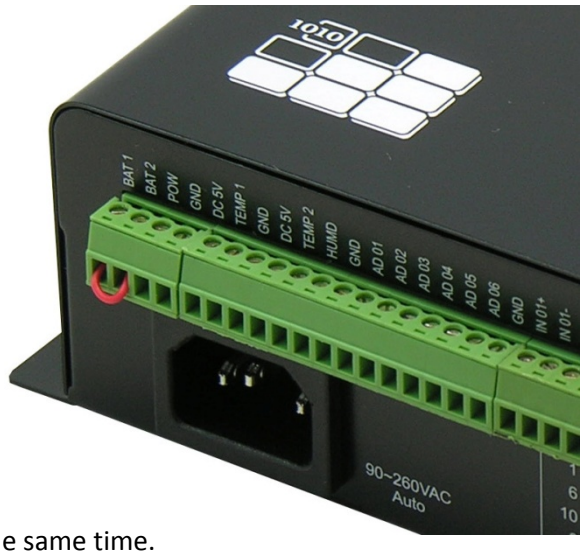
90~260V AC input can be connected to power socket as power source.



9.2 DC Power Input

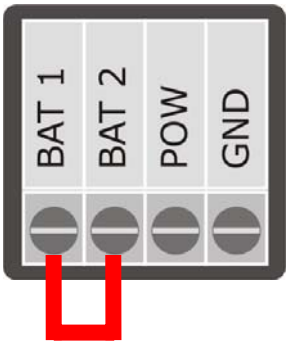
10~24V DC input can be connected to POW and GND as power source.





ⓘ AC Input and DC Input should NOT be connected at the same time.

9.3 Internal Rechargeable Battery



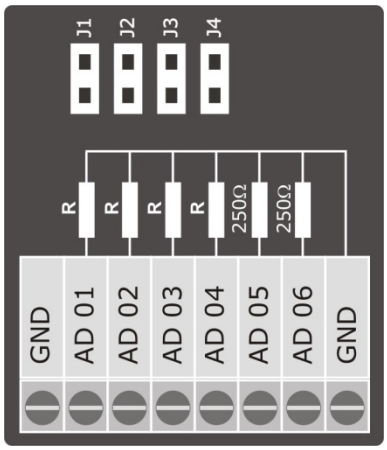
- Short the pins BAT-1 and BAT-2 to turn on the rechargeable battery
- When device is not in use, open the pins connection to save the power of rechargeable battery
- When AC power is plugged and BAT pins are shorted, device is powered by AC and internal battery is being charged.
- Charging will be automatically stopped when battery is full.
- When both AC and DC input are lost, device will be powered by internal battery.

10. Input Output Schematics

10.1 Analog Input

AD01 - 04

Analog Channel	AD01 ~ 04		AD05 ~ 16
Jumper	J1 ~ J4		No Jumper
	Short	Open	--
Input Type	Current	Voltage	Current
Range	DC 4~20mA	DC 0 ~ 5V	DC 4~20mA
Input Impedance R	250 Ω	20K Ω	250 Ω



10.2 Digital Input

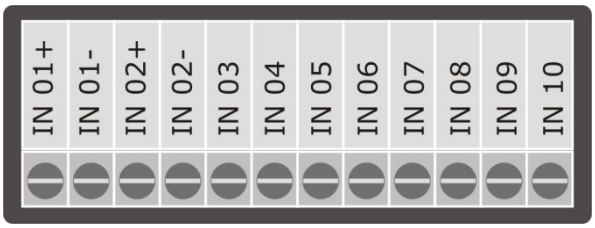
IN01 – 04 [Programmable On/Off or Pulse Channel]

a) On/Off Channel

- Triggered Level > 20ms
- Input Resistance 1KΩ, 1/4W
- DC5~24V voltage or DC5~24mA current

b) Pulse Channel

- Pulse Frequency Measure > 20ms



IN05 – 10

- Dry Contact
- Input: Non-power type

10.3 Relay Output

Max. Loading: DC24V @1A, AC220V @1A

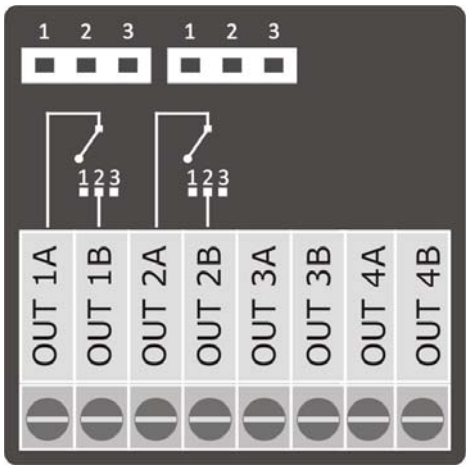
OUT 1 – 2

Jumper 1-2 short: Normal Close

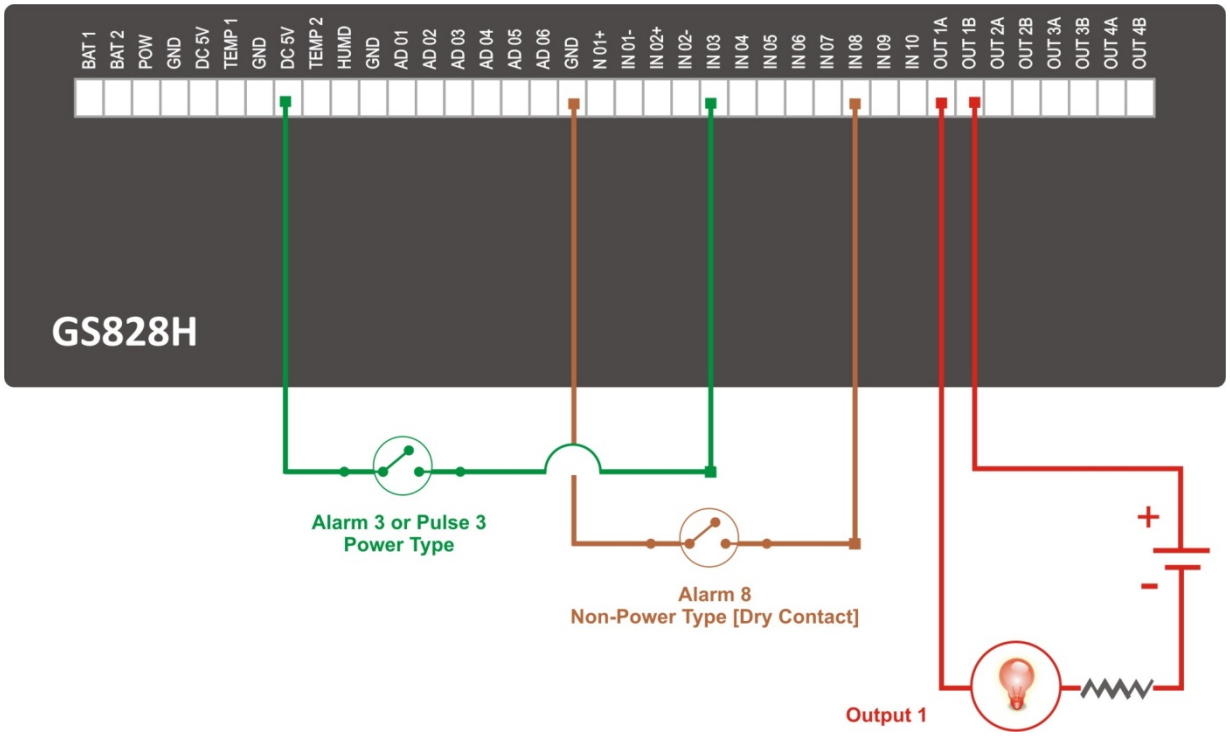
Jumper 2-3 short: Normal Open

OUT 3 – 4

No Jumper: Normal Open



Connection Example:

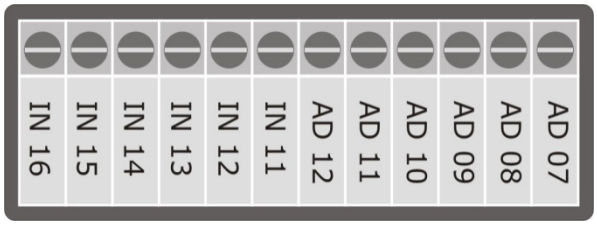


10.4 RS485 Port

- ModBus Protocol
- Support external sensors or measuring devices

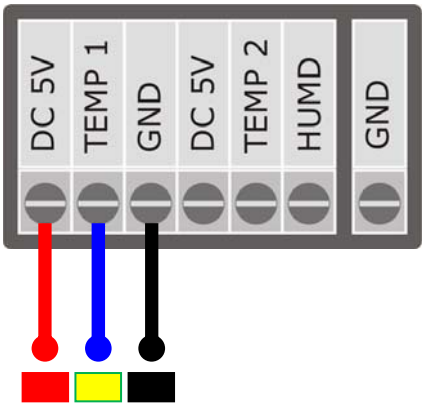
10.5 Extended Input Output Channels

- Only available in model GS828-HX



10.6 Temperature Sensor Input

- Bundled Temperature Sensor must be used
- This input should NOT be used as AD channels for other sensors

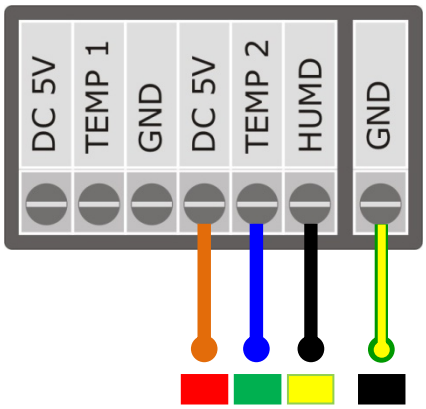


T_V1 max. 1 meter cable long
T_V2 max. 100 meter cable long

Color Code:
T_V1 Red / Blue / Black
T_V2 Red / Yellow / Black

10.7 Temperature & Humidity Sensor Input

- Bundled Temperature & Humidity Sensor must be used
- This input should NOT be used as AD channels for other sensors



TH_V1 max. 1 meter cable long
TH_V3 max. 100 meter cable long

Color Code:
TH_V1 Brown / Blue / Black / Yellow
TH_V3 Red / Green / Yellow / Black

11. Temperature & Humidity Sensors

Two Temperature Sensors and One Humidity Sensor are integrated with the device for environmental monitoring [GS828-H2, GS828-HX].

a) Temperature Sensor is built in a waterproof steel housing for outdoor or submersible monitoring.

Temperature_1 = AD Channel 13

b) Temperature Sensor and Humidity Sensor are built in the same housing for indoor monitoring.

