

# LMm Data Logger Manual Ver. 2.0R2 (100mS Version)

2015/8/19

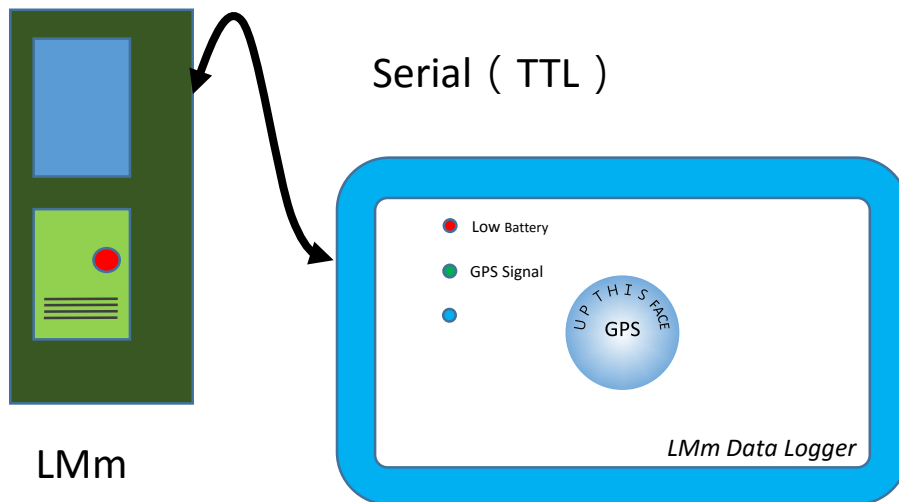
Tokyo Gas Engineering Solutions Corporation

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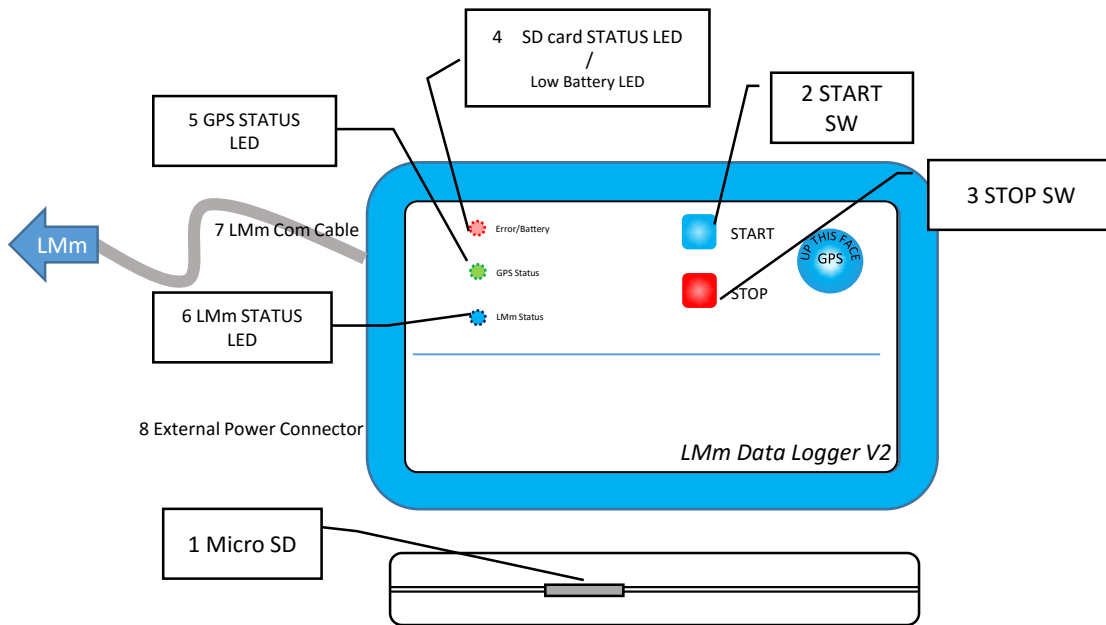
# Outline

LMm measurement and GPS location data are recorded in the data logger by simply connecting the device to the LMm.



- The data will be recorded on a micro SD card in the device. The data will be recorded every 0.1 second .
- The format of the recorded data is CSV; the data can be easily manipulated in PCs after the data recording.
- In order to receive the GPS signal correctly, the orientation of the logger is important. Face the top panel up as instructed on the top panel.

# Description of the Logger



## 1. Micro SD

- Power will be automatically ON by inserting a SD card to the slot.
- A SD card, maximum 2GB, should be formatted in FAT16.
- A SDHC card, capacity of 2GB-32GB, should be formatted in FAT32.
- Data is recorded in a file named "datalog.csv."
- The file will be generated automatically in the SD card when "datalog.csv" does not.
- After restarting the logger, new data will be added to the existing "datalog.csv."

## 2. START SW

- After inserting a micro SD card in the slot, the recording will start by pressing the START SW..
- Make sure LMm is connected with the logger before pressing the START SW.

## 3. STOP

- Prior to removing the SD card, press STOP SW.
- If this switch is not pressed prior to the SD card removal, the recorded data may be compromised and destroyed.

