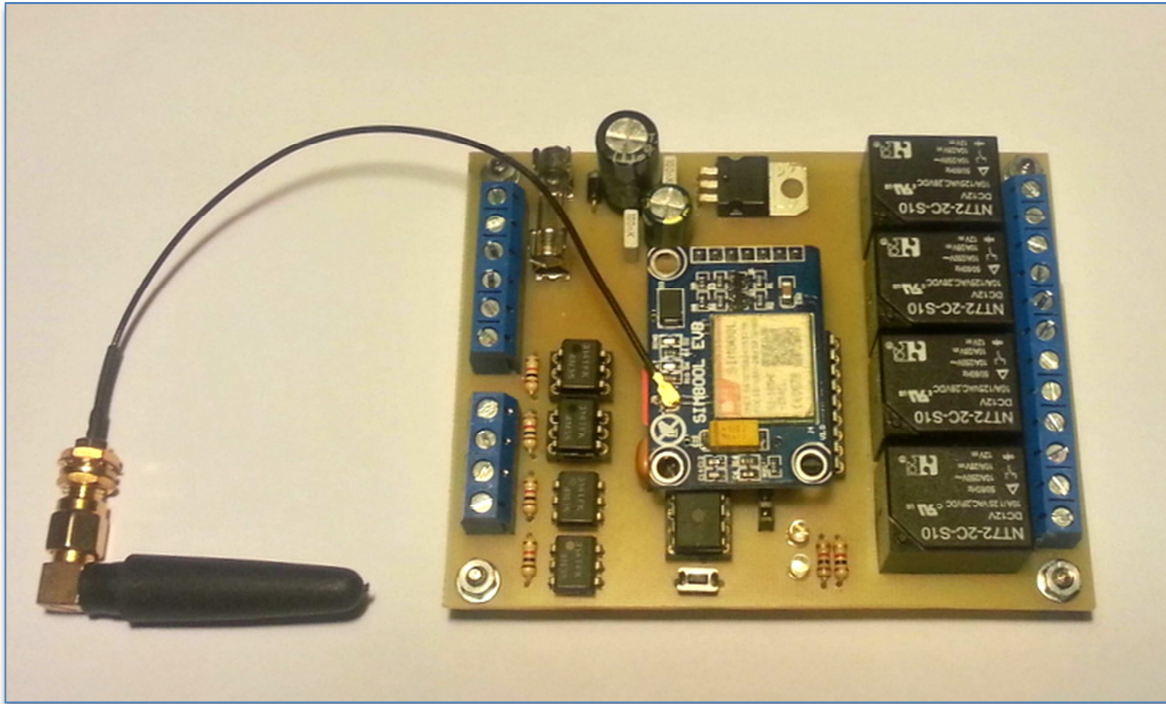


ARDUINO BASED GSM/SMS Remote Control Unit

USING

SIM800 GSM Module



Designed by
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Introduction

With such a wide range of GSM modules available for the hobbyist, most of us ended buying one. I purchased a SIM800L module locally, and ended up playing with the different commands of the module.

Using the Arduino Uno and the Arduino IDE, I was able to turn my ideas into reality. This did not come easy, with the **SINGLE BIGGEST ISSUE** being the limitation of only 2KB SRAM. After a lot of research on the internet and different forums, I was able to overcome this limitation.

Different programming techniques, a much better understanding of the Arduino compiler, and using the SIM card and EEPROM for additional memory, saved this project. After some changes to the code, a stable prototype was build and tested over a period of a week.

A drawback of the limited SRAM was that the unit could not be fitted with a display and user keys. This resulted in a complete rewrite of the code. With no user interface, the only option left to continue with the project was to make use of SMS messages to configure the unit, as well as the users.

This turned out to be an exciting project, and more futures were added as the development continued.

My main goal was to stick with the Arduino Uno, or in this case, the ATMEGA328p, and not use any surface mount components. This will make is easier for the general public to copy and build the unit.

