GSM Global Communication Adapter

MMLink-G

User Manual

Introduction

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MMLink-G is Machine-to-Machine (M2M) communication adapter which makes GSM/GPRS wireless communication through the 2G cellular networks by using the onboard LAN interface.

Please read this manual carefully before using the product.

Precaution

Important Safety Information

This product is not intended for use in the following circumstances
・ Area(s) where radio transmission equipment (such as cell phone) are not permitted.
・ Hospitals, health care facilities and area(s) where cell phones are restricted by law.
・ Gas stations, fuel storage and places where chemical are stored.
・ Chemical plants or places with potential explosion hazard.
・ Any metal surface that may weaken the radio signal level.
・ The appliance is intended to be installed in restricted access location. Only service person or authorized person is allowed to access.
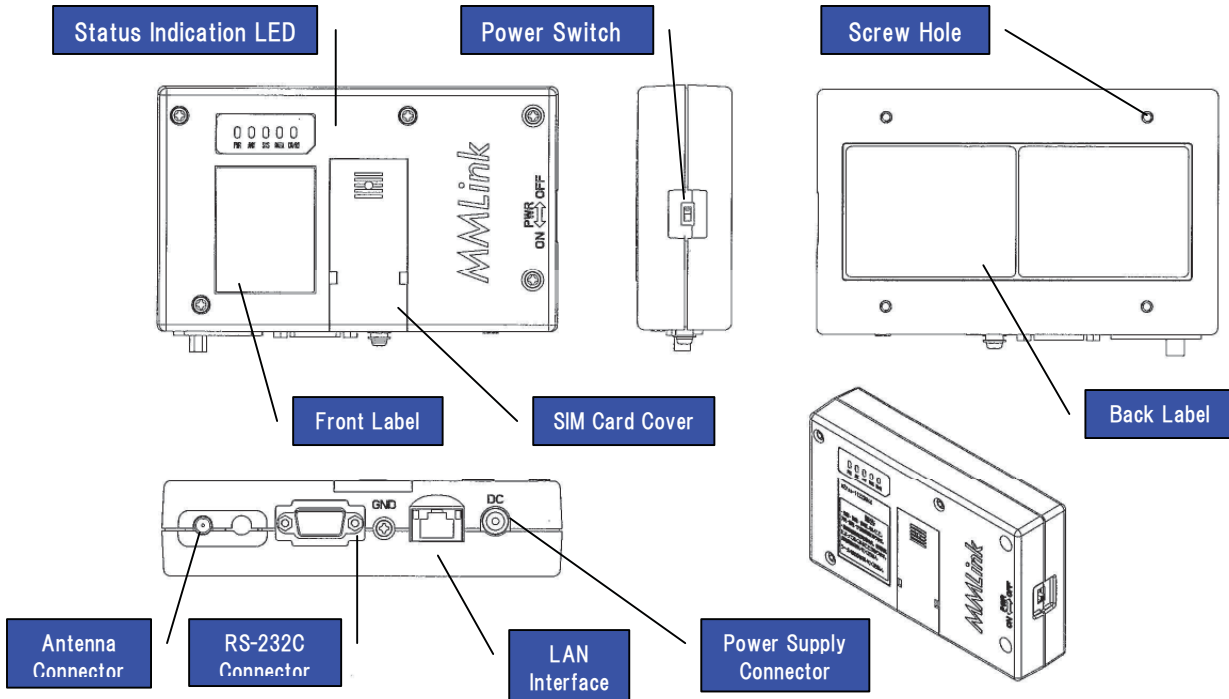
List of Content

Introduction

Name of Each Parts

The following are the parts of this adapter.

Status Indication LED

Power Switch

Screw Hole

Front Label

SIM Card Cover

Back Label

Antenna Connector

RS-232C Connector

LAN Interface

Power Supply Connector

Status Indication LED

Status Indication LED can indicate the status of this adapter.