## 4. SD CARD STATUS LED / LOW BAT LED

Refer to LED Indications.

## 5. GPS STATUS LED

Refer to LED Indications.

## 6. LMm STATUS LED

Refer to LED Indications.

## 7. LMm Communication Connector

Refer to connector specifications.

## 8. External Power Connector

- 2V ~ 5V DC (Never exceed 5V tp prevent fatal damage to the circuitry..)
- +:Center pin

## 2. Battery

- Type: SIZE AAA
- Capacity min. 700mA/h
- Minimum voltage 2.0V
- Ni-MH (Recommended) or Ni-cd
- 8 hours of operation is possible with fully charged batteries. The usable time depends on operating temperatures.

# Starting Data Logging

- ① Connect a LMm with the logger. LMm should be powered-on before the connection is made.
- ② Insert a SD card to the slot, and press START SW.
- ③ Confirm the green and blue LEDs are ON after all LEDs are ON momentarily.
- ④ Replace batteries when the red LEDs are blinking.
- ⑤ Start measurement with LMm. Blinking blue LED indicates successful data transmission from the LMm.
- ⑥ Wait until the green LED begins to blink. The logger will search for GPS satellites from the operating location.
  - It may take a few minutes up to 30 minutes.
  - It is suggested to start the GPS search beforehand as it may take a long time. GPS search will be initiated when batteries (or external power) and SD card are inserted.
  - GPSLED on the GPS device will be lit when the search process is completed.
  - The blue LED will blink if the LMm is connected properly.
- ⑦ The following conditions have to be met for proper data logging.
  - The batteries are fully charged.
  - The micro SD card is properly formatted and inserted to the slot.
  - LMm in measurement mode is connected with the logger.
  - The following LED operation should be observed for normal operation.
    - RED LED                      OFF
    - GREEN LED                      Blinking
    - BLUE LED                      Blinking

# Terminating Data Logging

- ① Press STOP switch.
- ② Take the SD card out from the slot.
- ③ Disconnect the cable, and turn off the LMm.

# LED Indications

Causes	R	G	B	Synopsis	Actions
Low Battery	<b>B</b>	O F F	O F F	Checking battery voltage when power-on. This mode may occur when battery voltage is less than 2.0V, resulting in start-up failure. Replace the batteries with full charge.	Start-up failure
SD Card Error	<b>B</b>	O F F	O F F	Access failure to the SD card when power-on. Illegal SD format was found. Check the SD card, and power-on again.	Start-up failure
	<b>O N</b>	O F F	O F F	Abnormal actions on SD card operation. Continue data logging but data may be lost.	Continue logging
LMm Error	O F F	O F F	<b>B</b>	LMm communication error when power-on. Connection problem with LMm, LMm is power-off, LMm is not in the measurement mode. Check the LMm connection cable, and press START SW.	Start-up failure
GPS Error	O F F	<b>B</b>	O F F	GPS communication failure when power-on. Press START SW again. Possible GPS module failure if the problem persists.	Start-up failure
GPS Access	O F F	<b>O N</b>	O F F	GPS communication is not completed. Wait until green LED begins to blink. It may take a few minutes up to 30 minutes.	Continue Start-up
No LMm Connection	O F F	O F F	<b>B</b>	No LMm connection when power-on. Connect a LMm in the measurement mode.	Continue Start-up
Normal Operation	O F F	<b>B</b>	<b>B</b>	The LEDs will blink every time GPS/LMm data are received.	Normal Operation

\*B: Blinking

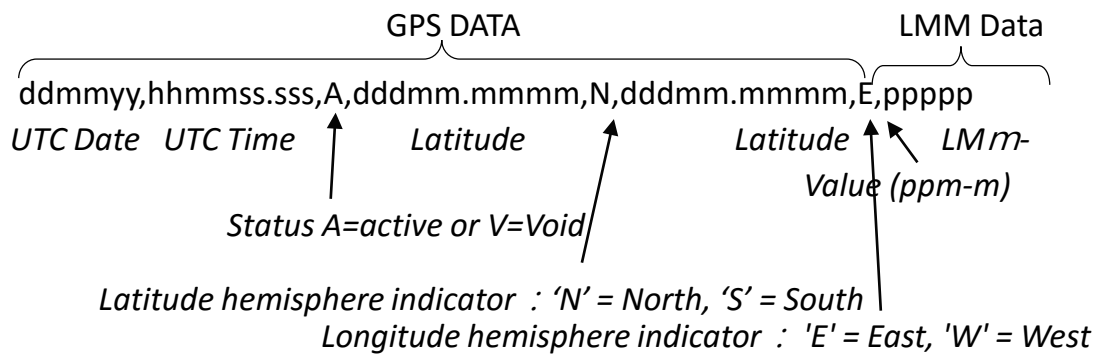
# Caution

- Power-on the LMm before making the cable connection with the logger.
- Self check error message may appear if the LMm is powered on after the connection.
- Data size  
Logdata.csv      1 data/sec    53 bytes/data      380KByte/2 hours of operation



# DATA Format

- Data format to be recorded on the SD card
  - Media Format : FAT (Window Compatible)
  - File Format : datalog.csv
  - Record Format : (ASCII 7Bit character)



- GPS Data  
Error symptoms are recorded in the GPS field of a data sequence. There are two types of GPS related errors.