Specification of the unit:

- Four digital outputs
- Four digital inputs
- A maximum of 250 users can be programmed on the unit
- Outputs that can be controlled by calling the unit can be set for each individual user
- Outputs that can be controlled by SMS messages can be set for each individual user
- SMS messages for changes on the Inputs can be send to 5 different users
- Inputs that is monitored, can be set for each of the 5 users
- Each output can be configured as a PULSE, TIMED or LATCHING output
- Output pulse duration can be set between 0.5 .. 10 seconds
- Output timer duration can be set between 1 .. 720 minutes
- Each input can be configured to trigger on OFF to ON changes.
- Each input can be configured to trigger on ON to OFF changes
- Each input delay time can be set between 0 seconds and 1 hour
- Names and status text for each input can be set by the user
- Names and status text for each output can be set by the user
- Unit can be configured to receive SIM card balance messages via USSD messaging.
- All users can request I/O status updates of the unit
- All users can control individual outputs via SMS messages
- All user can control individual outputs by calling the unit

Safety Features

- Initial setup of the unit can only be done while at the unit.
- Initial setup can only be performed by the MASTER USER
- Initial setup commands are automatically disabled after ten minutes.
- Only calls and SMS messaged from known users can control the unit
- Users can only operate the outputs assigned to them by the MASTER USER

Other Features

- Calls to this unit are free, as the call never gets answered.
- When the unit is called, the call will only drop after 2 seconds. This is confirmation to the caller that the unit responded to the call.
- If the SIM card service provider supports USSD messages, balance inquiries can be made by the MASTER USER. The USSD message that contains the balance will then be forwarded to the MASTER USER.

SIM Card requirements

For the unit to operate correctly, an active SIM card is required. Any SIM card from ANY Service Provider should work correctly in the unit.

Most of the functions of the unit do NOT require any airtime. Calls to the unit are free, and SMS to the unit is paid by the sender of such SMS's.

The following functions require airtime or an active SMS bundle to function correctly:

- Status Request of the unit.
- Balance Request of the installed SIM card.
- Notifications of any changes to the inputs of the unit.

SMS's sent from this unit is charged at the normal rate of the Service Provider.

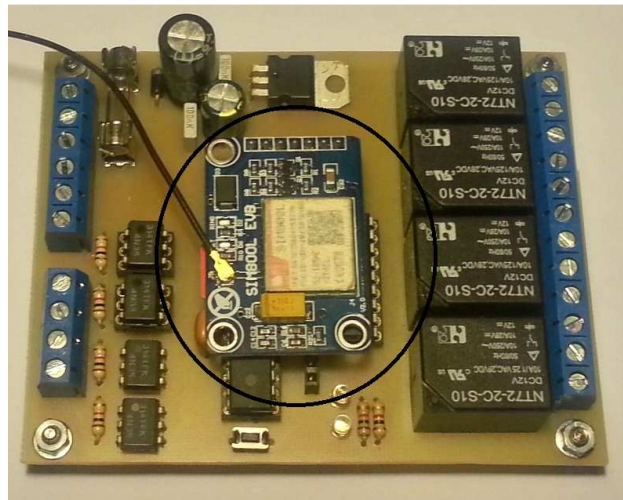
SIM Card Installation

NOTE: To insert or remove the SIM card of the unit, please remove power to the unit first.

The SIM card is located underneath the SIM800 module.

Follow these steps to Insert/Remove the SIM card:

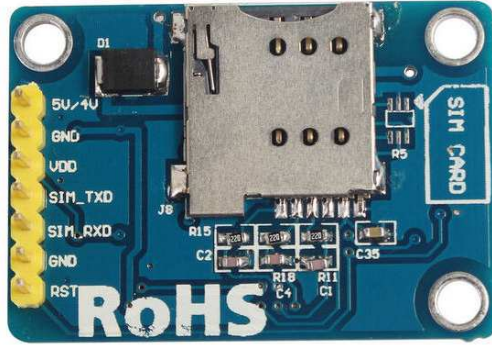
- Remove power from the unit. All LEDs on the unit should be OFF.
- Locate the SIM800 module on the unit.



- Gently unplug the SIM800 module from the main board, taking care not to damage the antenna wire of the unit. Do NOT unplug the antenna wire from the SIM800 unit.



- The SIM card is located on the bottom of the SIM800 module.



- To insert a SIM card, insert the SIM card as indicated on the bottom of the SIM800 module. Press the SIM card gently until it latches into position in the SIM card holder.
- To remove the SIM card, gently push on the SIM card, and release the SIM card. The SIM card will unlatch from the holder, and can now be safely removed.
- After SIM card installation, gently plug the SIM800 module back onto the main board. Please ensure that all 7 pins are inserted correctly on the main board socket.
- Reapply power to the unit.