Name	Color	Description
PWR	GREEN	Light when powered is on.
ANT	ORANGE/ GREEN/ RED	Indicate the received signal level. **Signal status: Bad**　　　Off **Signal status: Poor**　　　Light on with red color **Signal status: Average**　　Light on with orange color **Signal status: Good**　　　Light on with green color
STS	ORANGE/ GREEN/ RED	Indicate the running status of this adapter. (Note) **Idle**　　　　　　　Off **Initializing**　　　　Blinking with green color **Information 1**　　　Light on with orange color **Information 2**　　　Light on with red color
DATA	GREEN	Indicate the communication status between this adapter and the wireless network. **No communication**　　Off **Communicating**　　　On
CD/RI	GREEN	Indicate the CD signal statue. **Wireless network disconnected**　OFF **Wireless network connecting**　　On **Wireless network connected**　　On

Note: About the information display of STS LED

Please contact the Customer Support Services when information 1 or information 2 is ON.
Information 1 : probably hardware failure.
Information 2 : probably SIM card is unreadable.

RS-232C Connector

Pin Assignments
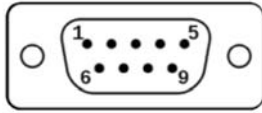
D-sub Connector PIN Assignments			
Pin No.	Signal	Pin No.	Signal
1	DCD	6	DSR
2	RxD	7	RTS
3	TxD	8	CTS
4	DTR	9	RI
5	GND	—	

LAN Interface

Pin Assignments
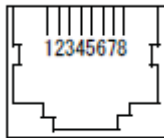
RJ-45 Connector Pin Assignments	
Pin No.	Signal
1	Tx+
2	Tx-
3	Rx+
4	—
5	—
6	Rx-
7	—
8	—

Note:
 MDI/X auto-cross/straight cable support.

Antenna Connector (SMA)

Pin Assignments

GND

Signal
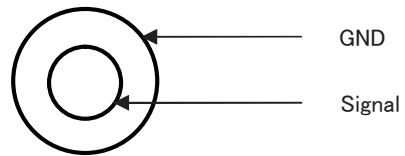
Power Supply Connector (DC)

Pin Assignments
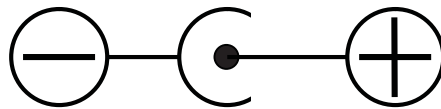
Basic Operations

Connection Method

Before using this adapter please do the following preparations.

Step 1. Attach the antenna to the antenna connector

Please use the antennas that adapted to this adapter. (Note 1)
Please ensure that no excessive force is applied to the antenna connector.

Step 2. Ensure that the equipment and this adapter is power-off.

Step 3. Connect the power supply to the power connector

Please use the power supply that adapted to this adapter. (Note 2)

Step 4. Connect the equipment to this adapter.

Please connect a LAN cable to this adapter's LAN connector.

Note:
1. Please contact the Customer Support Services to obtain the information about the manufacturer's recommended antennas.

2. Please contact the Customer Support Services to obtain the information about the manufacturer's recommended power supply (AC adapter).

Power ON Method

Turn on the Power Switch on the side of this adapter.

It takes about 30-60 seconds until it is ready to communicate with equipment from the Power Switch to ON.
STS LED would keep blinking with green color while initializing, and would be turned off while initialization is normally finished.
Please wait at least 5 seconds between power off and power on.

When performing packet communications, please check the signal level by ANT LED.

Power OFF Method

Turn off the Power Switch on the side of this adapter.

Please check if the PWR LED is off.
It takes 3-5 seconds to shut down when turning off the Power Switch.

Packet Communication

■ This adapter is available in the GSM worldwide coverage.

■ Please perform a GPRS Service Contract before using the packet communication.
For more information please contact Customer Support Services.

■ High-speed packet communication.
DL: max. 85.6 kbps
UL: max. 42.8 kbps

The line speed will be affected by communication environment and the contract probably.

Fees

■ Terms and packet communications services, contract fees, monthly fees, communication fees required depending on the amount of data sent and received. For more information please contact Customer Support Services.

