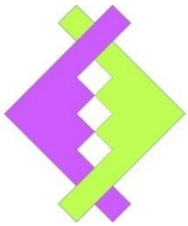

User manual

DIGITAL INPUT OUTPUT SMS ALERTING MODEM

V1.22

UASAGE NOTICE

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INTRODUCTION

Product:

1. 3 digital input SMS alerting modem

2. SMS alerting modem with expansion (16 inputs, 16outputs)

Data collection interface:

Configuration using SMS or serial RS232 interface

3 potential free digital inputs

16 Digital inputs using input expansion board

Data output:

Plain text SMS alert

16 open collector output when expansion board is connected

The SMS alerting modem gets information over digital interface from external device and automatically sends SMS if there is level change on any of digital inputs. Level change implies high to low (falling edge) and low to high (rising edge) voltage level change on any of the digital inputs. There is provision for setting independent message text for rising and falling edge for each of inputs. The modem monitors 16 inputs and each of can be used for generating different alert level. The message body to be sent in SMS can be anything set by end user. For every alert triggered, a total of up to 15 numbers will receive SMS. Any specific digital inputs can be 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.

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:

- 16 digital inputs for receiving alerting signal from external device
- Both rising and falling edge can be used. Separate message for rising and falling edge.

- Each input's rising or falling edge can be independently enabled/disabled
- Modem automatically sends SMS to predefined number whenever any of digital input is activated.
- 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 only.
- SMS message text and the alert receiver numbers can be set by master end user.
- Modem device can be configured from anywhere using SMS

Applications:

- Anti-theft alerting systems, Burglar alarms
- Remote monitoring of critical parameters such as temperature of ware houses, remote furnaces
- Remote monitoring of fire, smoke etc at remote location

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.

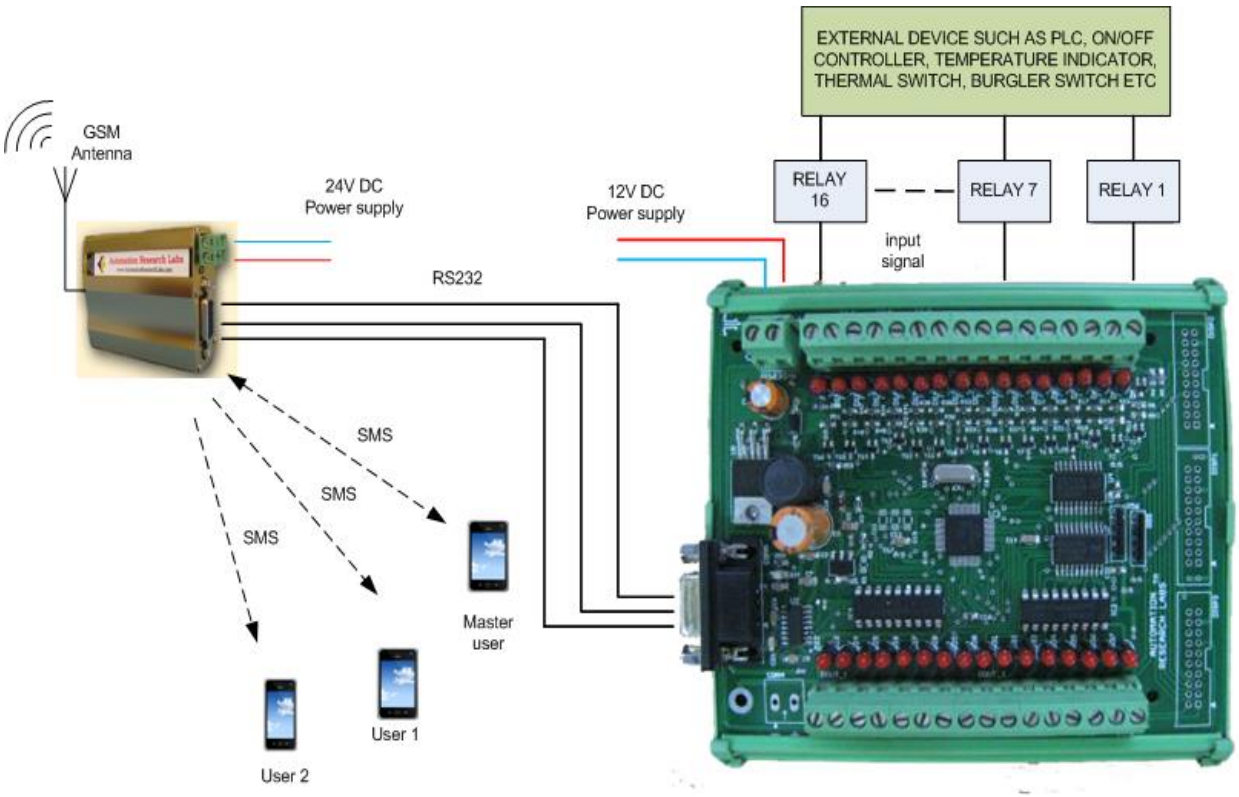
DB9 PIN	3 DIGITAL INPUT MODEM	16 DIGITAL INPUT MODEM
1	NC	NC
2	TXD RS232	
3	RXD RS232	
4	Digital input 1	Fault indicate signal
5	GND	
6	Digital input 2	NC
7	Digital input 3	NC
8	NC	NC
9	NC	NC
Case	Connected to Ground	