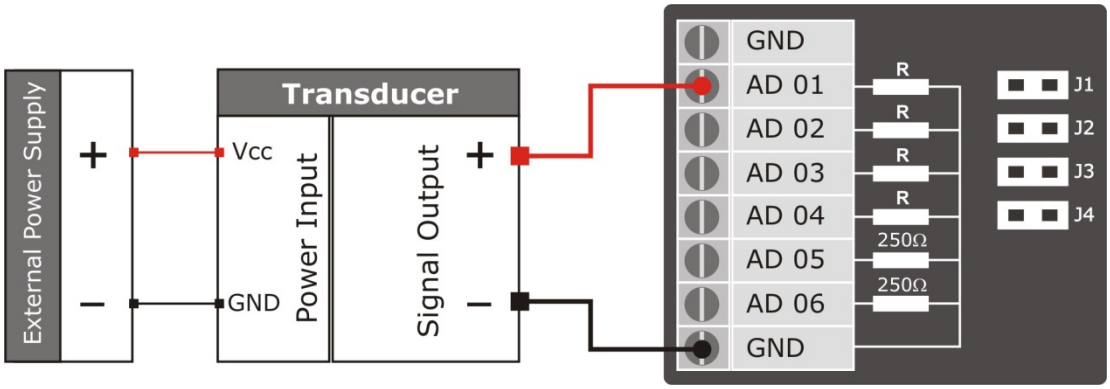
Humidity = AD Channel 00

Temperature_2 = AD Channel 14

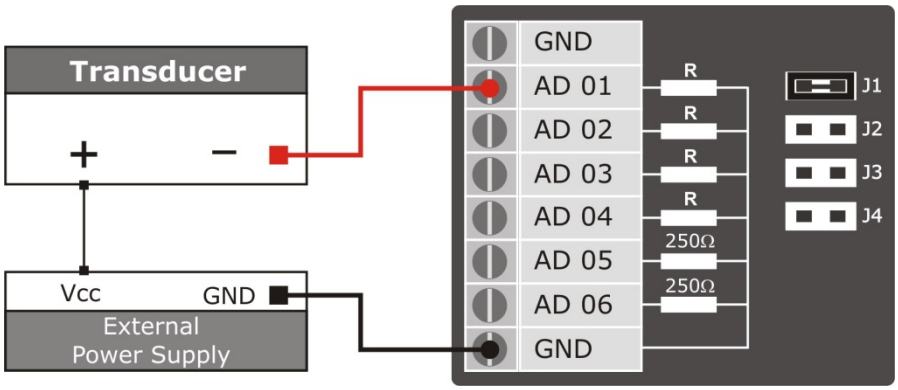
First & Second Temperature Sensor		**Humidity Sensor**	
Model:	DS18B20	Model:	CHM-01A
Temperature Range:	-50 ~ 125°C	Humidity Range:	0 ~ 100%RH
Accuracy:	0.1°C	Accuracy:	± 5%RH
T_V1:	max. 1 meter cable	TH_V1:	max. 1 meter cable
T_V2:	max. 100 meter cable	TH_V3:	max. 100 meter cable
Temp_1 Sensor:	AD Channel 13	Sensor:	AD Channel 00
Temp_2 Sensor:	AD Channel 14		

12. Connecting Sensors/Transducers & Calibration

- Sensor Output: Voltage Type
  Range: 0 ~ 5V DC
  Jumper: Open

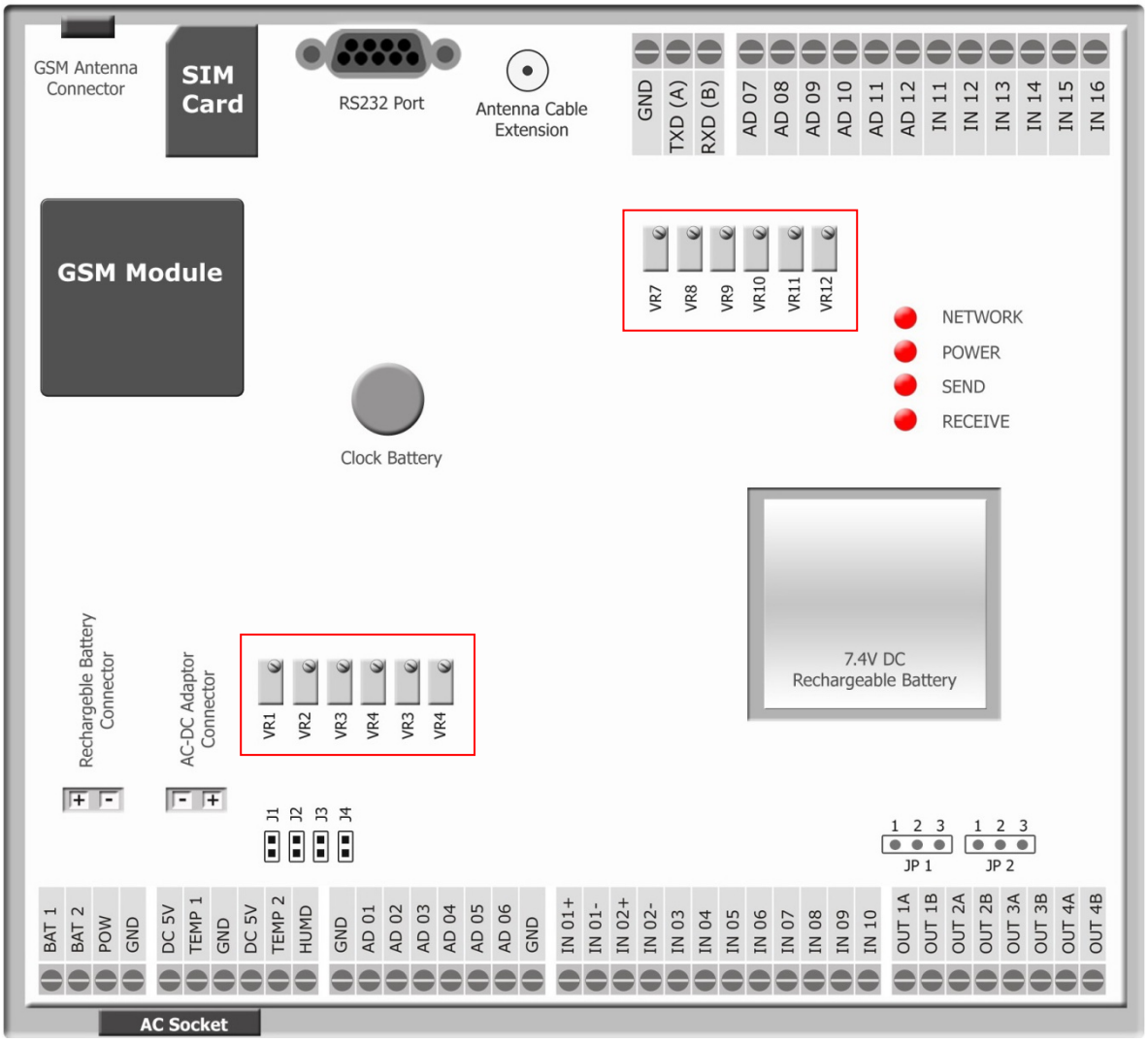


- Sensor Output: Current Type
  Range: 4 ~ 20mA
  Jumper: Short



Make sure that the connection of sensor devices is followed according to its output type. Wrong wiring may damage not only the sensor but also the data logger.

AD Channel Calibration



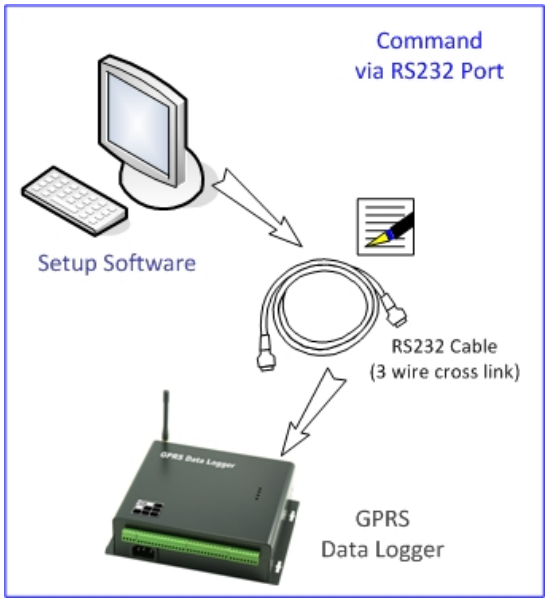
When the AD value is different to the exact input value, please follow the calibration procedures as below:

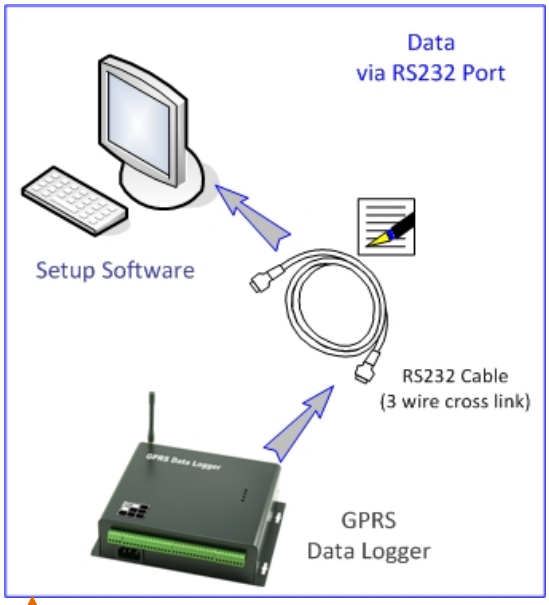
- By fine tuning the VR (variable resistor) for the corresponding AD channel until the input and AD values are exactly the same.
- By adjusting the Start Zero value between 0.992 ~ 1.008 in the AD channel parameters setup.

13. PC Connection

RS232 Port is available for PC connection running "DataLogger_Setup" Software locally:

- GS828 configuration setup
- GS828 data download



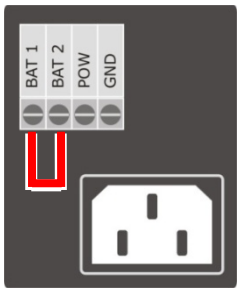


14. SIM Card Installation [GS828H, GS828-H2]

1) Press the yellow button to release the SIM card caddy as shown below.
2) Insert the SIM card into caddy.
3) Make sure that the golden contact is facing down when inserting the SIM card caddy.

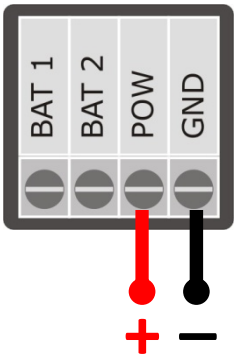
15. Power Up

Turn on the unit by either one of the following:



13.1) When AC power is used:

- Plug in the AC socket
- Enable the internal battery backup by short jumper BAT-1 & 2



13.2) When DC power is used:

- Connect 10~24VDC power input pins POW, GND

LED Display:

1) Network GPRS Module Status

Always OFF	Not Ready
Flash @1 second	Checking network connection
Flash @3 seconds	Network Connected & Ready

2) POW Power Source

ON	AC Power is used
OFF	AC Power is lost, Internal Battery is used.