■ If you are using Internet access services, the fee is required for the provider you use.
For fee details, please contact your provider for help.

■ Subscribe to dedicated lines will require a fee depending on connection fees and options contracts.
For fee details, please contact your provider for help.

■Installation Dimensions（Back Case）

Dimension of screw hole: M3
(Effective screw length: 4mm)
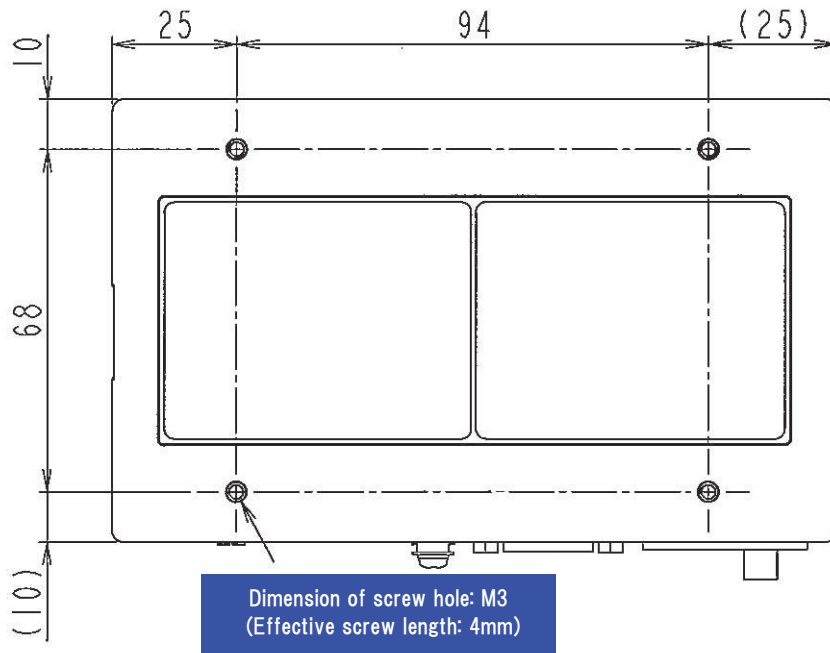
Features

Summary of Features

The following is a summary of the features.

Feature	Description
Simple Router (Static NAT)	The IP packets received from equipment which connected to this adapter can transmit to the WAN by IP address transforming.
Simple Location Information Acquisition	You can get the location information using a simple command by TCP / IP communications from the LAN interface of this adapter.
SMS Auto Connection	You can automatically connect to wireless network by receiving an SMS message.
Remote Diagnosis	You can check the network connectivity of this adapter.
Fail-Safe	This adapter can detect the communication failures automatically and make a recovery from the failures.

Simple Router (Static NAT)

This adapter can communicate with WAN using TCP/IP packets by connecting the equipment to the LAN.