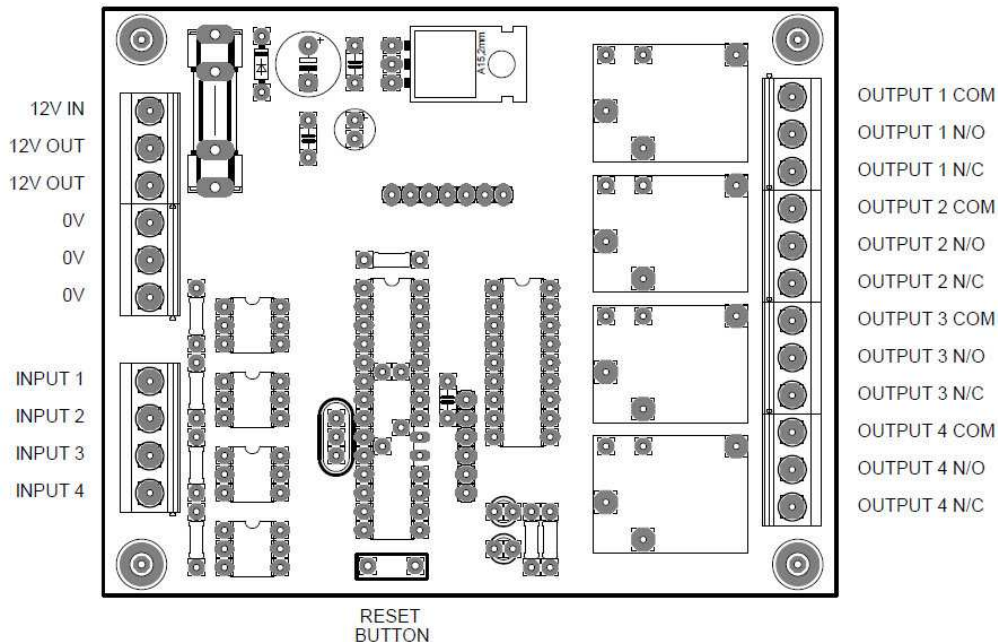
Electrical Connections

The unit is designed to operate from a standard 12V DC power supply, but will work between 10V and 15V. Higher input supply voltages are not recommended. The unit is equipped with reverse polarity protection, and will not turn on if the supply on if the input voltage is connected incorrectly. The unit is electrically protected by an on-board 1A fuse. Two 12V DC outputs are provided, and are also protected by the same 1A on-board fuse.

Power Supply

Connect the 12V DC power supply to the “12V IN” and any of the “0V” terminals.

Correct power supply connections will be indicated by the LEDs on the unit turning ON when the supply is switched on.



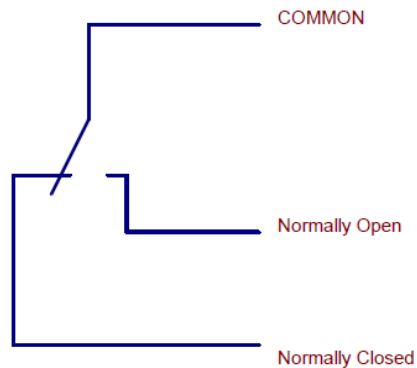
Outputs

The output channels consist of potential free change-over contacts, and are electrically isolated from the unit

. Contacts are rated as follow:

220V AC, 5 Amp.

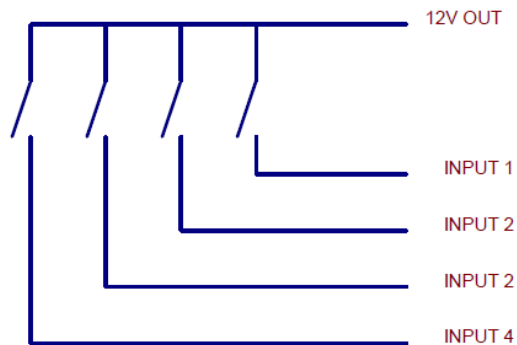
24V DC, 2 Amp.



Inputs

Inputs are activated by applying a 12V DC signal to each input. Each input is protected against reverse polarity.

- With 12V DC applied to the input, the input is registered as ON by the unit.
- With 12V DC removed from the input, the input is registered as OFF by the unit.
- When activated, each input consumes about 10mA.



First Time Setup

The first step in setting up this unit is to program the **MASTER USER** telephone number. This telephone number will be used to configure the various settings of this unit.

NOTE: Only ONE telephone number can be assigned as the **MASTER USER**.

Secondly, the unit must be restored to **FACTORY DEFAULTS**. This will erase all user programmable settings on the unit.

Lastly, all information on the SIM card must be erased to ensure no unwanted users can access the unit.

Programming of MASTER USER telephone number

To program the **MASTER USER** telephone number, you will need to be at the unit. Power up the unit, or if already powered up, press the **RESET** button on the unit.

Within 10 minutes, send an SMS to the unit's telephone number in the following format:

MASTER<n> **Note:** This command is case sensitive

Where n is a name that can be assigned to the unit (max 20 characters)
If no name is entered, the unit will use the default name.