3) TXD Sending GPRS Data or GSM SMS

Flash (startup)	Checking network connection
Flash	Sending Data

4) RXD Receiving GPRS Data or GSM SMS

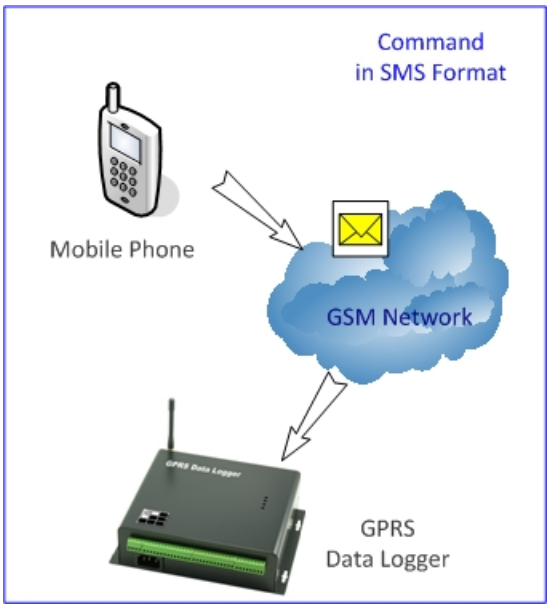
Flash (startup)	Checking network connection
Flash	Receiving Data

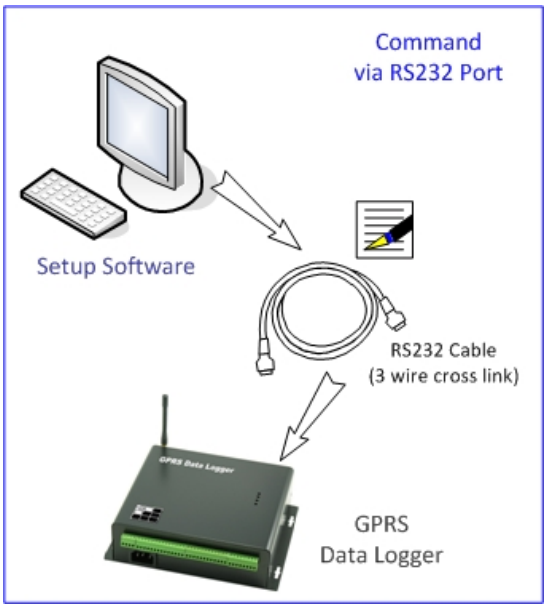
- After GPRS network connection is lost for 2 minutes, RXD will flash for 5 minutes trying to reconnect to GPRS network.
- If connection is still lost, TXD will be ON for 15 minutes.
- After 15 minutes, data logger will reset the GSM module and try to rebuild the GPRS connection.

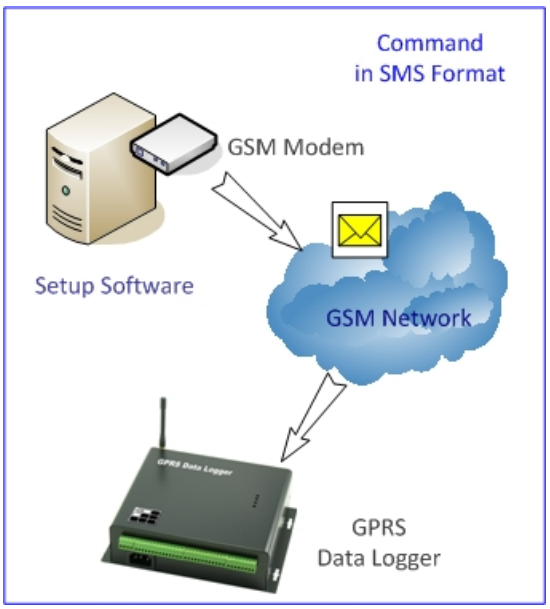
16. Setup

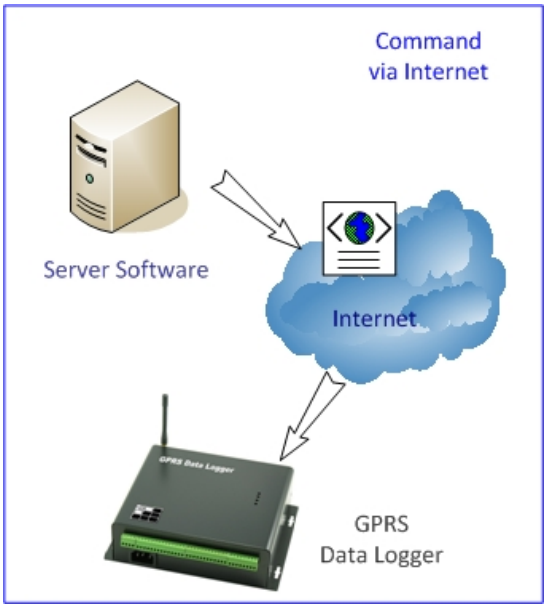
GS828 GPRS Data Logger can be setup in four ways.

Before site installation, setup and test via RS232 port by PC software is highly recommended.









17. Remote Configuration

17.1 Command via GPRS DATA

- Most commands can be delivered via GPRS Data, except those configuring the GPRS network properties.

- Command in remote configuration should have @888 header in order to comply with UDP protocol format.

Example:
Mode: GPRS DATA [TCP Protocol], GSM SMS, RS232 Port
Status Check
Command: @888999999#STATUS#

17.2 Command via GSM SMS

- Most commands can be implemented via SMS by mobile phone or GSM Modem remotely.

17.3 Command via RS232

- All commands can be implemented via RS232 but only possible on site.

Note: GS828L is a device designed for low power operation and always in standby mode. All command will be processed only when GS828L resumes normal mode.

GS828L is preset to upload data at 08:00 every day and remains in normal mode for another 1 minute after data upload. During this period, command @888888888#MO:2# is used to turn the device into normal mode. The device can then be setup in other parameters configuration. After the setup, command @888888888#MO:1# is needed to turn the device into sleep mode again.

18. Start Up

18.1) Quick Startup Procedure:

1. Insert the SIM Card
2. Turn on the unit by plug in the AC power cord
3. Connect BAT-1&2 pins to enable the internal battery backup

18.2) Power On

Signal LED

OFF>ON GPRS network registration success

OFF GPRS network registration fail

a) GPRS module defective

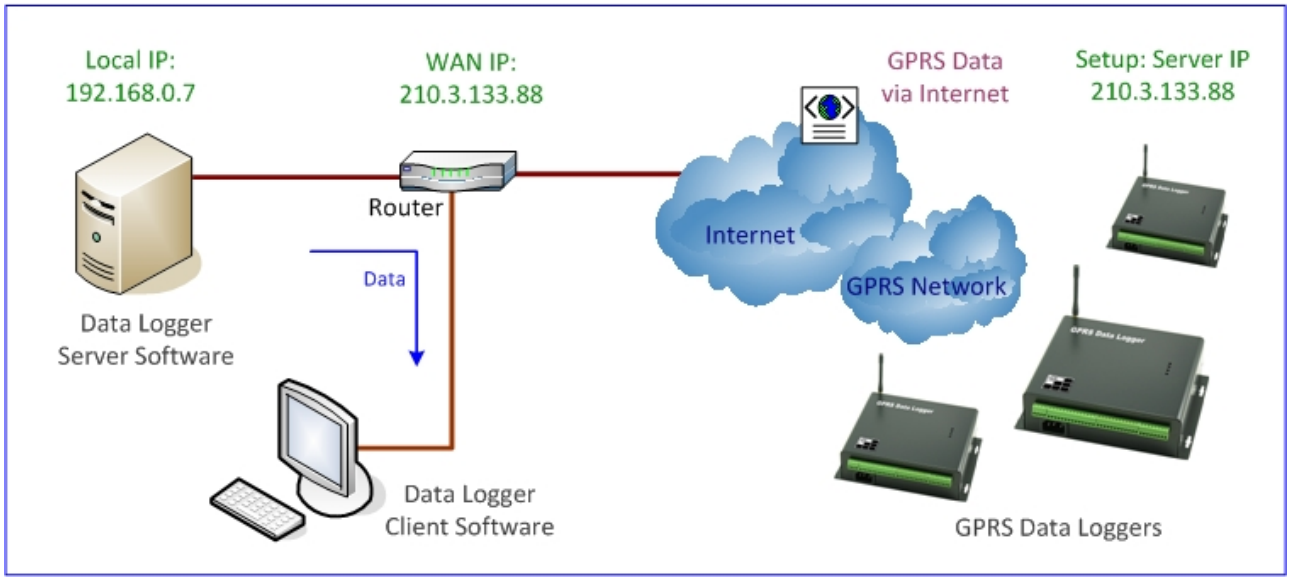
b) SIM card defective

c) Network Unavailable

d) GS828 Device Setup not configured properly

Note: GPRS network registration takes about 1 ~ 1.5 minutes

During the first time start up, GPRS registration usually fails because of incomplete configuration of GPRS network properties.



18.3) GPRS Data Logger Network Setup

- ❖ Use mobile phone sending SMS command to setup the following parameters.
- ❖ Use PC and "Datalogger_Setup" Software to setup the following parameters

1) When public fixed IP is available, please follow the steps below in sequence.
   - GPRS Access Point (APN)
   - Server IP Port
   - Server IP Address
   - Domain Name is left blank

2) When no public fixed IP is available, dynamic domain name is needed.
   - GPRS Access Point (APN)
   - Server IP Port
   - Server IP Address is left blank
   - Domain Name (please visit www.dyndns.com/support/kb/what_is_dns.html)

After GPRS network registration, the green GPRS LED on "DataLogger_Setup Software" screen indicates the proper network access.

18.4) Server PC Network Setup

1) When public fixed IP is available, please follow the steps below.
   - Configure public fixed IP address in Server PC if it is connected to Internet directly
   - Configure router WAN IP as public fixed IP address and port forward to server local LAN IP if server PC is connected to Internet via router
   - Open the Server port in firewall and router

2) When no public fixed IP is available, dynamic domain name is needed.
   - Use DDNS service e.g. http://www.dyndns.com, and apply for a domain name
   - Router port must be forwarded to server local LAN IP
   - Use the DNS tool to map the domain name and server local LAN IP address
   - Open the Server port in firewall and router

.

19. Communication Protocol & Data Format

Header Description:

STA Real Time Data

STB Packet Data

STC Parameters Check

STD Historical Data

STS Acknowledge Message to Setup Command

20. Attention on using SMS and GPRS DATA simultaneously

When GPRS DATA data upload is unsuccessful, GS828 will redial and try to connect to GPRS network for re-uploading the data.

During the redial interval or re-uploading the data via GPRS DATA, any SMS command will be lost and schedule SMS data upload will also be dismissed.

Therefore, when the GPRS DATA data upload interval is short, it is recommended to select a longer SMS upload interval and vice versa.

It normally takes about 45~60 seconds to complete an incoming SMS command or outgoing SMS data upload

21. Enquiry Command

A) Real Time Status Check

Mode: GPRS Data, GSM SMS

Command: 999999#STATUS#

GPRS Reply Message: Live Data

#STA:000000,000;L:310;TM:090516195102;D:1;T:01;C:25;A00:0.166;A01:00000;A02:0.578;A03:00000;A04:00000;A05:00000;A06:00000;A07:00000;A08:00000;A09:00000;A10:00000;A11:00000;A12:00000;A13:31.00;A14:30.93;P01:00000000;P02:00000000;P03:00000000;P04:00000000;P05:00000000;P06:00000000;K01:13333330000000000;O01:0000;8F#

SMS Reply Message: Live Data

#STA:000000,000;L:310;TM:03/04/2009,09:34;D:1;T:01;C:25;A00:0.166;A01:00000;A02:0.578;A03:00000;A04:00000;A05:00000;A06:00000;A07:00000;A08:00000;A09:00000;A10:00000;A11:00000;A12:00000;A13:31.00;A14:30.93;P01:00000000;P02:00000000;P03:00000000;P04:00000000;P05:00000000;P06:00000000;K01:13333330000000000;O01:0000;8F#

P.S.: Max. 160 characters in each SMS message, second SMS messages with header STA: will be sent when data is more than 160 characters.