The following image shows the operations of the equipment connected to MMLink-G.
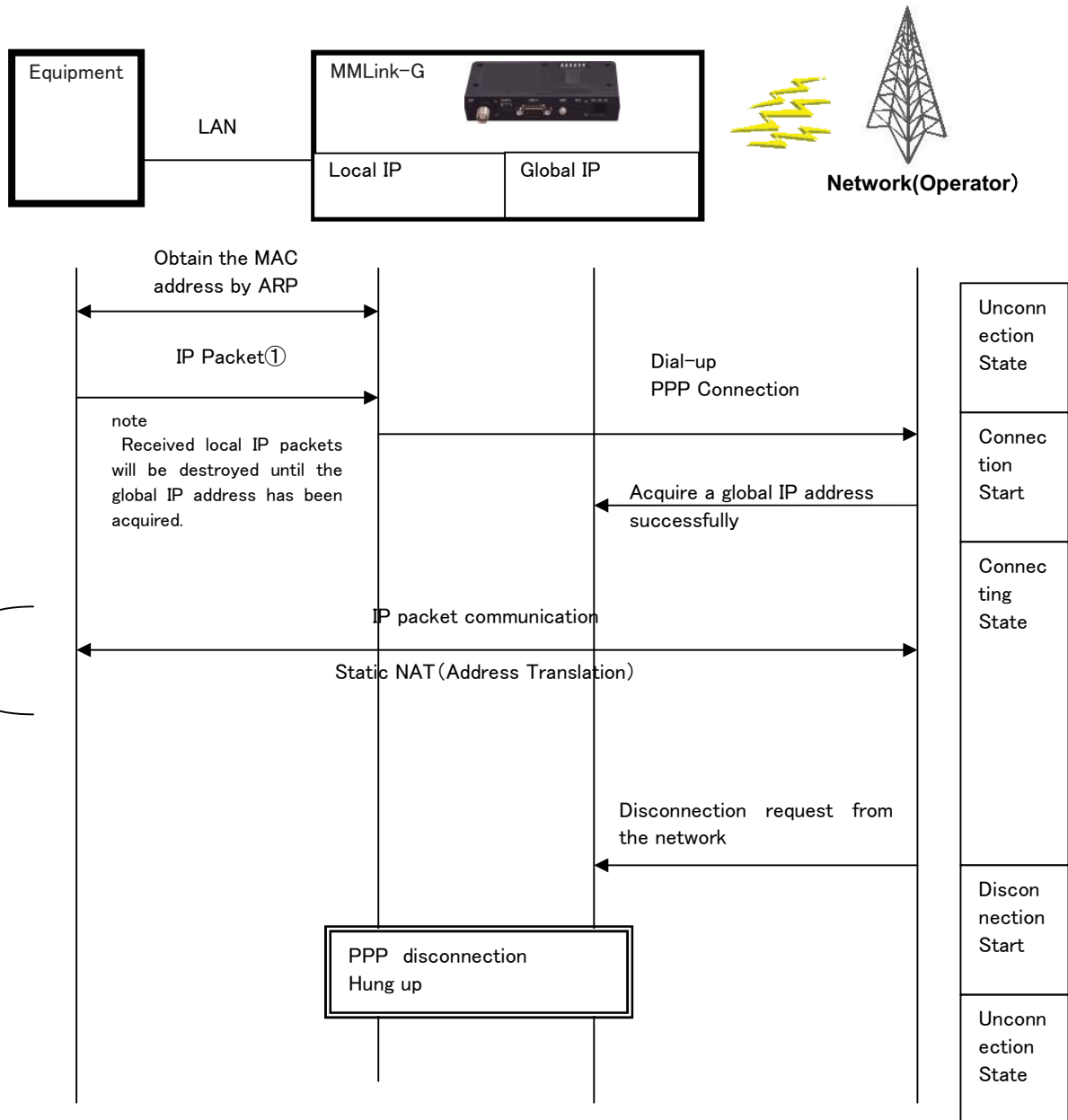
Settings Of The Simple Router (Static NAT)

The equipment needs the protocols below.

7		Application Layer
6		Presentation Layer
5		Session Layer
4	**TCP**	Transport Layer
3	**IP**	Network Layer
2	**Ethernet**	Data Link Layer
1		Physical Layer

TCP/IP protocol is needed.

■ The TCP/IP settings of this adapter

IP Address	192.168.0.133
Subnet Mask	255.255.255.0

The TCP/IP settings of equipment

IP Address	192.168.0.100
Subnet Mask	255.255.255.0
Default Gateway	192.168.0.133

■ Static address transforming

Equipment

IP Address
192.168.0.100

This Adapter

Local IP Address
192.168.0.133

Global IP Address
10.129.100.1

Network
Environment

Server

IP Address
172.16.100.2
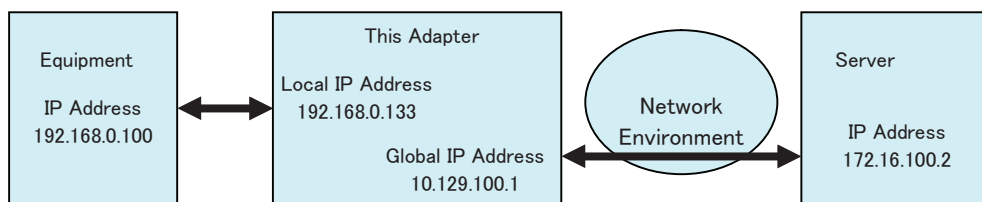
How to Use Simple Location Information Acquisition Command

You can get the location information via a command by using a specific TCP/IP port.

