

User manual

MODBUS MASTER ALERTING SMS MODEM

V1.50

USAGE NOTICE

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INTRODUCTION

Product:

MODBUS Master alerting SMS modem

Data collection interface:

MODBUS communication over RS232 or RS485

Data output:

Plain text SMS alert

This modem is designed to interface with any standard MODBUS RTU device that want to send SMS. In typical PLC applications, situations such as failure of particular component or out of normal situation needs to intimated to someone who can take corrective action. The receiver can even be a SMS receiving modem that can operate a switch to control the situation without involvement of human.

In so far applications, interfacing a standard GSM modem to PLC requires writing specific AT commands in PLC. Writing vast variety of messages along with AT commands and interfacing all those over serial port may not be an easy task for an ordinary programmer. The MODBUS master modem does the job for you. The MODBUS modem reads specific register from PLC and triggers SMS for the message code present in that register. The SMS is sent only when a new code is detected. For idle situation, a 0 message code can be kept in register. Modem stores up to 150 different messages along with their message code. For every message triggered, a total of up to 15 numbers can receive SMS. Each of the message can be separately enabled or disabled. Similarly, any particular SMS receiver can be enabled or disabled.

The modem has one master number configured in it. The master can modify any or all of the configuration settings of modem from the mobile phone only. In addition, a configuration utility is available for initial configuration.

GSM/GPRS Features:

- Based on Quectel quad band GSM/GPRS module.
- Quad band 850/900/1800/1900MHz.
- 3V SIM Card Slot.
- Works with off-the-shelf available 50E antenna.
- Aluminum casing with powder coating.

Alerting Features:

- Reads specified register from connected MODBUS RTU device such as PLC
- Up to 150 messages with message code can be saved inside modem.
- Whenever message code in register matches with any of the saved message code, corresponding SMS is sent to all enabled receivers.
- Up to 15 receiver numbers can be configured in the modem. Each of the configured number receives the alert SMS
- The alert message can also include time stamp of the event that caused the SMS alert. This can be disabled if not required.
- Alerting criteria is fully configurable by end user. The configuration can be done from mobile phone or from configuration utility software.
- SMS message text and the alert receiver numbers can be set by master end user.

Applications:

- SMS sending from PLC based SPM
- Alert message sending from any MODBUS RTU device

Specifications:

- Power supply: 7.5V to 24V DC.
- Dimension: 80mm x 55mm x 25mm
- Weight: 142gm approx.

Connections pin-out:

Modem has D sub miniature 9 pin female connector for signal interface and 2pin phoenix two piece right angle screw terminal for power supply connections. Below are pin wise details for both these connectors.