If successful, the GREEN LED will flash 2 times. The MASTER USER will also receive a confirmation SMS.

If the command was sent after 10 minutes of rebooting the unit, or if the command fails, the RED LED will flash 5 times to indicate an error.

Erase all data from SIM card

NOTE: Only the **MASTER USER** can erase all data from the SIM card.

To erase all users from the SIM card, you will need to be at the unit. Power up the unit, or if already powered up, press the **RESET** button on the unit.

Within 10 minutes, send an SMS to the unit's telephone number in the following format:

CLEARSIM **Note:** This command is case sensitive

This will erase all the telephone numbers stored on the SIM card

The erase process can take a couple of seconds. During the erase process, the RED LED will be on.

If successful, the GREEN LED will flash 3 times.

If the command was sent after 10 minutes of rebooting the unit, or if the command fails, the RED LED will flash 5 times to indicate an error.

Reset the unit to FACTORY DEFAULT

NOTE: Only the **MASTER USER** can reset the unit to **FACTORY DEFAULTS**.

This command does NOT erase all telephone numbers stored on the SIM card. It does however erase the first 5 telephone numbers of the SUPER USERS from the SIM card. Refer to Add Users for more information on SUPER USERS.

To reset the unit to **FACTORY DEFAULT**, you will need to be at the unit. Power up the unit, or if already powered up, press the **RESET** button on the unit.

Within 10 minutes, send an SMS to the unit's telephone number in the following format:

CLEARALL **Note:** This command is case sensitive

This will restore the **FACTORY DEFAULTS** of the unit

If successful, the unit will reboot itself.

If the command was sent after 10 minutes of rebooting the unit, or if the command fails, the RED LED will flash 5 times to indicate an error.

Reset unit via SMS

NOTE: Only the **MASTER USER** can change this setting.

When it is necessary to reboot the unit, send an SMS in the following format:

RESET **Note:** This command is case sensitive

This will reset and reboot the unit.

Successful programming is indicated by the RED and GREEN LED flashing once.

Output Configuration

By default, all outputs are set to give a pulsed output of 1 second when activated. Each output can be configured independently for **PULSE**, **TIMED** or **TOGGLE** operation.

The output **PULSE** duration can be adjusted between 0.5 and 10 seconds.

The output **TIMED** duration can be adjusted between 1 and 720 minutes.

Output Modes

NOTE: Only the **MASTER USER** can change this setting.

To select which of the output channels must output a single pulse, send an SMS in the following format:

OUTMODE,c,m,t **Note:** This command is case sensitive

Where c is the channel numbers required to pulse
 m is the output mode
 P – for pulsed output
 T – for timed outputs
 L – for latching outputs
 t is the output time delay in minutes (1 to 720)

Example: *OUTMODE,1,p*
 sets output channel 1 to PULSE mode. Output 1 will turn on for the duration set in PULSETIME,
 then turn off

OUTMODE,2,t,5
sets output channel 2 to TIMER mode. Output 2 will turn on for 5 minutes, then turn off

OUTMODE,3,l
sets output channel 3 to LATCHING mode. Output will stay on until the next commed, then turn off

Successful programming is indicated by the RED and GREEN LED flashing once.

Setting of Pulse Output Duration

NOTE: Only the **MASTER USER** can change this setting.

The output pulse duration of all channels are set by a single command. The duration can be set between 0.5 seconds and 10 seconds. The setting is common to all channels.

To set the Pulse duration, send an SMS in the following format:

PULSETIME,t **Note:** This command is case sensitive

Where t is the duration (0 to 10 seconds).
 If t = 0, the pulse duration will be set to 0.5 seconds.
 If t > 10, the pulse duration will be set to 10 seconds.

Example: *PULSETIME,2*
 Will set the output pulse timer to 2 seconds.

Successful programming is indicated by the RED and GREEN LED flashing once.

Output Channel Description

NOTE: Only the **MASTER USER** can change these settings.

By default, the output channel descriptions are as follow:

Output Channel	Output Channel Text	Text when output is ON	Text when output is OFF
1	Output 1	On	Off
2	Output 2	On	Off
3	Output 3	On	Off
4	Output 4	On	Off

All descriptions can be changed as per requirements. The length of each text field is limited to 10 characters.

To change the description of an output channel, send an SMS in the following format:

OUTTEXT,c,tn, ton, toff **Note:** This command is case sensitive

Where c is the output channel number being changed.
tn is a logical name for the output.
ton is the text displayed when the output is ON.
toff is the text displayed when the output is OFF.