#STA: 000000,000	STA	Header: Live Data
	000000	Station ID
	000	Hardware Version

L:310 Number of characters in packet from “S” to the last “;” inclusive

TM:0702011200 Current Date Time of GPRS Data Logger (yymmddhhmm)

D:1 Logging Interval

D	Data Logging Interval
5	1 minute
1	5 minutes
2	15 minutes
3	30 minutes
4	60 minutes

T: 01 Number of records in each data packet

C: 08	Counter of packets uploaded It is used to check any loss of data packet. It should be increasing and reset to 00 when it is over 99.	
A01:00000	Value captured on AD Channel 1	[A02, A03… A12 are the same]
A00:	Humidity	
A13:	Temperature 1	
A14:	Temperature 2	
P01:01234212	Accumulated Pulses captured It is accumulated, and reset to 0 when it is over 99999999	[P02, P03… P06 are the same]

K:xyyyyyyzzzzzzzz

First digit x – status of power source

- 1: AC power input is ON
- 0: AC power input is OFF (now powered by battery)

2nd ~ 7th digit yyyyyy – status of Digital Channel 01 ~ 06

- 3: Configured as Pulse Channel
- 1: Configured as On/Off Channel, Alarm Input is closed
- 0: Configured as On/Off Channel, Alarm Input is open

8th ~17th digits zzzzzzzzzz – status of Digital Channel 07 ~ 16

- 1: Configured as On/Off Channel, Alarm Input is closed
- 0: Configured as On/Off Channel, Alarm Input is open

O01:0000 indicates the status of Digital Output [Relay Output]

- 1 Close
- 0 Open

8F Parity Check

\# End Symbol

B) Automatic schedule data upload

Mode: GPRS Data, GSM SMS

Command: upload is on schedule, and no command is necessary

Reply Message: upload is in packet data

#STB:000000,000;L:642;TM:0906121535;D:1;T:03;C:17;
A00:00000|00000|00000;A01:-0.24|-0.24|-0.24;A02:-0.24|-0.24|-0.24;A03:-0.24|-0.24|-0.24;A04:-0.24|-0.24|-0.24;A05:-0.24|-0.24|-0.24;A06:-0.24|-0.24|-0.24;A07:-0.24|-0.24|-0.25;A08:-0.25|-0.25|-0.24;A09:-0.24|-0.24|-0.25;A10:-0.24|-0.24|-0.24;A11:-0.24|-0.24|-0.24;
A12:-0.24|-0.24|-0.24;A13:-0.06|-0.06|-0.06;A14:-0.06|-0.06|-0.06;
P01:00000016|00000016|00000016;P02:00000006|00000006|00000006;P03:00000005|00000005|00000005;P04:00000009|00000009|00000009;P05:00000006|00000006|00000006;P06:00000006|00000006|00000006;
K01:13333330000000000|13333330000000000|13333330000000000;O01:0000|0000|0000;19#

#STB: 000000,000	STB	Header: Packet Data
	000000	Station ID
	000	Hardware Version

L:642	Number of characters in packet from “S” to the last “;” inclusive
TM: 0906121535	Starting Date Time of Data Packet (yymmddhhmm)

D:1	Logging Interval
T: 03	Number of records in the data packet
C: 08	Counter of packets uploaded

D	Data Logging Interval
5	1 minute
1	5 minutes
2	15 minutes
3	30 minutes
4	60 minutes

|	Data record separator
	Each data record interval will be defined by parameter D
XX	Parity Check
#	End Symbol

In this example: Upload Interval is 15 minutes

Logging Interval is 5 minutes

Records at 15:35, 15:40, 15:45 are packed into the data

Another Example: Upload Interval is 30 minutes
Logging Interval is 15 minutes

D: 2 Logging Interval is 15 minutes
T:02 Number of records is 2 in this data packet
Records at 15:30, 15:45 are packed into the data

#STB:000000,000;L:475;TM:0906121530;D:2;T:02;C:17;
A00:00000|00000;A01:-0.24|-0.24;A02:-0.24|-0.24;A03:-0.24|-0.24;A04:-0.24|-0.24;A05:-0.24|-0.24;A06:-0.24|-0.24;A07:-0.24|-0.24;A08:-0.25|-0.25;A09:-0.24|-0.24;A10:-0.24|-0.24;A11:-0.24|-0.24;A12:-0.24|-0.24;A13:-0.06|-0.06;A14:-0.06|-0.06;
P01:00000016|00000016;P02:00000006|00000006;P03:00000005|00000005;P04:00000009|00000009;P05:00000006|00000006;P06:00000006|00000006;
K01:13333330000000000|13333330000000000;O01:0000|0000;19#

C) Historical Data Manual Retrieval

Mode: GPRS Data, RS232 Port [SMS is not supported]

Command: 999999#REDEEM090512161004#

REDEEM historical data retrieval

0712281645 starting date time on 2009-05-12 at 16:45

04 number of records to be retrieved each packet

Reply Message:

#STD:000000,000;L:809;TM:0905161610;D:1;T:04;C:18;
A00:00041|00000|00000|00000;A01:-0.24|-0.24|-0.24|-0.24;A02:-0.24|-0.24|-0.24|-0.24;
A03:-0.24|-0.24|-0.24|-0.24;A04:-0.24|-0.24|-0.24|-0.24;A05:-0.24|-0.24|-0.24|-0.24;
A06:-0.24|-0.24|-0.24|-0.24;A07:-0.24|-0.24|-0.24|-0.24;A08:-0.24|-0.24|-0.24|-0.24;
A09:-0.24|-0.24|-0.24|-0.24;A10:-0.24|-0.24|-0.24|-0.24;A11:-0.24|-0.24|-0.24|-0.24;
A12:-0.24|-0.24|-0.24|-0.24;A13:33.06|32.00|33.18|33.18;A14:31.68|30.87|31.62|31.87;
P01:00000000|00000000|00000000|00000000;P02:00000000|00000000|00000000|00000000;
P03:00000000|00000000|00000000|00000000;P04:00000000|00000000|00000000|00000000;
P05:00000000|00000000|00000000|00000000;P06:00000000|00000000|00000000|00000000;
K01:13333330000000000|13333330000000000|13333330000000000|13333330000000000;
O01:0000|0000|0000|0000;48#

STD:000000,000	STD	Historical Data Packet
	000000	Station ID
	000	Hardware Version

L:809 Number of characters in packet from “S” to the last “;” inclusive

TM: 0905161610 Starting Date Time of Data Packet (yymmddhhmm)

D:1 Logging Interval

D	Data Logging Interval
5	1 minute
1	5 minutes
2	15 minutes
3	30 minutes
4	60 minutes

T:04 Number of records in the data packet

4 records at 16:10, 16:15, 16:20, 16:25 are in the data packet

C:07 Counter of packets uploaded

It is used to check any loss of data packet.

It should be increasing and reset to 00 when it is over 99.

AD Channel record data:

A01:3.323|3.323|3.323|3.323

Pulse Channel record data:

P01: 00087032|00087679|0008790|0008790

Digital Input On/Off record data:

K: 13333330000000000|13333330000000000|13333330000000000|13333330000000000

| Data record separator

48 Parity Check

End Symbol

- GPRS Data & RS232

  Max. number of records to be retrieved each time: 99 records

  Max. number of records each data packet: 30 records

  When more than 30 records are retrieved, more than one data packets will be sent .

  For example, 46 records are to be retrieved from the Data Logger.

  2 packets will be delivered.

  1st packet: 30 records

  2nd packet: 16 records

- GSM SMS

Only one record can be retrieved each time via SMS owing to the limitation of SMS text length.

Storage Period:

1) Internal Memory: 1MB
2) Records can be kept in the device at about 90 days when logging interval is at 15 minutes.
3) The storage period can be longer than 90 days when logging interval is set at 60 min.
4) When there is no record data on the selected date, packet data will only include characters “9”.

D) System Parameters Check

Mode: GPRS DATA, GSM SMS

Command: 999999#CHEACK1#

Reply Message:

#STC1:000000,000;L:227;TM:0905161954;PS:999999,888888;SA:1;SD:02,0,1;CP:13750782917,0;AP1:13143882308;AP2:;DR:001;ID:CMNET;IA:0;IP:;IY:abc.mabc.com;IH:6060;IT:0120;IR:0888;IU:1;ER:000; OUT:1:0000;OUT:2:0000;OUT:3:0000;OUT:4:0000;PL:850/1900XH:29;3C#

#STC1:000000,000 Header, Station ID, Hardware Version

L:227 Number of characters in packet from "S" to the last ";" inclusive

TM: 0905161954 Current date time of GPRS Data Logger (yymmddhhmm)

PS:999999,888888 Check Password, Setup Password

SA:2 Data Logging Interval

SA	Data Logging Interval
0	No Save
5	1 minute
1	5 minutes
2	15 minutes
3	30 minutes
4	60 minutes

SD:xx,y,z GPRS Upload Interval, Data Format, Number of times data is uploaded

xx: Upload Interval

y=0: Live Data

y=1: Packet Data

z= number of re-upload

xx = 00	No Upload	05	15 minutes
12	5 seconds	06	30 minutes
13	15 seconds	07	1 hour
01	30 seconds	08	2 hours
02	1 minute	09	6 hours
03	2 minutes	10	12 hours
04	5 minutes	11	24 hours

When upload interval is 24 hours, data is uploaded every day at 8:00am.

CP:yyyyyyyyyyy,X Control Center Phone Number (receiving SMS), Upload Interval via SMS

X = 0	No Upload	5	1 hour
1	1 minute	6	2 hours
2	5 minutes	7	6 hours
3	15 minutes	8	12 hours
4	30 minutes	9	24 hours

AP1:xxxxxxxxxxx	Alarm Phone Number 1		
	AP2 is the same for alarm phone number 2		
DR:001	ModBus Address		
ID:CMNET	GPRS APN (Access Point Network)		
IA:1	Server Location	1: Fixed IP	0: Domain Name
IP: 210.3.32.70	Server Fixed IP Address		
IY:abc.net	Domain Name		
IH:5600	Server Port		
IT:	Acknowledge Interval		
IR:	Redial Period		
IU:1	Connection Protocol	1: UDP Protocol	0: TCP Protocol

ER:000	GPRS Module Status		
	First Digit	0: Module Normal	1: Module Defect
	Second Digit	0: SIM Card Normal	1: SIM Card Defect
	Third Digit	0: GPRS Connection Normal	1: Connection Error

OUT:1:xxxx	Time Lapse of Relay 1 ON triggered by Alarm (in seconds)
	OUT:2, OUT:3, OUT:4 same for Relay 2, 3, 4

PL:850/1900XH	GSM Band Selected	
	0	mono-band mode 850 MHz
	1	mono-band mode 900 extended MHz (900E)
	2	mono-band mode 1800 MHz
	3	mono-band mode 1900 MHz
	4	dual-band mode 850/1900 MHz
	5	dual-band mode 900E (extended) / 1800 MHz
	6	dual-band mode 900E (extended) / 1900 MHz

XH:29	Network Signal Strength
3C	Parity Check
#	End Symbol

E) Input Channel Parameters Check

Mode: GPRS DATA, GSM SMS

Command: 999999#CHEACK2#

Reply Message:

#STC2:000000,000;L:556;AD00:170.0,0.000,0.000,1,170.0,0.000;AD01:1.000,0.000,1.000,1,1.000,0.000;AD02:1.000,0.000,1.000,1,1.000,0.000;AD03:1.000,0.000,1.000,1,1.000,0.000;AD04:1.000,0.000,1.000,1,1.000,0.000;AD05:1.000,0.000,1.000,1,1.000,0.000;AD06:1.000,0.000,1.000,1,1.000,0.000;AD07:1.000,0.000,1.000,1,1.000,0.000;AD08:1.000,0.000,1.000,1,1.000,0.000;AD09:1.000,0.000,1.000,1,1.000,0.000;AD10:1.000,0.000,1.000,1,1.000,0.000;AD11:1.000,0.000,1.000,1,1.000,0.000;AD12:1.000,0.000,1.000,1,1.000,0.000;AD13:1,100.0,0.000;AD14:1,100.0,0.000;PA:01111110000;C5#

#STC2:000000,000	Header, Station ID, Hardware Version
L:556	Number of characters in packet from “S” to the last “;” inclusive

AD01: xxxxx,yyyyy,zzzzz,m,aaaaa,bbbbb

Analog Digital Channel 01

Measuring Upper Limit		xxxxx
Measuring Lower Limit		yyyyy
Start zero value		zzzzz
m	0:	disable channel
	1:	enable channel
	2:	enable channel and Hi/Lo Alert
Hi Alert Value		aaaaa
Lo Alert Value		bbbbb

When AD input source is 4~20mA current type and input resistance is configured as 250 ohm, the start zero should be 1.000 (0.004A x 250Ω = 1V).