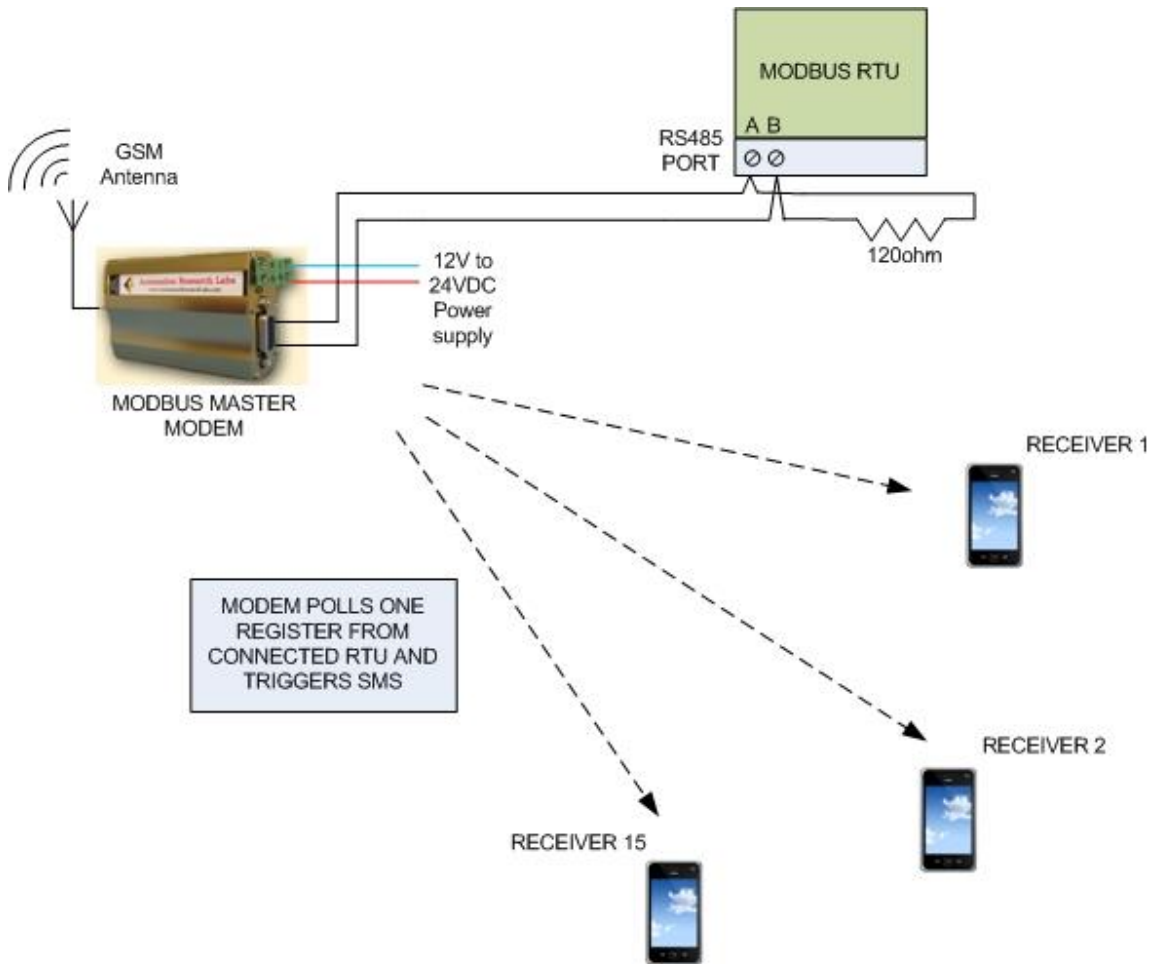
DB9 PIN	SIGNAL NAME (RS485)	SIGNAL NAME (RS232)
1	NC	NC
2	RS485 TX-(B)	TXD
3	RS485 TX+ (A)	RXD
4	NC	
5	GND	
6	NC	
7	NC	

8	NC
9	NC
case	Connected to Ground

Table Terminology
 NC: No internal connection.
 GND: Supply negative

Warning: Wrong connection or over voltage at any of the D type serial connector pin may permanently damage the modem.

Application Diagram:



DEVICE CONFIGURATION

Modbus master modem is fully configurable using SMS. Each setting that needs to be changed can be configured using a simple text SMS from a predefined number. The configuration commands are entertained from an authorized number only. Any configuration command received from unknown number is discarded. Configuration is a onetime process and all the setting information is saved in modem permanently

Configuration commands

a. Setting master user mobile number:

Service engineer can set master user number using following SMS command. Master user can set or modify all settings except service provider number.

SET<space>MASTER<space><mobile number>

e.g. SET MASTER 7588623994

b. Setting receiver mobile number:

Receiver is any user who will receive the alert message for any digital input trigger. If the receiver is enabled then it receives alert message input is triggered. Receiver cannot change any settings of modem. Maximum 15 different receiver numbers can be set. Receiver number is set using following SMS command. Here sequence number is location of internal table where the setting will be saved. There are 15 locations in to store up to 15 different receivers.

SET<space>RECEIVER<space><receiver sequence number>,<receiver mobile number>

e.g. SET RECEIVER 1,7588623994

Here mobile number 7588623994 is set as first receiver number.

c. Enabling receiver number:

The receiver number which is set, can be enabled by using following SMS command.