Table Terminology

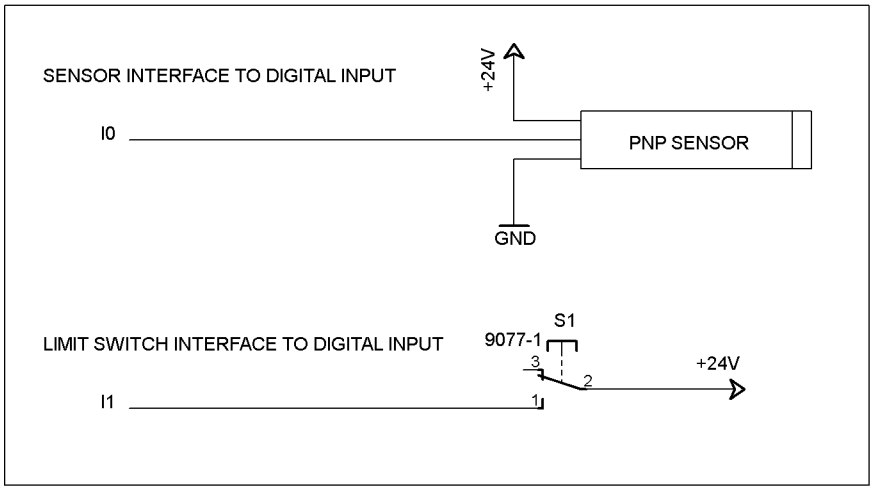
NC: No internal connection.
GND: Supply negative

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

Application Diagram:



Digital input connections



DEVICE CONFIGURATION

SMS Alerting 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 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***>

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 10 different receiver numbers can be set. Receiver number is set using following SMS command.

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 alert SMS for Rising Edge Input :

User can set separate alert SMS for all the 16 inputs. When any one of the input is triggered for **Rising edge**, then appropriate alert message is sent to all the receiver numbers which are set and enabled. Message body can be maximum of size 120 characters. Alert message can be set by following SMS command

SET<*space*>ALERTMSG<*space*>UP<*space*><*input sequence number*>,<*MSGBODY*>

e.g. SET ALERTMSG UP 1,INPUT 01 TURNED ON DUE TO RISING EDGE

Here alert message **INPUT 01 TURNED ON DUE TO RISING EDGE** is set for input 01 which is received to the set receiver number.

f. Setting alert SMS for Falling Edge Input :

User can set separate alert SMS for all the 16 inputs. When any one of the input is triggered for **Falling edge**, then appropriate alert message is sent to all the receiver numbers which are set and enabled. Message body can be maximum of size 120 characters. Alert message can be set by following SMS command

SET<*space*>ALERTMSG<*space*>DN<*space*><*input sequence number*>,<*MSGBODY*>

e.g. SET ALERTMSG DN 1,INPUT 01 TURNED ON DUE TO FALLING EDGE

Here alert message **INPUT 01 TURNED ON DUE TO FALLING EDGE** is set for input 01 which is received to the set receiver number.