Note:
Location information obtained by this command is based on cellular system, so it's different to the GPS positioning.

■ The setting of service port
Please use following dedicated TCP/IP port to perform the Simple Location Information Acquisition Command.

Port No.	777

Equipment	This Adapter

Simple Location Information Acquisition Command

TCP/IP Head	GETPOS (ASCII)	CR+LF

TCP/IP Head	OK (ASCII)	CR+LF

TCP/IP Head	Location Information	CR+LF

TCP/IP Head	:END (ASCII)	CR+LF
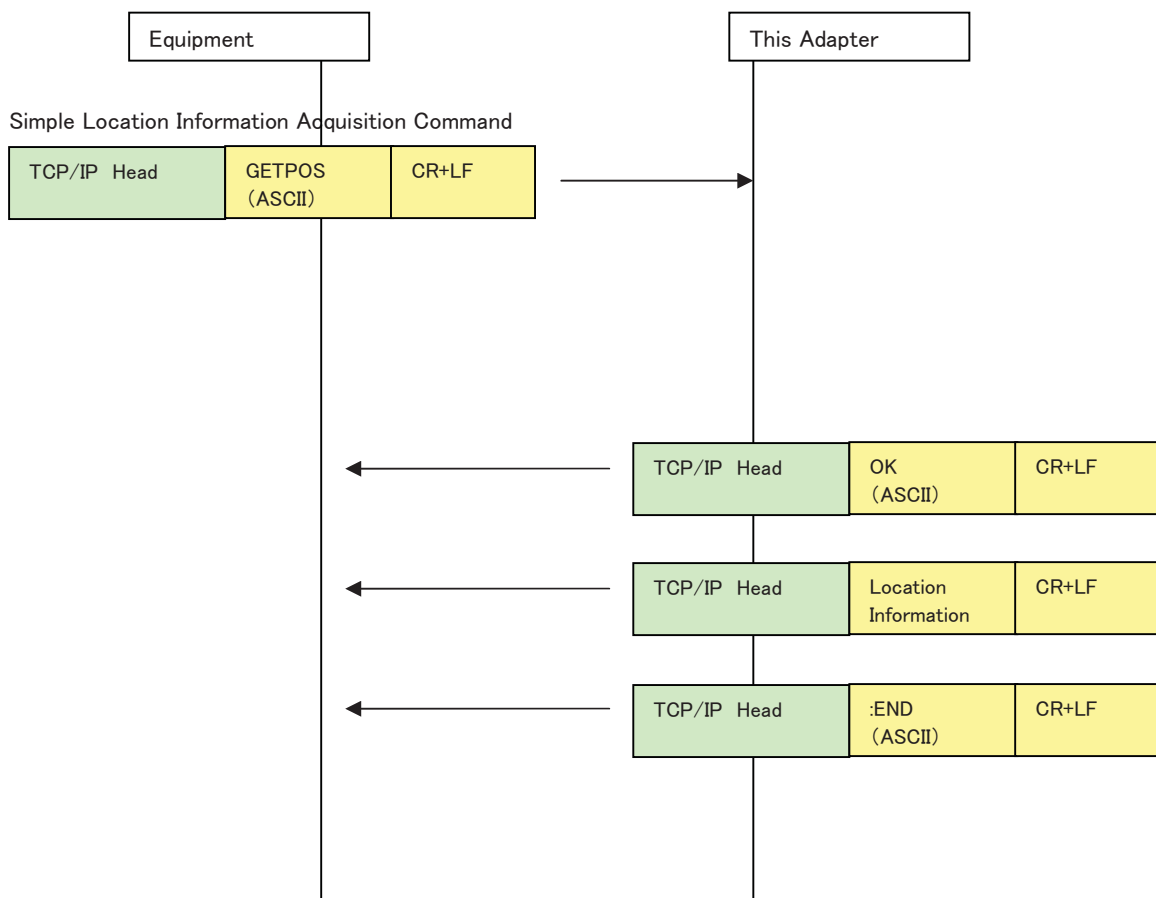
The format of the location information.　〈ASCII String〉