Example: *OUTTEXT,1,Pump,On,Off*
 will set output channel 1 name to "Pump", the ON text to "On", and the OFF text to "Off".

Messages received will be as follow:
When the output is on Pump On
When the output is off Pump Off

Successful programming is indicated by the RED and GREEN LED flashing once.

Input Configuration

By default, all input triggers are disabled. When a trigger is SET, an SMS will be sent to up to 5 **SUPER USERS** to notify them of changes on the input channels. Refer to Add Users for more information on **SUPER USERS**. Input channels can have their OFF-to-ON AND as well as their ON-to-OFF trigger set simultaneously.

When 12V is applied to an input, the state will change from OFF to ON. When the 12V is removed from the input, the state will change from ON to OFF.

Input OFF-to-ON Triggers

NOTE: Only the **MASTER USER** can change this setting.

The OFF-to-ON trigger of each channel can be set individually. To select which of the input channels must trigger on OFF to ON changes, send an SMS in the following format:

TRIGGERON,cccc **Note:** This command is case sensitive

Where cccc is the channel numbers required to trigger on OFF to ON changes

Example: **TRIGGERON,0204**
will set channels 2 and 4 to trigger on OFF to ON changes.

Successful programming is indicated by the RED and GREEN LED flashing once.

Input ON-to-OFF Triggers

NOTE: Only the **MASTER USER** can change this setting.

The ON-to-OFF trigger of each channel can be set individually. To select which of the input channels must trigger on ON to OFF changes, send an SMS in the following format:

TRIGGEROFF,cccc **Note:** This command is case sensitive

Where cccc is the channel numbers required to trigger on ON to OFF changes

Example: **TRIGGEROFF,1004**
will set channels 1 and 4 to trigger on ON to OFF changes.

Successful programming is indicated by the RED and GREEN LED flashing once.

Input Delay Timers

NOTE: Only the **MASTER USER** can change this setting.

The input delay of each channel can be set individually. This is the time before the input will register a change in status. To set each channel's input time delay, send an SMS in the following format:

INTIME,c,t **Note:** This command is case sensitive

Where c is the input channel timer to be set
t is the time delay in seconds. Max 3600 seconds (60 minutes)

Example: **INTIME,2,20**
will set input channel 2 input time delay to 20 seconds

Successful programming is indicated by the RED and GREEN LED flashing once.

Input Channel Description

NOTE: Only the **MASTER USER** can change these settings.

By default, the input channel descriptions are as follow:

Input Channel	Input Channel Text	Text when input is ON	Text when input is OFF
1	Input 1	On	Off
2	Input 2	On	Off
3	Input 3	On	Off
4	Input 4	On	Off

All descriptions can be changed as per requirements. The length of each text field is limited to 10 characters.

To change the description of an input channel, send an SMS in the following format:

INTEXT,c,tn, ton, toff **Note:** This command is case sensitive

Where c is the input channel number being changed.
tn is a logical name for the input.
ton is the text displayed when the input is ON.
toff is the text displayed when the input is OFF.

Example: *INTEXT,2,Alarm,Armed,Disarmed*
will set input channel 1 name to "Alarm",
the ON text to "Armed",
and the OFF text to "Disarmed".

Messages received will be as follow:
When the input is on Alarm Armed
When the input is off Alarm Disarmed

Successful programming is indicated by the RED and GREEN LED flashing once.

Types of Users

There are three different types of users that can be programmed. Each of the users will have different functions available to them.

Master User

The **MASTER USER** is the only user that can do the following:

- Erase device data.
- Erase SIM data.
- Programming of the unit parameters.
- Adding of Users.
- Deleting of Users.
- Request SIM card balances.
- Reset or Reboot the unit.

The following functions are unavailable to the **MASTER USER**:

- Calls received from this number will be ignored.
- Manually setting of output channels via SMS.
- Requesting of unit status via SMS.
- Receiving a warning SMS for changes on input channels.

The **MASTER USER** must also be added as a **SUPER USER** or **NORMAL USER** to be able to control outputs and/or receive SMS warnings on input changes.

Super User

The following functions are available to **SUPER USERS**:

- Control outputs by calling the unit.
- Manual setting of output channels via SMS.
- Requesting of unit status via SMS.
- Receiving a warning SMS for changes on input channels.

Normal User

The following functions are available to **NORMAL USERS**:

- Control outputs by calling the unit.
- Manual setting of output channels via SMS.
- Requesting of unit status via SMS.

Adding of Users

Different users are stored in different locations.

- **MASTER USER** Stored on the unit, not on the SIM card.
- **SUPER USER** Stored on the SIM card, in location 1 to 5.
Additional information also stored on the unit.
- **NORMAL USER** Stored on the SIM card, in location 6 to 250.