AD02~12 same as AD01

AD00: Analog Digital Channel 00 = Humidity Sensor

170.0,0.000,0.000,x,150.0,6.000

Measuring Upper Limit		170.0
Measuring Lower Limit		0.000
Start zero value		0.000
m	0:	disable channel
	1:	enable channel
	2:	enable channel and Hi/Lo Alert
Hi Alert Value		150.0
Lo Alert Value		6.000

AD13: Temperature Sensor 1

1,120.0,-30.0

m	0:	disable channel
	1:	enable channel
	2:	enable channel and Hi/Lo Alert
Hi Alert Value		120.0 °C
Lo Alert Value		-30.0 °C

AD14: Temperature Sensor 2

AD13 & AD14 are integrated with digital temperature sensor DS18B20. Measuring range, upper and lower limits are fixed as below.

Measuring Upper Limit	125.0
Measuring Lower Limit	-50.0

PA:	xyyyyyymmmm		
	1st digit	x:	Setting of Power Source Alert
			0 = No Alarm
			1 = AC Power Resume Alarm
			2 = AC Power Loss Alarm
			3 = AC Power Resume/Loss Alarm
	2nd~7th digit	yyyyyy	Setting of Channel IN01 ~ IN06
			0 = Channel Disable
			1 = Pulse Channel Enable
			2 = NO - Close Triggered Alarm
			3 = NC - Open Triggered Alarm
			4 = Change State Triggered Alarm
	8th~11 digit	mmmm	Setting of Channel IN07~ IN10
			0 = Channel Disable
			2 = NO- Close Triggered Alarm
			3 = NC - Open Triggered Alarm
			4 = Change State Triggered Alarm
	IN11 ~ IN16		No alarm function
C5	Parity Check		
#	End Symbol		

F) Output Channel Parameters Check

Mode: GPRS DATA, GSM SMS

Command: 999999#CHEACK3#

Reply Message:

#STC3:000000,000;L:153;COUT1:YYYYYYYYYYYYYYYYYYYYYYYY;COUT2:000000000000000000000000000;COUT3:000000000000000000000000;COUT4:000000000000000000000000;F5#

#STC3:000000,000 Header, Station ID, Hardware Version

L:153 Number of characters in packet from "S" to the last ";" inclusive

COUT1: HMMMMMMMMMMMMEEPNNNNNNNNNN

1: Turn On Relay Output 1

0: No Relay Output Control

COUT2: 1: Turn On Relay Output 2

0: No Relay Output Control

Same as COUT3 & COUNT4

H:	1st digit	AD00	Humidity Sensor
M:	2nd~13th digits	AD01~AD12	Analog Input
E:	14th~15th digits	AD13~AD14	Temperature Sensor 1 & 2
P:	16th digit	Power Source	
N:	17th~26th digits	IN01~IN10	Digital Input

F5 Parity Check

End Symbol

G) Version Check

Mode: GPRS Data, GSM SMS

Command: 999999#CHEACKVR%

Reply Message: SDH828H VA-1 05/26/2009#

22. Setup Command

a) Setup Command Reply Message

Success Reply: #STS:000010, Set Success#

Failure Reply: #STS:000010, Set Fail#

b) Device ID

Mode: GPRS DATA, GSM SMS, RS232

Command: 888888#ST:xxxxxx# (Default: 000000, Range:00 0000 ~ 999999)

Example: 888888#ST:000010#

c) Password

Mode: GPRS DATA, GSM SMS, RS232

Command: 888888#PS:xxxxxx,yyyyyy#

xxxxxx Inquiry Password (Default: 999999, Range: any six digits)

yyyyyy Setup Password (Default: 888888, Range: any six digits)

Example: 888888#PS:333333,777777#

d) System Time

Mode: GPRS DATA, GSM SMS, RS232

Command: 888888#TM:yymmddhhnn#

Example: 888888#TM:0712230615#

e) Configuration Reset

Mode: GPRS DATA, GSM SMS, RS232

Command: 888888#RESET#

All parameters (except GSM band & password) will be restored to factory

Success Reply: Initialized success!

f) Power Mode [GS828L]

Mode: GPRS DATA, GSM SMS, RS232

Command: 888888#MO:X# (Default: 2)

X: 1: Sleep (Low Power) Mode always - no response to command

2: Normal Operation Mode - response to command

3: Sleep Mode after 7 minutes normal mode

g) Set GPRS Network Access Point [APN]

Mode:	GSM SMS, RS232	
Command:	888888#ID:XXXXXXXX!#	
XXXXXX:	Access Point	[max. 29 characters]
!:	End Symbol	
Example:	888888#ID:vodafone.internet!#	

h) Set Server IP Address

Mode:	GSM SMS, RS232 Port
Command:	888888#IP:xxx.xxx.xxx.xxx!#
xxx.xxx.xxx.xxx:	IP Address
!:	End Symbol
Example:	888888#IP:123.45.56.122!#

i) Set Server Port Number

Mode:	GSM SMS, RS232 Port	
Command:	888888#IH:xxxxx#	(Default: 6000)
xxxxx:	Port Number	
Example:	888888#IH:6050#	
Note:	After setting up the port number, IP Address must be setup to save these two parameters.	

j) Set Domain Name (DDNS)

Mode:	GSM SMS, RS232 Port
Command:	888888#IY:mmmmm!#
mmmmm:	Domain Name
!:	End Symbol
Example:	888888#IY:dyndns.com!#

k) Set Protocol

Mode:	GSM SMS, RS232 Port	
Command:	888888#IU:X#	(Default: 0)
X:	0: TCP 1:UDP	
Example:	888888#IU:0#	

l) Set ModBus Protocol Address

Mode: GSM SMS, RS232 Port

Command: 888888#DR:XXX# (Default: 001)

Example: 888888#DR:226#

m) Setup GSM Band

Mode: GSM SMS, RS232 Port

Command: 888888#PL:X# (Default: 5)

X:
0 mono-band mode 850 MHz
1 mono-band mode 900 extended MHz (900E)
2 mono-band mode 1800 MHz
3 mono-band mode 1900 MHz
4 dual-band mode 850/1900 MHz
5 dual-band mode 900E (extended) / 1800 MHz
6 dual-band mode 900E (extended) / 1900 MHz

ⓘ This command is only available in Quad Band Version using Wavecom Module.

Device must be power off and then on again, to register new GSM band.

It will automatically select the GSM band in Siemens MC55 Tri-Band and MC55i Quad Band..

n) Data Logging Interval

Mode: GPRS DATA, GSM SMS, RS232

Command: 888888#SA:X# (Default: 2)

X: This is the interval of data records stored in the device internal memory

X	Data Logging Interval
0	No Save
5	1 minute
1	5 minutes
2	15 minutes
3	30 minutes
4	60 minutes

Operation Mode:

GS828L is in sleep mode during the normal time.

It will automatically wake up and log the captured data according to the data logging interval, and then resume the sleep mode.

o) GPRS Data Upload Interval

Mode: GPRS DATA, GSM SMS, RS232

Command: 888888#SD:xx.y,z#

xx: Upload Interval Time

xx = 00	No Upload	05	15 minutes
12	5 seconds	06	30 minutes
13	15 seconds	07	1 hour
01	30 seconds	08	2 hours
02	1 minute	09	6 hours
03	2 minutes	10	12 hours
04	5 minutes	11	24 hours

y: Data Format

1: Packet Data

0: Live Data

z: data records to be uploaded within the period to be defined

0: same as upload interval

When upload interval is 1 hour, data records within this 1 hour will be uploaded.

1: records within 2 x upload interval time

When upload interval is 1 hour, data records within the last 2 hours will be uploaded.

2: records within 4 x upload interval time

When upload interval is 1 hour, data records within the last 4 hours will be uploaded.

! When upload interval is 12 or 24 hours, starting time is 08:00 every day and preset in factory. Interval will be counted from 08:00.

Data Upload Interval < 15 minutes, only real time data is uploaded.

Data Upload Interval = or >15 minutes, packet data within the interval will be uploaded.

For example 2: IP Upload Interval = 1 hour, Logging Interval =15 minutes

At 10:00am, data records at 9:15, 9:30, 9:45, 10:00 will be uploaded.

P.S. Data is captured and logged every 15 minutes (Logging Interval) by default. This time interval is found to be appropriate for most applications, but can be modified by user.

p) Control Centre Phone Number

Mode: GPRS DATA, GSM SMS, RS232

Command: 888888#CP:xxxxxxxxxxx!,Y#

Data is transmitted to the preset Control Centre Phone Number over GSM Network. Instead of mobile phone, GSM Modem GS300 can be used to receive the real time data via SMS.

xxxxxxxxxxx: Control Centre Phone Number

!: End Symbol

Y: SMS Upload Interval

X = 0	No Upload	5	1 hour
1	1 minute	6	2 hours
2	5 minutes	7	6 hours
3	15 minutes	8	12 hours
4	30 minutes	9	24 hours

Example: 888888#CP:12345612222!,6#

q) Alarm Phone Number

Mode: GPRS DATA, GSM SMS, RS232

Command: 888888#APY:xxxxxxxxxxx!#

xxxxxxxxxxx: Alarm Phone Number

!: End Symbol

Y: Two Alarm Phone Numbers can be configured (1, 2)

Example: 888888#AP1:12345612344!#

Max. number of digits for the alarm phone number is 20 digits.

“0” and “+” are supported in the first digit of phone number.

Auto SMS reply

Whenever calls are made from alarm phone number or control number, Data Logger will reply with its status to the calling party via SMS.

This feature is designed for instant and easy on site testing of device setup. User does not need to wait the upload interval for the device status report, but is able to get the status immediately by making a call to the device.

r) AD Channel

- Once AD Channel is over/below hi-low alarm level, data logger will upload real time data to Control Centre via SMS & GPRS DATA.
- AD Channel is measured and compared to Hi/Lo Alarm Level every 2 seconds.
- Even though AD channel is measured every 2 seconds, the measured value will only be logged into memory every 5 minutes.