ENABLE<space>**RECEIVER**<space><receiver sequence number>

e.g. ENABLE RECEIVER 4

Here receiver 4 is enabled which receives alert messages, when input is triggered.

d. Disabling receiver number:

The receiver number which is already set, if don't want alert messages then it can be disabled. Receiver number is disabled using following SMS command.

DISABLE<space>**RECEIVER**<space><receiver sequence number>

e.g. DISABLE RECEIVER 4

Here receiver 4 is disabled which will not receive alert messages.

e. Setting RTC Time

This is optional feature. This command will work only if your product model supports it. Time and date stamp appears in data string transmitted to server. User can set time and date using following SMS command. Since the command is being issued using SMS, the time at which it gets delivered to modem is not guaranteed. Hence the accuracy of time being set in modem cannot be guaranteed. It is recommended to consider this delay approximately while issuing this command.

SET<space>**TIME**<space><DD/MM/YYYY><space><HH:MM:SS>

e.g. SET TIME 29/09/2016 17:11:00

Note:

- Single space cannot be replaced by multiple spaces.
- Specified time is in 24hour format

f. Enable RTC

This command is used to make date and timestamp appear in message string sent to receiver.

RTC<space>**ENABLE**

g. Disable RTC

This command is used to make date and timestamp disappear in message string sent to receiver.

RTC<space>DISABLE

h. Setting RTU information

This command is used to set the RTU information.

SET<space>RTUINFO<space><RTUID>,<REGISTER ADDRESS>,<FUNCTION CODE>

e.g SET RTUINFO 1,3220,02

RTUID – MODBUS RTU ID of connected device such as PLC

REGISTER ADDRESS – Register where the message code will be available.

FUNCTION CODE – MODBUS function code most typically 3 or 4

i. Setting default message

Whenever a message code that is not available in message table, modem sends default message to receiver. This default message is set using following command.

SET<space>DEFAULTMSG<space>DEFAULT MESSAGE

e.g SET DEFAULTMSG FAULT DUE TO DRY RUN

j. Clearing the table

This command is used to clear all the messages which is stored in message table.

TABLE<space>CLAR<space>

e.g TABLE CLEAR

k. Find empty row in a table

This command is to find the next available empty row in a table. If user set the messages from 1 to 30 then using this command it shows the empty row is 031 so user can set the next message in next free row

e.g. FIND EMPTYROW

Reply: NEXT AVAILABLE EMPTY ROW IS AT 031

l. Setting message string

Custom message can be set by following SMS command.

**SET<space>MESSAGE<space>ROW NUMBER,MESSAGE
CODE,MESSAGETEXT**

e.g SET MESSAGE 1,45,FAULT 45 DUE TO LOCATOR MALFUNCTION

m. Enable message code

The message which is set, can be enabled a message code by using following SMS command

ENABLE<space>MSGCODE<space><Message code>

e.g. ENABLE MSGCODE 22

n. Disable message code

The message which is set, can be disabled a message code by using following SMS command

DISABLE<space>MSGCODE<space><Message code>

e.g. DISABLE MSGCODE 22

o. Search message code

The message which is set, can be search a message code by using following SMS command

SEARCH<space>MSGCODE<space><Message code>

e.g. SEARCH MSGCODE 22

Reply:

p. Changing baud rate of modbus communication

This command can be used for changing the communication speed over Modbus interface. It is required that all the devices connected over RS485 bus support the communication baud specified here. Hence make sure to select setting which is also supported by other devices.

SET<space>BAUD<space><Desired baud rate>

e.g SET BAUD 19200

Note:

- Supported baud rate are 2400, 4800, 9600, 19200, 38400 and 57600.
- Factory default setting is 9600

q. Setting parity of modbus communication

This command can be used for changing the parity of communication over Modbus interface. It is required that all the devices connected over RS485 bus support the same parity selected here. Hence make sure to select setting which is also supported by other devices.