Master User

To program the **MASTER USER** telephone number, you will need to be at the unit. Power up the unit, or if already powered up, press the **RESET** button on the unit.

Within 10 minutes, send an SMS to the unit's telephone number in the following format:

MASTER **Note:** This command is case sensitive

This will save the MASTER USER number into memory

If successful, the GREEN LED will flash 2 times.

If the command was sent after 10 minutes of rebooting the unit, or if the command fails, the RED LED will flash 5 times to indicate an error.

Super User

NOTE: Only the **MASTER USER** can add new users to the system.

To add a new **SUPER USER** telephone number to the system, send an SMS in the following format:

Add,loc,nr,Coooo,Soooo,iiii **Note:** This command is case sensitive

Where loc is the location on the SIM card. Must be from 1 to 5 only.
nr is the telephone number of the new **SUPER USER**.
Coooo is the output channels that can be controlled by user when dialling
Soooo is the output channels that can be controlled by user via SMS
iiii is the input channels to be monitored.

Example: *Add,3,012345678,1200,1230,0034*
 *will save the number "012345678" to SIM card location 3 as a **SUPER USER**.*

*When a call is received from this number, outputs 1 and 2 will be pulsed or switched On/Off depending on the **PULSE** and **PULSETIME** setting.*

Only channels 1, 2 and 3 can be controlled via SMS

*A warning SMS will be sent to this number if any changes to input 3 and 4 are detected, depending on the **TRIGGERON** and **TRIGGEROFF** settings.*

Messages received will be as follow:

When the input is on Alarm Armed
When the input is off Alarm Disarmed

Successful programming is indicated by the RED and GREEN LED flashing once.

Once saved, a confirmation SMS will be sent to the new user.

*After adding the **SUPER USER**, please make sure to update the user details on the provided **USER DETAILS** list in Annexure A.*

Normal User

NOTE: Only the **MASTER USER** can add new users to the system.

To add a new **NORMAL USER** telephone number to the system, send an SMS in the following format:

Add,loc,nr,oooo **Note:** This command is case sensitive

Where loc is the location on the SIM card. Must be from 5 to 250.
nr is the telephone number of the new **NORMAL USER**.
oooo is the output channels that can be controlled when dialling the unit.

Example: *Add,19,9876543210,0004*
 *will save the number "9876543210" to SIM card location 19 as a **NORMAL USER**.*
 *When a call is received from this number, output 4 will be pulsed or switched On/Off depending on the **PULSE** and **PULSETIME** setting.*

Successful programming is indicated by the RED and GREEN LED flashing once.

Once saved, a confirmation SMS will be sent to the new user.

*After adding the **NORMAL USER**, please make sure to update the user details on the provided **USER DETAILS** list in Annexure A.*

Deleting of Users

NOTE: Only the **MASTER USER** can delete users from the system.

To remove a user from the system, you will need to know under which SIM card memory location the specific user was added. Refer to the **USER DETAILS** list in Annexure A.

To delete any user's telephone number from the system, send an SMS in the following format:

Del,loc **Note:** This command is case sensitive

Where loc is the location on the SIM card. Can be from 1 to 250. Refer to the **USER DETAILS** list.

Example: *Del,12*
 will delete the user with telephone number "1122334455" from SIM card memory location 12.

Successful deletion is indicated by the RED and GREEN LED flashing once.

*After deleting a user, please make sure to update the user details on the provided **USER DETAILS** list in Annexure A.*

Changing of User Options

No command is available to change user options. The only options available is ADD or DELETE users.

To change the user options (for instance the output channels that the user can control), at the user again using the **Add** command.

Balance Enquiry Configuration

NOTE: Only the **MASTER USER** can configure or request SIM card balances.

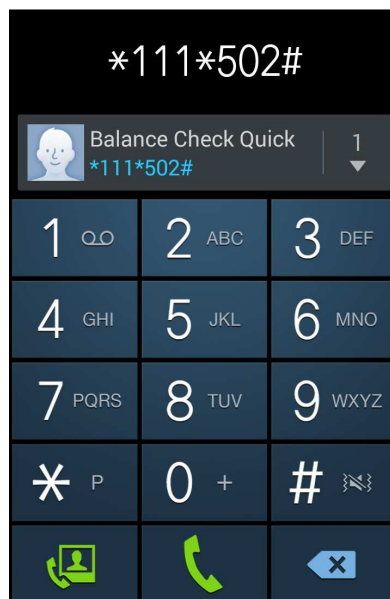
SIM card balance enquiry is done by sending a “USSD” code to the SIM card service provider. The service provider will then reply with a “USSD” message, containing the balance. As the unit does not have a display, the received “USSD” message containing the balance, will be forwarded to the **MASTER USER** telephone number.