g. Enabling Rising Edge Input channel:

Each input channel for Rising edge should be enabled for receiving alert message, by default all the inputs are enabled. Each input can be enabled by following SMS command

ENABLE*<space>*RISINGEDGE*<space><input sequence number>*

e.g. ENABLE RISINGEDGE 02

Here input channel 2 is enabled that is if input 2 is triggered for rising then receiver number receives alert message for input 2.

h. Disabling Rising Edge Input channel:

Input channel for which alert message for rising edge is not required such input channel can be disabled by using following SMS command

DISABLE*<space>*RISINGEDGE*<space><input sequence number>*

e.g. DISABLE RISINGEDGE 03

Here input channel 3 is disabled that is if input 3 is triggered for rising no alert SMS is received to any receiver number.

i. Enabling Falling Edge Input channel:

Each input channel should be enabled for receiving alert message, by default all the inputs for Falling edge are enabled. Each input can be enabled by following SMS command

ENABLE*<space>FALL*INGEDGE*<space><input sequence number>*

e.g. ENABLE FALLINGEDGE 02

Here input channel 2 is enabled that is if input 2 is triggered for falling then receiver number receives alert message for input 2.

j. Disabling Falling Edge Input channel:

Input channel for which alert message for falling edge is not required such input channel can be disabled by using following SMS command

DISABLE<*space*>*FALL*INGEDGE<*space*><*input sequence number*>

e.g. DISABLE FALLINGEDGE 03

Here input channel 3 is disabled that is if input 3 is triggered for falling no alert SMS is received to any receiver number.

k. Setting INPUT Type:

User can set input type as per the requirement as normally open that is NO type or normally closed that is NC type or EDGE type. Default input type is NO type.

INPUT<*space*>TYPE<*space*>NO

Here input type NO is set, on triggering input SMS set for Rising EDGE is received.

INPUT<*space*>TYPE<*space*>NC

Here input type NC is set, on triggering input SMS set for Falling EDGE is received.

INPUT<*space*>TYPE<*space*>EDGE

If input type EDGE is set, SMS is sent for both Rising EDGE and Falling EDGE of input.

l. Operation of output

User can operate all 16 outputs ON and OFF instantly using following command. It will operate the specified output immediately after receiving the SMS. User can give these commands from receiver numbers also. This feature is available only when expansion board is connected. Modem itself does not have any output port.

TURN<*space*>ON<*space*><*output number*>

e.g. TURN ON 03

Here output 03 turns on immediately as receives command

TURN<*space*>OFF<*space*><*output number*>

e.g. TURN OFF 03

Here output 03 turns off immediately as receives command

m. Setting communication baud rate:

The baud rate at which the communication with the external device should take place can be configured and set by using following SMS command.

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

e.g. SET BAUD 57600

Here communication baud rate is set to 57600

Note:

- Supported baud rates are 4800, 9600, 19200, 38400, 57600 and 115200.
- Factory default setting is 9600.
- Other communication settings are 8data bits, no parity and one stop bit.
- After setting new baud value modem should be power cycled.

FAULT SIGNAL

This feature is available only with 16 input output product.

The modem has auxiliary output signal to indicate any unhealthy situation during the operation. This signal is active high and gives voltage equal to power supply when any fault situation is encountered. In normal working condition, this signal is at 0 volt. This signal is asserted in multiple situations as detailed below

1. When SMS sending fails due to insufficient account balance, FAULT signal is asserted for approx. 50mSEc
2. When SMS sending fails due to invalid destination number, FAULT signal is asserted for approx. 50mSEc
3. In case of network connectivity loss, FAULT signal is asserted until network connectivity is resumed
4. In case of SIM registration failure, FAULT signal is asserted until problem related to SIM/network is rectified.

POWER CONSUMPTION

Power consumption for one 16DI16DO unit is approx. 1.1W to 8.2W
When modem is in idle state, power consumption is less than 600mW
During communication bursts power dissipation of modem can go up to 7.7W
For expansion card, power consumption is approx. constant at 500mW

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.

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