Mode: GPRS DATA, GSM SMS, RS232 Port

❖ AD01~12 Analog Digital Channel 01 ~ 12

Command: 888888#ADn: xxxxx,yyyyy,zzzzz,m,aaaaa,bbbbb#

n: Analog Digital Channel Number (01, 02 … 12)

xxxxx: Measuring Upper Limit

yyyyy: Measuring Lower Limit

zzzzz: Start zero value

m 0: disable channel

1: enable channel

2: enable channel and Hi/Lo Alert

aaaaa: Hi Alert Value

bbbbb: Lo Alert Value

Example: 888888#AD01:10.00,1.000,1.000,1,9.000,2.000#

When AD input source is 4~20mA current type and input resistance is configured as 250 ohm, the start zero should be 1.000 (0.004A x 250Ω = 1V).

- AD00: Analog Digital Channel 00 = Humidity Sensor

  Command: 888888#ADn: xxxxx,yyyyy,zzzzz,m,aaaaa,bbbbb#

  n: Analog Digital Channel Number (01, 02 … 12)

  xxxxx: Measuring Upper Limit (value is determined by Auto Calibration)

  yyyyy: Measuring Lower Limit (value is 0)

  zzzzz: Start zero value (value is 0)

  m 0: disable channel

  1: enable channel

  2: enable channel and Hi/Lo Alert

  aaaaa: Hi Alert Value

  bbbbb: Lo Alert Value

  Example: 888888#AD00:150.0,0.000,0.000,1,130.0,30.00#

- AD13: Analog Digital Channel 13 = Temperature Sensor_1
- AD14: Analog Digital Channel 14 = Temperature Sensor_2

  Command: 888888#ADn:m,aaaaa,bbbbb#

  n: Analog Digital Channel Number (13 or 14)

  m 0: disable channel

  1: enable channel

  2: enable channel and Hi/Lo Alert

  aaaaa: Hi Alarm Value

  bbbbb: Lo Alarm Value

  Example: 888888#AD13:1,120.0,-30.0#

  Hi Alert Value 120.0 °C

  Lo Alert Value -30.0 °C

  AD13 & AD14 are integrated with digital temperature sensor DS18B20. Measuring range, upper and lower limits are fixed as below and not necessary to be configured.

  Measuring Upper Limit 125.0

  Measuring Lower Limit -50.0

Examples of AD Channel Setup:

External Factors

Standard Input Current: 4 ~ 20mA (Starting zero value current: 4mA) – Figure 06

GS828 Internal Resistance: 250 Ω

Starting zero value: Z = 0.004 x 250 = 1 (4mA x 250 Ω = 1V)

User Defined Factors

Measuring Upper Limit 20

Measuring Lower Limit 4

Measuring Range: Q = 16

If the measured current is over 19mA, it is considered as "High Alert Level".

If the measured current is below 7mA, it is considered as "Low Alert Level".

On Site Measurement

Measured current: C

Analog Channel Value: $A = \frac{(C \times 250 - 0.004 \times 250) \times Q}{(0.02 \times 250 - 0.004 \times 250)}$

Upon the above checking conditions

When current is 19mA, A should be = $\frac{(0.019 \times 250 - 0.004 \times 250) \times 16}{(0.02 \times 250 - 0.004 \times 250)} = 15$

When current is 7mA, A should be = $\frac{(0.007 \times 250 - 0.004 \times 250) \times 16}{(0.02 \times 250 - 0.004 \times 250)} = 3$

Then, the AD Channel should be configured as below:

Measuring Range: 16.00

Starting Zero Value: 1.000

High Threshold Value: 15

Low Threshold Value: 3

s) Power Source & Digital Channel

Mode: GPRS DATA, GSM SMS, RS232 Port

Command: 888888#PA:xyyyyyymmmm

PA: xyyyyyymmmm

1st digit	x:	Setting of Power Source Alert
		0 = No Alarm
		1 = AC Power Resume Alarm
		2 = AC Power Loss Alarm
		3 = AC Power Resume/Loss Alarm
2nd~7th digit	yyyyyy	Setting of Channel IN01 ~ IN06
		0 = Channel Disable
		1 = Pulse Channel Enable
		2 = NO - Close Triggered Alarm
		3 = NC - Open Triggered Alarm
		4 = Change State Triggered Alarm
8th~11 digit	mmmm	Setting of Channel IN07~ IN10
		0 = Channel Disable
		2 = NO- Close Triggered Alarm
		3 = NC - Open Triggered Alarm
		4 = Change State Triggered Alarm
IN11 ~ IN16		On/Off Channel
		No alarm function

t) Pulse Channel Start Zero Value

Mode: GPRS DATA, GSM SMS, RS232 Port

Command: 888888#LPx:aaaaaaaa#

x: Channel Number (1 ~ 6)

aaaaaaaa: Set the start zero value

Zero adjustment on matching with other measuring device on local site

Example: 888888#LP1:00123456#

u) Control Digital Output

Mode: GPRS DATA, GSM SMS, RS232 Port

Command: 888888#Oa:b#

a: Digital Output Channel 1 ~ 4

b: 1 – Output Close

0 – Output Open

Example: @888888888#O2:1# will turn on the relay 2

v) Alarm Triggered Digital Output Time Lapse

Mode: GPRS DATA, GSM SMS, RS232 Port

Command: 888888#OTa:xxxx#

a: Digital Output Channel 1 ~ 4

xxxx:period of relay turned ON (in seconds)

0000 means relay will be kept ON once alarm is triggered

Example: @888888888#OT2:0010#

Relay 2 will be turn on for 10 seconds when alarm is triggered

w) Digital Output Associated Alarms

Mode: GPRS DATA, GSM SMS, RS232 Port

Command: 888888#OCa:xyyyyyyyyyyyyzzpnnnnnnnnnn#

a: Digital Output Channel 1 ~ 4

Position of digits

1st digit	x	AD00	Humidity
2nd ~ 13th digits	yyyyyyyyyyyy	AD01 ~ 12	
14th ~ 15th digits	zz	AD13 ~ 14	Temperature 1 & 2
16th digit	p	Power Source	
17th ~ 26th digits	nnnnnnnnnn	IN01 ~ 10	

When value = 1, this channel alarm will trigger the relay output ON.

When value = 0, this channel alarm will not trigger relay output.

- AD channel will be measured and checked for alarm level every 2 seconds

x) Local Data Transmission via RS232 port

Mode: GPRS DATA, GSM SMS, RS232 Port

Command: 888888#SE:y#

y: 1 enable data upload via RS232 port
upload interval is the same to the GPRS data upload interval

0 disable data upload via RS232 port

This feature is useful for bench testing before site installation.

Besides, it can be used for local data logging with “GS828_COM” software. Please contact your agent or 3gtrack for software copy and license.

23. How GS828H response on alarm?

Alarm is triggered when Digital Input state is changed or AD Input reading is higher or lower than user preset values. User can be alerted via SMS or GPRS when alarm is triggered.

1) Configure the Alarm Test:

Command:	888888#SMSSETYY:X,ZZ,□□□□□ #	
YY:	Channel	
	00	Humidity Channel
	01 ~ 12	AD01 ~ 12
	13	TEMP 1
	14	TEMP 2
	15	Power Source Alert
	16 ~ 25	IN01 ~ IN10
X:	0:	Live Data will be uploaded [By Default]
	1:	Alarm Text preset by user will be uploaded
ZZ:	Max. Length of Alarm Text	
□□□□□:	Alarm Text	e.g. Temperature_High [No space is allowed]

When Temperature 1 is over alert high value “85.00”, message “TEMP_HIGH” is sent to user.

888888#SMSSET13:1,10,TEMP_HIGH#

Alarm Phone receives message: STA:000000:TM:2009/12/08/16:10;A13:85.00,TEMP_HIGH

A) When X: 0 and alarm is triggered:

- Live Data will be uploaded to Server via GPRS
- Live Data will be sent to Control Centre via SMS
- Live Data will be sent to Alarm Phone via SMS

B) When X: 1 and alarm is triggered:

- Live Data will be uploaded to Server via GPRS
- Live Data will be sent to Control Centre via SMS
- Alarm Text will be sent to Alarm Phone via SMS

2) Read the Alarm Text from GS828H

Command: 888888#SMS:YY#

This is to retrieve the alarm text configured by above command for verification only.

24. Capturing, Logging & Upload

The section is to explain in detail the relationship among intervals of data capturing, logging and upload.

1. Data Capturing
   - GS828H captures data from sensors every 2 seconds.

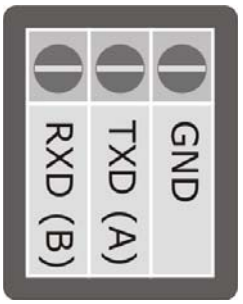
2. Data Logging
   - GS828H logs the captured data into its internal memory in interval of 5/15/30/60 minutes options.
   - Logging interval is user programmable.
   - Every logging interval, one record of data will be stored in internal memory for upload.

3. Data Upload
   - GS828H uploads the logged data records in interval from 5 second upto once a day.
   - Upload interval is user programmable.
   - When upload interval is larger than logging interval, there will be more than one record. Data will be uploaded in packet containing more than one data record.
     For example:
     Logging Interval = 5 minutes Upload Interval = 15 minutes
     At 8:00 am, GS828H will upload three data records logged at 7:50, 7:55, and 8:00 am in one packet.
     At 8:15 am, GS828H will upload three data records logged at 8:05, 8:10, and 8:15 am in one packet.
   - When upload interval is smaller than logging interval, real time data record will be uploaded.
     For example:
     Logging Interval = 5 minutes Upload Interval = 2 minutes
     At 8:00 am, GS828H will upload one data record captured at 8:00 am.
     At 8:02 am, GS828H will upload one data record captured at 8:02 am.
   - However, data record at 8:02 am will not be logged (saved) in internal memory. But only data captured at 8:00 and 8:15 am will be logged (saved) in internal memory.

4. Real Time Data Upload
   - When GS828H receives 999999#STATUS# command, it will capture the instant data and upload it. That means it will upload the real time data upon this command.
   - However, this data record will not be logged (saved) in internal memory.

25. RS485 Port

- This port is ready for connecting to meters, transducers or other measuring devices via RS485 port.
- Operation will not be available in Sleep Mode for GS828L.