310,410,179A,075B,20
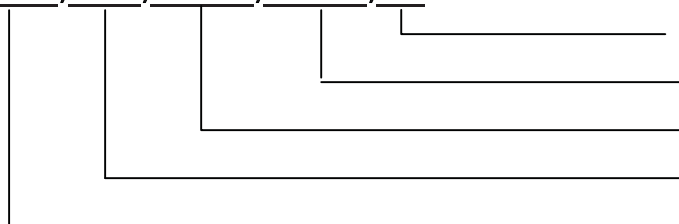
- Received Signal Level(RSSI)：1-2 decimal digits
- Cell Identifier(CellID)：4 hexadecimal digits
- Location Area Code(LAC)：4 hexadecimal digits
- Mobile Network Code(MNC)：2-3 decimal digits
- Mobile Country Code(MCC)：3 decimal digits

Communication sequence is as follows:

This adapter is a TCP Socket Server, and the equipment is a TCP Socket Client. They need connect or disconnect using TCP/IP.

Simple router feature is enabled while service port is using, so you can acquire the location information while normal data communication.

```
┌─────────────────┐                              ┌─────────────────┐
│   Equipment     │                              │  This Adapter   │
│    (Client)     │                              │    (Server)     │
└─────────────────┘                              └─────────────────┘
        │                                                 │
        │                                        ┌─────────────────┐
        │                                        │   Wait TCP      │
        │                                        │   Connection    │
        │                                        └─────────────────┘
        │              TCP/IP Connection ═══════════════▶ │
        │                                                 │
        │      Location Information                        │
        │      Acquisition Command                         │
        │ ────────────────────────────────────────────────▶
        │                                        Receive the Command
        │                                        Get Location Information
        │                                        Make the Response
        │ ◀────────────────────────────────────────────────
        │              Response                            │
        │        (Location Information)                    │
        │ ◀════════ TCP/IP disconnection ════════▶         │
        │                                                 │
        │                                                 │
```
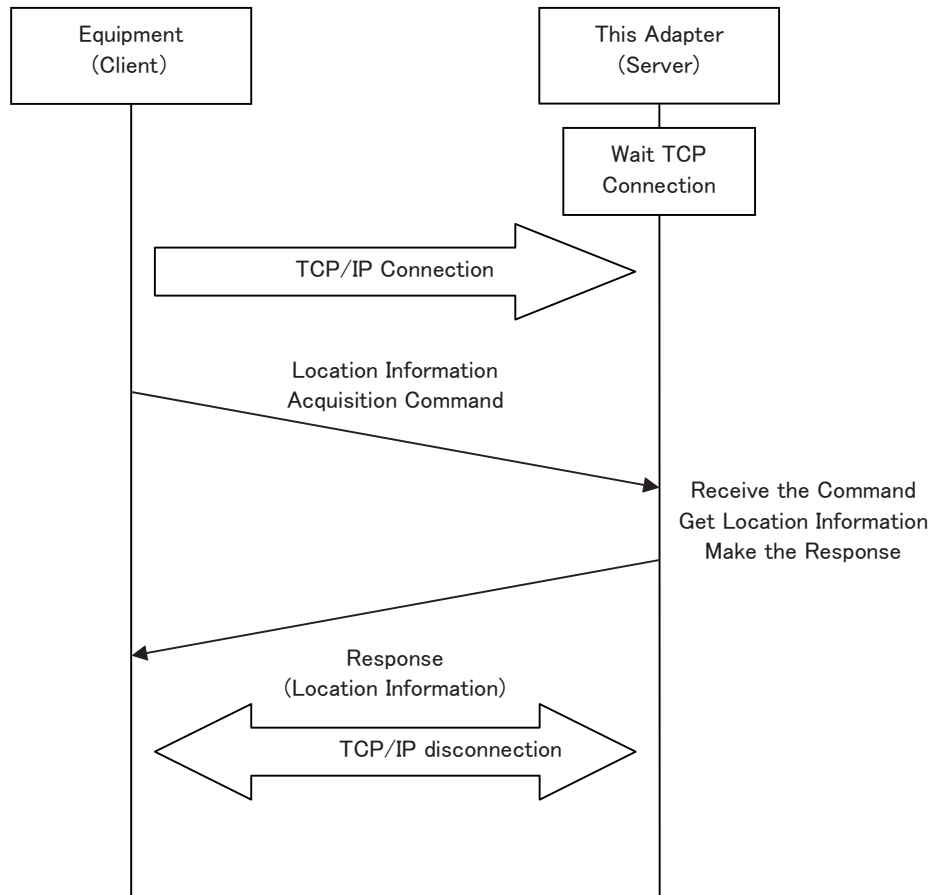
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SMS Auto Connection