SET<space>PARITY<space><Desired parity>

e.g. SET PARITY EVEN

Note:

- Supported parity are EVEN ,ODD ,NONE
- Factory default setting is NO PARITY

r. Setting resending time

This command is to set the resend time of particular fault. Resend time is minimum 30 minutes to maximum 500minutes. Default setting disabled.

SET<space>RESENDTIME<space><Resend time in minutes>

e.g. SET RESENDTIME 30

This above command is used to resend the fault message after 30minutes.

s. Setting data collection interval time

Modem collects data from all configured RTU devices at specified interval. This interval is in seconds and can be configured using following command. The polling time can be as low as 200 mili seconds and up to 3000 mili seconds. Default setting for this interval is 1 seconds.

SET<space>POLLINTRVL<space><Interval time in seconds>

e.g. SET POLLINTRVL 500

APPENDIX

Troubleshooting notes

In normal operation, the modem's status LED blinks continuously. If the blue LED is in OFF state, the modem is in power down state. Following table provides various blink rates of LED for different situations.

LED STATUS	MODEM STATUS
OFF	The modem is in power down state
64mSec on / 800mSec off	The modem is not synchronized with GSM network.
64mSec on / 2000mSec off	The modem is synchronized with GSM network and is working normally.
64mSec on / 600mSec off	GPRS data transfer is ongoing

In case of GPRS data communication, modem requires considerable power during actual data transmission. Hence power supply is critical for reliable data communication. It is strongly recommended to use an industry grade power supply (SMPS) of at least 2Amp current rating for powering the modem. Also make sure that the antenna is properly connected to modem and placed at an elevated place where the modem can receive strong signal for communication.

Some more troubleshooting points are mentioned below.

Symptom: Modem not working at all

Reason: Check power supply. In many cases, bad power supply is main reason for modem to malfunction. Required power supply specifications are mentioned in relevant sections above. Make sure the modem has been connected with proper power supply with proper polarity.

Symptom: Modem powered on but not responding to any SMS queries

Reason: Check modem without connecting any device on bus. Many times wrong bus connections make the modem receive garbage data over bus and this result in modem continuously resetting itself trying to recover from the situation.

Also check if SIM card has sufficient space free to receive SMS. Check if antenna is properly connected and placed at elevated location.

Warranty statement

Products specified in this document are covered under warranty for a period of 12 months against manufacturing defects, workmanship and malfunction under normal operating conditions. The warranty is subject to the terms and conditions mentioned below.

1. The warranty commences from the date of sale for a period of 12 months irrespective of the actual installation date.
2. The warranty is against manufacturing defects and any subsequent malfunction of the instrument during the normal operation. The warranty shall not be applicable in case of accidental damage, damage due to wrong operation, connection or conditions that are out of normal operating specifications.
3. KARL PL, at its discretion may repair or replace the product depending on the condition of instrument, availability of spare parts and type of failure.
4. In case of warranty claim, the warranty period will not be extended and remains same as stated earlier from the date of sale.
5. Maximum liability of KARL PL remains up to repair or replacement of the product only. Any damages or losses raised out of use of the instrument are not covered by this warranty. In any case, cost of the product will not be refunded.
6. In case of warranty claim, the product should be sent over to KARL PL immediately after noticing the defect or failure. A detailed note of operating conditions in which fault occurred will be helpful in rectifying the defect.
7. Do not try to open or repair the instrument on your own. Warranty will stand null and void in such case. Products with tampered warranty seal will not be considered for warranty claims and regular service charges will be applicable.
8. In all claims, the company's decision will be final and legally binding.
9. Any and all disputes are subject to pune jurisdiction only.

Kurolikar Automation Research Labs Pvt Ltd
#226, Laxmi colony, Behind manish market,
Hadapsar, Pune - 411028.
www.AutomationResearchLabs.com
Email: sales@AutomationResearchLabs.com