ModBus Protocol

00 – 03	AD00 Analog Channel Value	(IEE754 format)
04 – 07	AD01 Analog Channel Value	(IEE754 format)
08 – 11	AD02 Analog Channel Value	(IEE754 format)
12 – 15	AD03 Analog Channel Value	(IEE754 format)
16 – 19	AD04 Analog Channel Value	(IEE754 format)
20 – 23	AD05 Analog Channel Value	(IEE754 format)
24 – 27	AD06 Analog Channel Value	(IEE754 format)
28 – 31	AD07 Analog Channel Value	(IEE754 format)
32 – 35	AD08 Analog Channel Value	(IEE754 format)
36 – 39	AD09 Analog Channel Value	(IEE754 format)
40 – 43	AD10 Analog Channel Value	(IEE754 format)
44 – 47	AD11 Analog Channel Value	(IEE754 format)
48 – 51	AD12 Analog Channel Value	(IEE754 format)
52 – 55	AD13 Analog Channel Value	(IEE754 format)
56 – 59	AD14 Analog Channel Value	(IEE754 format)

60 – 63	P01 Pulse Channel Accumulated Value	(hex format)
64 – 67	P02 Pulse Channel Accumulated Value	(hex format)
68 – 71	P03 Pulse Channel Accumulated Value	(hex format)
72 – 75	P04 Pulse Channel Accumulated Value	(hex format)
76 – 79	P05 Pulse Channel Accumulated Value	(hex format)
80 – 83	P06 Pulse Channel Accumulated Value	(hex format)

84	Power AC Loss (AC: OXFF, Loss: OX00)

85	Digital Input Channel 1 Setup	(OXAA: Pulse, OXFF: Close Alarm, OXOO: Open Alarm)
86	Digital Input Channel 2 Setup	(OXAA: Pulse, OXFF: Close Alarm, OXOO: Open Alarm)
87	Digital Input Channel 3 Setup	(OXAA: Pulse, OXFF: Close Alarm, OXOO: Open Alarm)
88	Digital Input Channel 4 Setup	(OXAA: Pulse, OXFF: Close Alarm, OXOO: Open Alarm)
89	Digital Input Channel 5 Setup	(OXAA: Pulse, OXFF: Close Alarm, OXOO: Open Alarm)
90	Digital Input Channel 6 Setup	(OXAA: Pulse, OXFF: Close Alarm, OXOO: Open Alarm)
91	Digital Input Channel 7 Setup	(OXFF: Close Alarm, OXOO: Open Alarm)
92	Digital Input Channel 8 Setup	(OXFF: Close Alarm, OXOO: Open Alarm)
93	Digital Input Channel 9 Setup	(OXFF: Close Alarm, OXOO: Open Alarm)
94	Digital Input Channel 10 Setup	(OXFF: Close Alarm, OXOO: Open Alarm)
95	Digital Input Channel 11 Setup	(OXFF: Close Alarm, OXOO: Open Alarm)
96	Digital Input Channel 12 Setup	(OXFF: Close Alarm, OXOO: Open Alarm)
97	Digital Input Channel 13 Setup	(OXFF: Close Alarm, OXOO: Open Alarm)
98	Digital Input Channel 14 Setup	(OXFF: Close Alarm, OXOO: Open Alarm)
99	Digital Input Channel 15 Setup	(OXFF: Close Alarm, OXOO: Open Alarm)
100	Digital Input Channel 16 Setup	(OXFF: Close Alarm, OXOO: Open Alarm)
101	Relay Output 1	
102	Relay Output 2	
103	Relay Output 3	
104	Relay Output 4	

Examples:

Read AD1 Channel

Command: 01 03 00 00 00 04 00 00

01 Local PC ModBus Address

03 ModBus Command

00 00 AD1 Start Address (AD2 Start Address: 00 04)

00 04 Data Length in Byte

00 00 ModBus CRC Check (00 00 : No CRC is implemented)

Reply: 01 03 04 3F 17 7D A2 E6 CA

AD Value: 3F 17 7D A2 (IEE754) i.e. 0.59176

Read P01 Channel

Command: 01 03 00 10 00 04 00

Reply: 01 03 04 00 0D 6C 14 46 FF

Pulse Value: 00 0D 6C 14 (hex format) i.e. 879636

Relay Output 1 On

Command: 01 05 00 27 00 FF 00 00

Relay Output 1 Off

Command: 01 05 00 27 00 00 00 00

Relay Output 2 On

Command: 01 05 00 28 00 FF 00 00

Relay Output 2 Off

Command: 01 05 00 28 00 00 00 00

Set ModBus Protocol Local PC Address

Command: 00 07 07 01

Read Digital Input Output Status (Starting from address 0)

Command: 01 03 00 00 00 29 00 00

26. UPD Testing Software

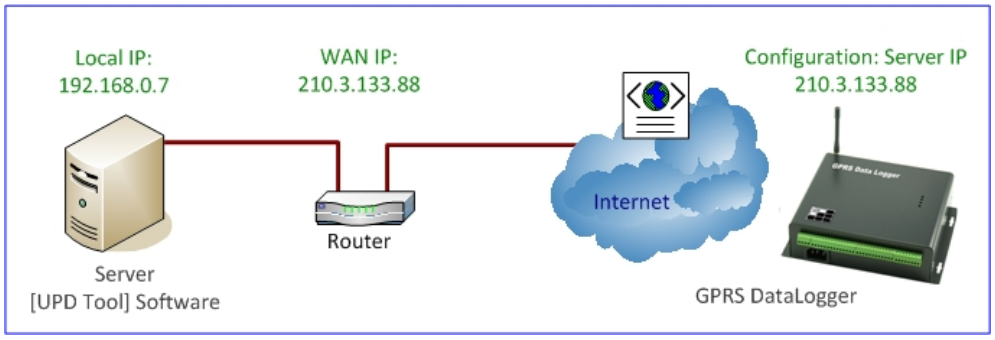
Free bundled testing software “UDP Tool” is used to test the GPRS connection and device.

Schematics

Check the IP address of the PC and Router

Configure the Data Logger [Server IP] parameter as Router WAN IP

Configure the same port in UDP Tool and Data Logger



Router Setup

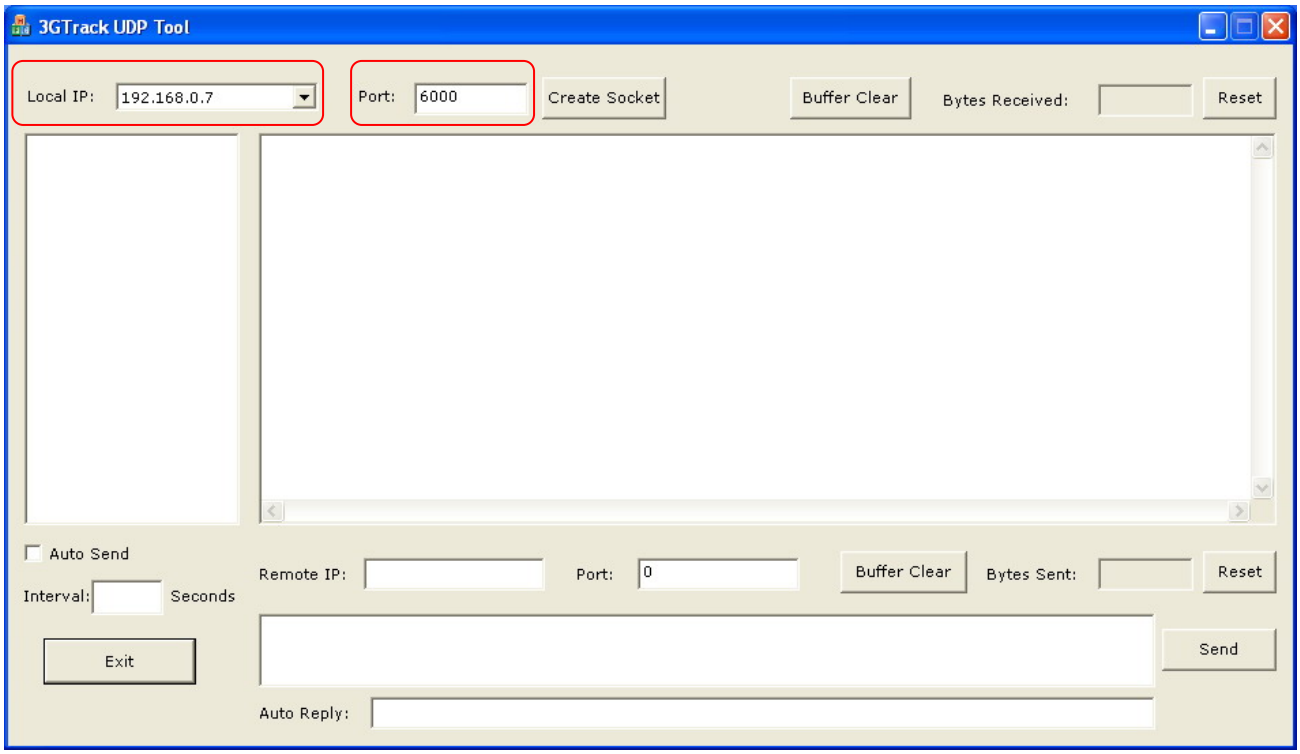
When router is installed between the PC and Internet, please open the ports for UDP and TCP.

Firewall Setup

On exceptions tab of Windows Firewall, click “UPD” program as exception or disable the firewall.

Open the ports defined by UDP Tool in the firewall setting.