This adapter supports automatic connection to the wireless network by an SMS message.

When you receive an SMS with this adapter, the following processes will be performed.
■ This adapter is disconnect to the wireless network
Automatically connect to the wireless network. The TCP/IP communication will be ready while connection is successful.

■ This adapter is connect to the wireless network already
Wireless network connection will be kept.

Remote Diagnosis

This adapter supports network connectivity detection by ICMP packet.

By send an ICMP packet as below, you can verify whether this adapter is connected to the wireless network.

■ This adapter will send a ICMP Type 14(Timestamp Reply) packet to answer the ICMP request while a ICMP Type 13(Timestamp Request) packet is received from wireless network,

Note:
  ICMP type 13 packets are not routed to the equipment that is connected to this adapter.
  This feature is only for checking the connection state of the adapter, so the data in the packet is meaningless.

Fail-Safe

This adapter is communicating with wireless network by inner wireless module. Network environments such as out of service, a weak signal level, and the base station design change and communication failure, combined with functional wireless module, a temporary situation or in some cases might be unable to continue to communicate successfully.
This adapter can detect such communication failures automatically and make a recovery from the failures.

When failures were detected, this adapter will reset itself automatically, so the communication between this adapter and equipment will temporary stop.

Although frequency of the automatic recovery feature works in some rare cases, please implement the following fail-safe features to you equipment in principle.

■ Retries and reconnect this adapter if the LAN interface is disconnected,
■ If your system does not recover by the normal retry processing, please reset this adapter.

Specifications

■ **Product Name and Model**

    Name: MMLink-G
    Model: GWA-G10

■ **Hardware Specifications**

Items	Specification
Dimensions	144×88×34mm (Excluding protrusions)
Case	Resin (Black Color)
Wireless Module	GSM/GPRS Class10 Quad-Band Support 850/900/1800/1900 MHz
Communication I/F	RS-232C×1 (Full wiring) LAN×1 (RJ-45)
Antenna	SMA Connector×1
SIM	SIM Card Slot×1
Power Supply	DC5V±5%
Typical Quiescent current	Busy : 1.5A below Idle : 1.0A below
Temperature for use	-20～+55℃
Temperature for storage	-20～+75℃
Humidity for use	10～90%RH (non condensing)
Humidity for storage	10～90%RH (non condensing)
Water proof / Dust proof	IP4X (Excluding the connector)

FEDERAL COMMUNICATIONS COMMISSION INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Warning
RF exposure compliance
1) To comply with FCC/IC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.
2) This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

CAUTION:
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.