Service Provider USSD Information

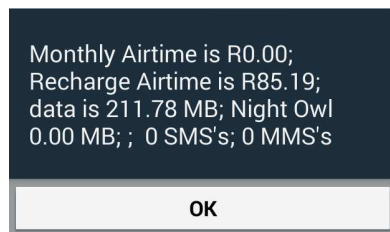
Each service provider has specific USSD codes for balance enquiries. Please obtain this USSD code directly from your service provider. Once you have the USSD code, test the USSD code with a telephone connected to the same service provider.

For VODACOM SOUTH AFRICA, the USSD code is: *111*502#

Dial the USSD code as you would dial a normal telephone number.



The service provider will respond by sending a balance summary back to your phone via USSD messaging.



Look at specific keywords in the message. For this example, “Airtime” will be used to determine if the USSD message is related to a balance request.

Setting up Balance Enquiry

NOTE: Only the **MASTER USER** can set up the Balance Request USSD setting.

To set up the USSD code, send an SMS in the following format:

SETUSSD,ussd,msg **Note:** This command is case sensitive

Where ussd is the USSD code to request a SIM card balance.

Msg is a unique part of the returned message to indicate the SIM card balance.

Example: **SETUSSD,*111*502#,Airtime**

*will set the USSD code to “*111*502#”, and wait for a USSD response containing “Airtime”.*

Successful programming is indicated by the RED and GREEN LED flashing once.

Requesting SIM Card Balance

NOTE: Only the **MASTER USER** can request a balance update.

To request for a balance update, send an SMS in the following format:

\$\$\$\$

Example: **\$\$\$\$**

will send an USSD code from the unit to the service provider.

the service provider returns the balance via USSD messaging.

*If the received USSD message contains “Airtime”, the unit will forward a SMS to the **MASTER USER** telephone number.*

Successful programming is indicated by the RED and GREEN LED flashing once.

Input/Output Status Request

NOTE: ANY user can request a status update from the system.

To request a status update, send an SMS in the following format:

????

Example: **????**

will request a status update.

the unit will respond with a SMS to the telephone number of the requester.



Successful status request is indicated by the GREEN LED flashing once.

Turning Outputs On/Off

The output channels of the unit can be controlled in two different ways:

- Dialling the unit.
- Send a SMS to the unit with the output channel to be controlled.

The output channels will be controlled according to the individual **USER**, **PULSE** and **PULSETIME** settings.

Dialling the Unit

NOTE: ANY user can control the individual output channels by dialling the unit.

Unknown Numbers

When the unit receives a call from an unknown telephone number, the unit will automatically drop the call within half a second.

This will be indicated by the RED LED flashing once.

Known Numbers

When the unit receives a call from a known telephone number, it will ring for about 2 seconds before dropping the call automatically.

This will be indicated by the GREEN LED flashing once.

The output channels saved under the specific user telephone number will be controlled according to the individual **USER**, **PULSE** and **PULSETIME** settings.

Example: Incoming call from 1122334455

- Refer to the **USER DETAILS** list in Annexure A for each user options.
- This number is stored in SIM card memory location 12.
- Output channels 2 and 3 can be controlled by this user.
- The output channels saved under the specific user telephone number will then be controlled according to the individual **USER**, **PULSE** and **PULSETIME** settings.

Sending a SMS

NOTE: ANY user can control the individual output channels by sending a SMS to the unit.

Unknown Numbers

When the unit receives a SMS from an unknown telephone number, it will be indicated by the RED LED flashing once. The unit will ignore the SMS.

Known Numbers

When the unit receives a SMS from a known telephone number, it will be indicated by the GREEN LED flashing once.

The output channels saved under the specific user telephone number will be controlled according to the individual **USER**, **PULSE** and **PULSETIME** settings.

Pulsed or Timed Output Channels

NOTE: ANY user can control the output channels of the system.

Example: Assume the following settings:
Output 1 was configured as a **PULSE** or **TIMED** output with the **OUTMODE** command.
Output 1 description was configured as "Gate","On","Off" with the **OUTTEXT** command.

To pulse or turn on output channel 1, send an SMS in the following format:

Gate **Note:** This command is NOT case sensitive

PULSED mode - will turn on output 1 for the duration stored with the PULSETIME setting

TIMER mode - will turn on output 1 for the time stored with the OUTMODE setting. If the command is received while the output is already on, the timer will be reset, and start again

If the names of the output channels are not known, they can be retrieved with the "???" command.