Software Setup

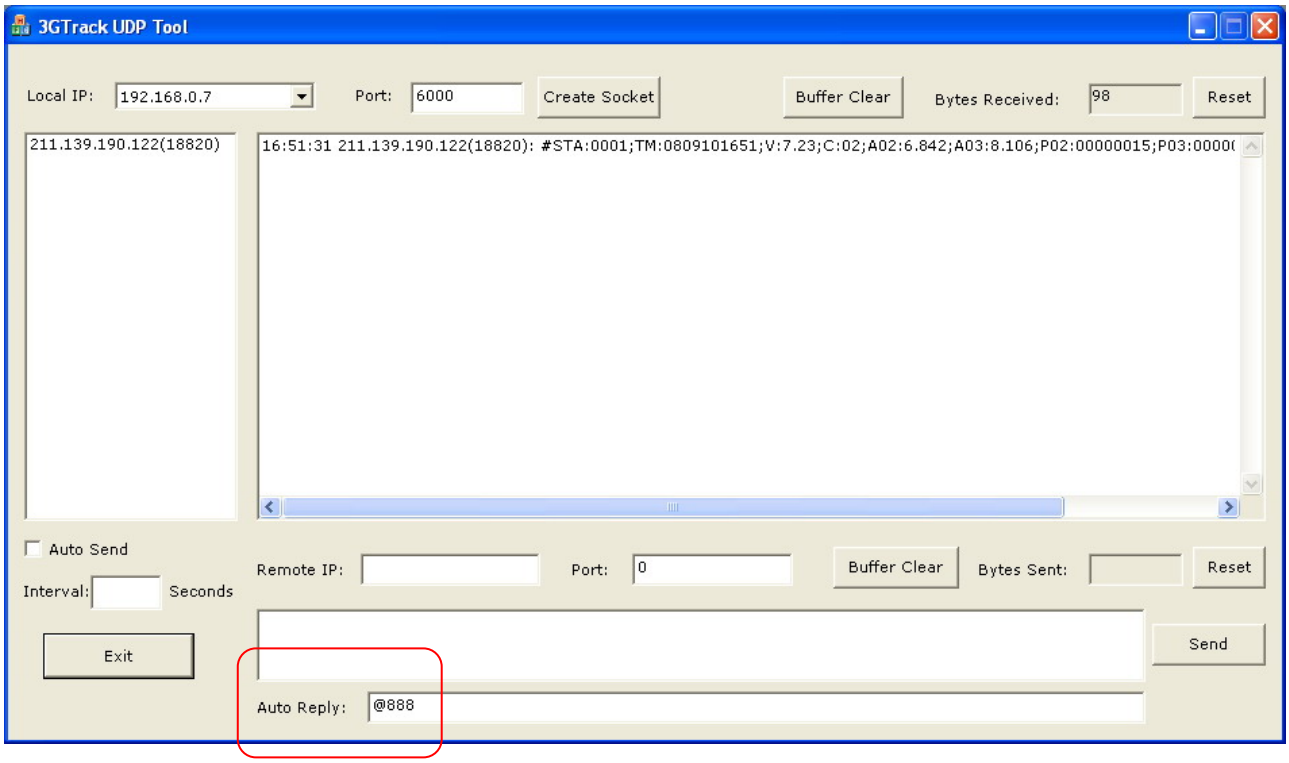


Live Data Upload

Click [Create Socket] to start receiving data from Data Logger

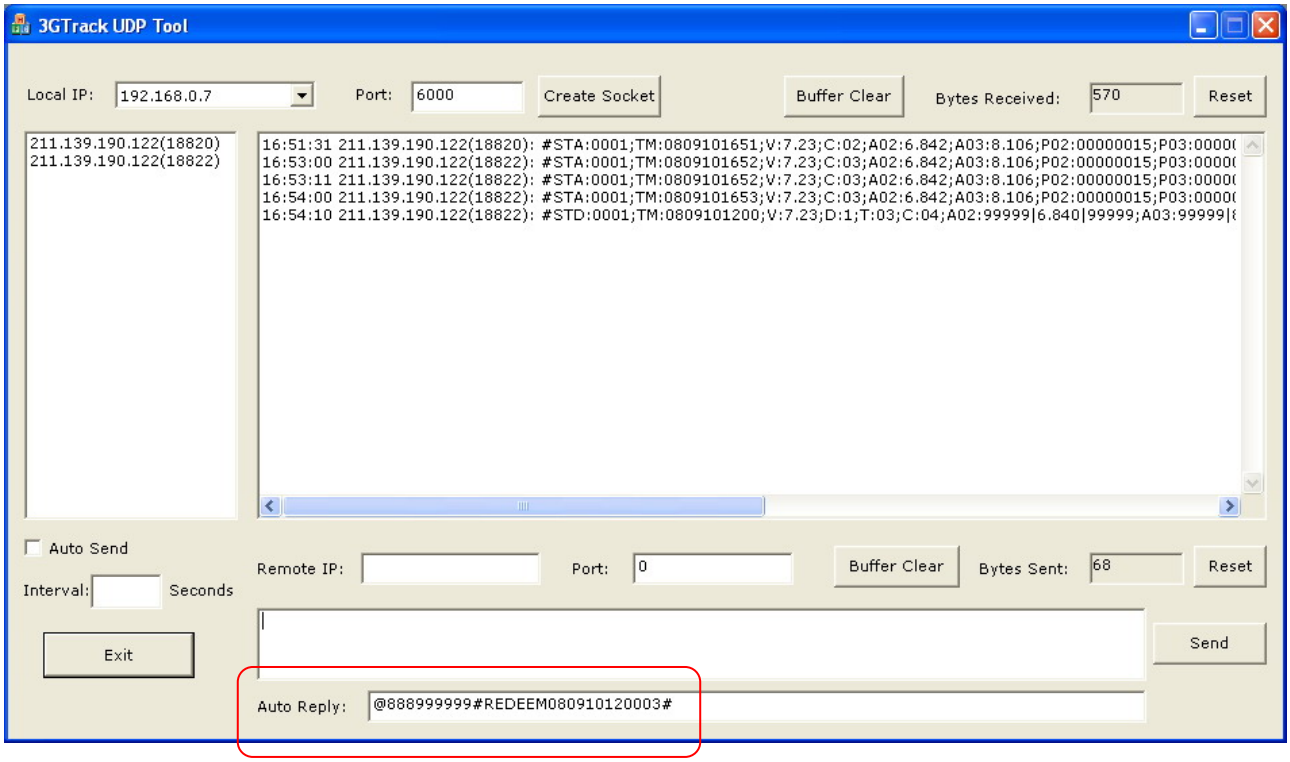
Make sure that the acknowledge message "@888" must be added as auto reply in UDP protocol

Data will be uploaded from Data Logger to the Server in logging interval



Historical Data Upload

Enter the command "@888999999#REDEEM080910120003#" in auto reply



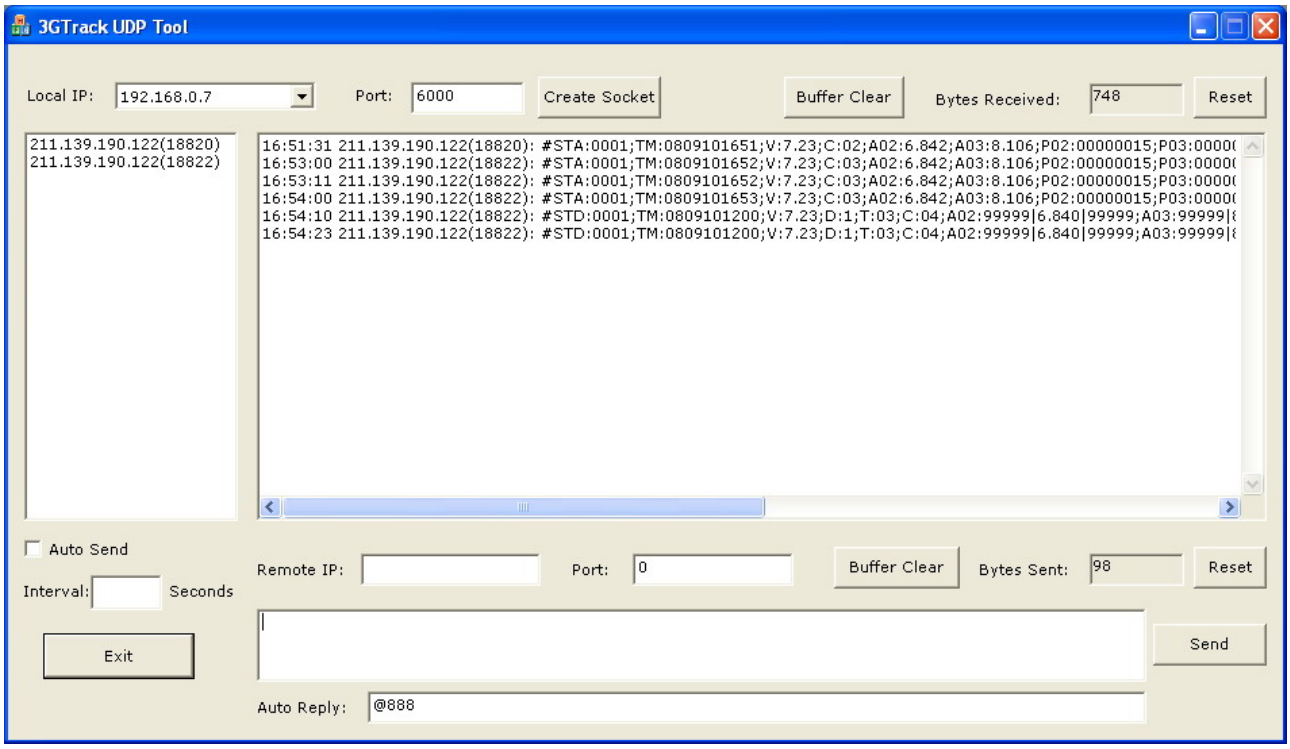
Historical Data is in packet format:

#STB:0001;TM:0705241115;V:8.65; T:04;C:01;A01:0.001|0.001|0.001|0.002;
A02:0.001|0.001|0.001|0.002;A03:0.001|0.001|0.001|0.002;A04:0.001|0.001|0.001|0.002|;
P01:00000000|00000000|00000000|00000000;P02:00000000|00000000|00000000|00000000;
P03:00000000|00000000|00000000|00000000;P04:00000000|00000000|00000000|00000000;
K:3333001|3333001|3333001|3333001;#

Resume Live Data Upload

Remember enter “@888” in auto reply

It will stop the historical data upload, and resume live data upload



27. TCP and UDP Operation

27.1 Data Format: TCP

This is a type of handshake data transmission with auto data recovery to ensure accuracy. When the network signal coverage is weak, data transmission bandwidth will be huge.

27.2 Data Format: UDP

This is a type of data upload without checking the data accuracy. Data transmission bandwidth can be expected or preset in advance.

In UPD format, packet data is considered as a secure way of data transmission to ensure the receipt of data in control centre.

GS828 sends out the data packet to control centre (CTR IP). CTR IP replies with "@888" message once it receives the data. GS828 will try to resend the data packet if reply message "@888" is not received.

27.3 Packet Data

Control Centre sends data to GS828

This is the communication protocol maintaining the connection between Control Centre and GS828. During the GPRS Internet connection, GS828 will automatically be assigned a Port Number and IP address by the ISP provider. When the Internet connection is idle for a certain period, the port number and IP address will be released. If CTR IP tries to send data to GS828 at that moment, GS828 will not be able to receive the data because the last port number and IP address cannot be located.

27.4 Secure Data Send/Receive (GS828H only)

When GS828 sends data to Control Centre, CTR IP will reply the confirmation message "@888" once the data is received by CTR IP. Otherwise, GS828 will try to resend the data packet or proceed the appropriate procedure.

27.5 Control Centre Check (GS828H only)

This can be used to check whether the software of Control Centre is running, or the CTR IP is on line.

27.6 Secure Command Send/Receive (GS828H only)

When CTR IP receives the data from GS828, it will be acknowledged with the GS828 current port number and IP address. A confirmation message “@888” will be replied to GS828. If any control is necessary, CTR IP can send the command as “@888xxxxxxx” (e.g. @888888888#SDx:y#) to GS828 at the same time. Usually, this method of sending command is secure because the port number and IP address of GS828 will remain unchanged within 70 seconds after GS828 sends out data. It is normal that the port number and IP address of GS828 will only be released when GPRS Internet connection is idle after 70 seconds.

27.7 Ack. Interval (Heart Beat) (GS828H only)

Heart Beat is used to ensure the integrity of data transmission in UPD protocol. Each time when GS828 sends out the live data or packet data, the Control Centre will reply with message “@888”. If GS828 does not receive this reply message within the “Heart Beat Interval”, it will send out “@888” message for three times every “Heart Beat Interval” until the reply message “@888” is received from Control Centre.

After failed in three times of heart beat check, GS828 will proceed to “Redial” stage.

By default, heart beat interval is set to 128 seconds but user configurable. Once the reply message is received from Control Centre, the “Heart Beat” counter will reset to zero and restarts again. Logically, “Heart Beat Interval” should be larger than “Upload Interval” in order to avoid repeated heart beat check and waste the GPRS air time.

27.8 Redial Interval (GS828H only)

When heart beat check fails three times continuously, GS828H will try to reconnect to the Internet, register a new port number & IP address, and send data after redial interval.

Usually, “Redial Interval” should be twice larger than “Upload Interval”.

28. Safety and Regulatory Notice

All applicable regulatory compliance statements, product certification markings, and safety and electromagnetic compatibility (EMC) standards and regulations the Data Logger is compliant with.

European Union Declaration of Conformity

Statement

We, 3gtrack.com declare under our sole responsibility that the product GS828 GPRS Data Logger is in conformity with all applicable essential requirements necessary for CE marking, following the provisions of the European Council Directives 2004/108/EC (EMC Directive) and 2006/95/EC (Low Voltage Directive).

CE

The product is properly CE marked demonstrating this conformity and is for distribution within all member states of the EU with no restrictions.

This product follows the provisions of the European Directives 2004/108/EC and 2006/95/EC.

Customer Support Links

View or download product support information from 3gtrack website:

http://www.3gtrack.com

or email contact at: support@3gtrack.com

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