1. No GPSs are captured

Data example : 310315,111701.300,V,,,,,00059

2. Incorrect data has been received from the GPS chip.

Data example : GPSERR,-----,V,-----,-----,ppppp

## About datalog.csv

- New data will be added to the end of the datalog.csv when a measurement is started following the starting up.
- Data format
  - The following header and footer will be recorded before and after a normal operation.
  - Battery voltages will be included in the header and footer.

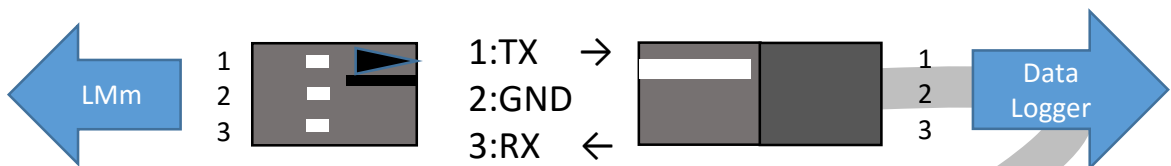
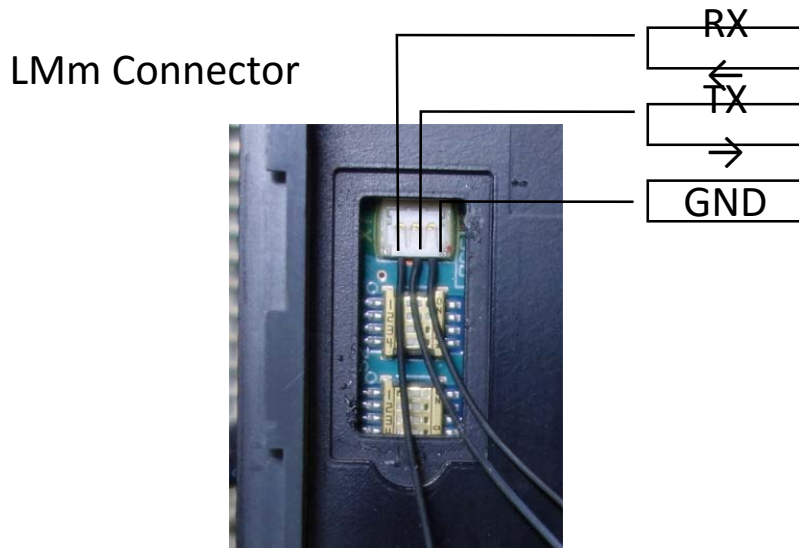
```
**** LMm Data Logging Start V2.0R1 Build 03.04.2015 **** bat:2.48V ; header
```

```
310315,111701.300,V,,,,,00059
310315,111701.400,V,,,,,00059
310315,111701.500,V,,,,,00057
310315,111701.600,V,,,,,00056
310315,111701.700,V,,,,,00056
310315,111701.800,V,,,,,00056
310315,111701.900,V,,,,,00055
310315,111702.000,V,,,,,00054
310315,111702.100,A,3542.4758,N,13941.1619,E,00054
310315,111702.200,A,3542.4756,N,13941.1619,E,00056
310315,111702.300,A,3542.4755,N,13941.1618,E,00059
310315,111702.400,A,3542.4754,N,13941.1617,E,00062
310315,111702.500,A,3542.4754,N,13941.1617,E,00063
310315,111702.600,A,3542.4753,N,13941.1616,E,00062
310315,111702.700,A,3542.4753,N,13941.1615,E,00063
310315,111702.800,A,3542.4752,N,13941.1615,E,00063
310315,111702.900,A,3542.4752,N,13941.1614,E,00063
310315,111703.000,A,3542.4751,N,13941.1614,E,00062
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. . .
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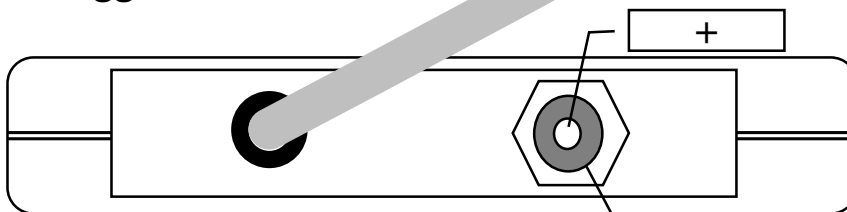
```
**** Data Logging END **** bat:2.47V ; footer
```

- Footer will not be recorded in the following cases, and missing footer indicates missing data after the recorded last data.
  - Taking out a SD card without pressing STOP SW.
  - Recording problem in SD card.SD
  - System rebooted for some reasons A header will be recorded after the reboot operation.
  - Halt due to power failure.

# Connection with LMm



Data logger connector



LMm Com Cable

External Power Connector