Toggle Output Channels

NOTE: ANY user can control the output channels of the system.

Example: Assume the following settings:
Output 2 was configured as a **Toggle** output with the **PULSE** command.
Output 2 description was configured as "Alarm","On","Off" with the **OUTTEXT** command.

To control output channel 2, send an SMS in the following format:

AlarmOn **Note:** This command is NOT case sensitive

will turn on output channel 2.

AlarmOff **Note:** This command is NOT case sensitive

will turn off output channel 2.

If the names of the output channels are not known, they can be retrieved with the "???" command.

Status Indication Lights

There are four LEDs to indicate the status of the unit.

Main PC Board indications

Green LED	Red LED	Description
Off	1 Flash	SMS of phone call from unknown telephone number
Off	2 Flashes	Invalid SMS command received
1 Flash	Off	SMS of phone call from valid telephone number
2 Flashes	Off	MASTER USER programmed successful
3 Flashes	Off	SIM card erased successful
Flashing	Flashing	Factory Reset complete. Press Reset button
1 Flash	1 Flash	SMS command from MASTER USER successful
Off	5 Flashes	Initial Setup not done within 10 minutes. Retry initial setup
Off	On	Waiting for network connection after system restart (max 2 min), or Waiting for SIM card to be erased after CLEARSIM command
On	Off	Busy sending of SMS message

SIM800L Module indications

NET LED	Ring LED	Description
-	Off	No power to the unit
-	On	Power present on the unit
1 Flash/second	On	Waiting for network connection after system restart (max 2 min)
Rapid Flashing	On	System Ready. 10 minute timer active for initial setup
3 Flashes/second	On	System ready

Annexure A: User Details

SIM Memory Location	User Name	Telephone Number	Output Channels	Input Channels
1				
2				
3	Demo SUPER USER 1	012345678	12	34
4				
5				
6				
7				
8				
9				
10				
11				
12	Demo NORMAL USER 2	1122334455	23	
13				
14				
15				
16				
17				
18				
19	Demo NORMAL USER 1	98765432210	4	
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
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41				
42				
43				
44				
45				
46				
47				
48				
49				

Annexure B: System Default Settings

Output Configuration

PULSETIME	1	Output pulse time
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Output Channel Modes	Mode	Output Timer
1	Pulsed	-
2	Pulsed	-
3	Pulsed	-
4	Pulsed	-

Output Channel Text

Output Channel	Name	On Text	Off Text
1	Output 1	On	Off
2	Output 2	On	Off
3	Output 3	On	Off
4	Output 4	On	Off

Input Configuration

TRIGGERON	0000	Channels to trigger on OFF-to-ON transitions
TRIGGEROFF	0000	Channels to trigger on ON-to-OFF transitions

Input Channel Time Delays

Input Channel	Time (seconds)
1	1
2	1
3	1
4	1

Input Channel Text

Input Channel	Name	On Text	Off Text
1	Input 1	On	Off
2	Input 2	On	Off
3	Input 3	On	Off
4	Input 4	On	Off

USSD Balance Request Configuration

SETUSSD	*111*502#,Airtime	USSD Number followed by keyword in returned USSD message
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Annexure C: List of Commands

MASTER USER COMMANDS – All commands are case sensitive

MASTER	Set the MASTER USER telephone number
CLEARALL	Restore the unit to FACTORY DEFAULTS
CLEARSIM	Erase all numbers stored on the SIM card
RESET	Restart the unit
OUTMODE,c,m,t	Set output channel mode
PULSETIME,t	Pulse time in seconds (0 to 10). 0 is 500ms
OUTTEXT,c,name,on,off	Set output channel descriptions
TRIGGERON,cccc	Input channels that will trigger on OFF-to-ON transitions
TRIGGEROFF,cccc	Input channels that will trigger on ON-to-OFF transitions
INTIME,c,t	Input channel time delay on change in seconds (3600 max)
INTEXT,c,name,on,off	Set input channel descriptions
SETUSSD,nr,text	Set balance enquiry number and text
Add,loc,nr,out,in	Add new user, memory location, number, output channels, input channels
Del,loc	Delete user from specific memory location
\$\$\$\$	Request SIM card balance
????	Request status of inputs and outputs
ChName	Activate PULSED or TIMED output channel
ChName + On/Off Text	Toggle LATCHING output channels On/Off

USER COMMANDS – All USER COMMANDS are NOT case sensitive

????	Request status of inputs and outputs
ChName	Activate PULSED output channel
ChName + On/Off Text	Toggle output channels On/Off