

# QK-G021/022 GSM Remote Controller application notes

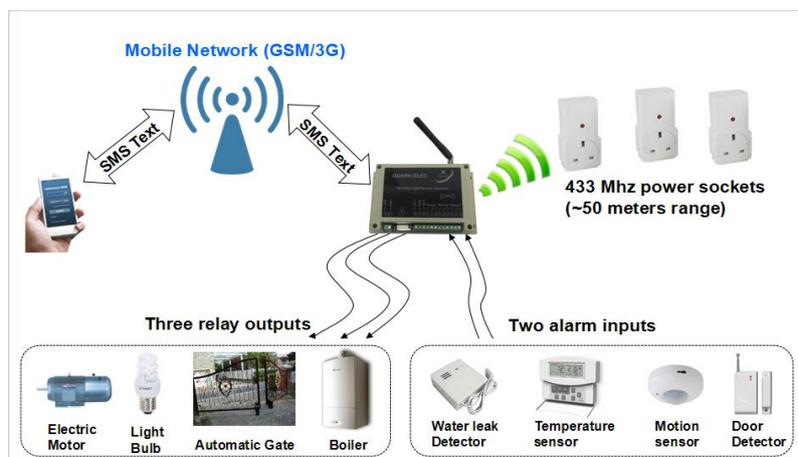
## Features

- Remote control from mobile phones
- Android and iOS APP interface
- Easy to install and configure (no PC required)
- Up to 4 mobile phones per unit
- Outputs controlled by SMS message
- Request status via SMS
- In-built clock for programming the switch state
- Automatically send SMS message after alarm trigger
- 433 Mhz remote control transmitter (up to 4 terminals)
- Wireless passive infrared (PIR) motion detector
- Waterproof enclosure
- Compatible with all major SIM networks
- Tri-band GSM for use in Europe & USA



## Applications

- Remote control by GSM mobile phones
- Remote maintenance
- Remote warnings / alarms
- Electric doors, shutters
- Irrigation systems
- Remote system monitoring
- Plant maintenance
- Valve control
- Pumping stations
- Oil/gas pipeline control
- Central heating systems
- Security systems
- PLC and automation systems
- Alert/panic caller



## Document history

Issue	Date	Changes / Comments
1.0	04-10-2013	Initial release
1.39	03-07-2014	Fix a bug: Use 'BD1(mobile number)F' as the registration of additional mobiles command. Still use '5+n(mobile number)F' for 1.0 and 1.1 hardware version.
1.40	30-07-2014	Release QK-G022R433US (US type power sockets)
1.44	12-12-2014	Use 'WHOACTIVE' to replace 'RSTATUS' message to check the relay status.
1.45	03-04-2015	Support 'ONOFFRnxx#' SMS command.
1.47	09-12-2015	Release QK-G022P433 (supports wireless PIR motion detector).
1.48	14-02-2016	Minor changes and corrections
1.49	23-03-2016	Release QK-G022G (supports GPS positioning function).
1.50	17-04-2016	Add 'EXTGBn' command to support disabling the external alarm input function.

## Order Information

Part No	Description
QK-G021	GSM remote control module
QK-G022	QK-G021 with waterproof enclosure
QK-G022R433UK	QK-G022 with RF transmitter and three RF433 Mhz control power sockets (UK type)
QK-G022R433EU	QK-G022 with RF transmitter and three RF 433 Mhz control power sockets (EU type)
QK-G022R433US	QK-G022 with RF transmitter and three RF 433 Mhz control power sockets (US type)
QK-G022P433	QK-G022 with PIR sensor receiver and one wireless 433 Mhz PIR sensor
QK-G022G	QK-G022 with GPS receiver

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## 1 INTRODUCTION

The QK-G021/022 series remote controller is a versatile device which can be attached to many electronic devices in homes, offices, plant or wherever required. It includes three independent relay switches, two digital alarm inputs and one 433/315 Mhz RF transmitter module. It allows operators to control/monitor remote equipment, machines or power sockets using SMS (Short Message Service) via the GSM network. Up to 4 mobile phone numbers (SIM card numbers) can be registered with the remote controller. These mobile phones can belong to technicians, engineers or individuals who have a requirement to control and/or monitor corresponding devices.

- Three relays - two with daily timers which can be used to setup the relay switch on/off time.
- Two digital alarm inputs - various sensors can be monitored and an alarm SMS can be sent out when the sensors are triggered.
- One 433/315 Mhz RF transmitter module (QK-G022R433 variant) - three RF power sockets within 25 meters of QK-G021/022 can be controlled by SMS.
- One wireless PIR receiver (QK-G022P433 variant) - receiving wireless PIR motion detector alarm signals.
- Four control mobile phones - one main control terminal and up to 3 additional control terminals can be registered with QK-G021/022.
- APP for Android and iOS (iPhone) - remote control/monitor supported by a touch sensitive, user friendly interface (text free).

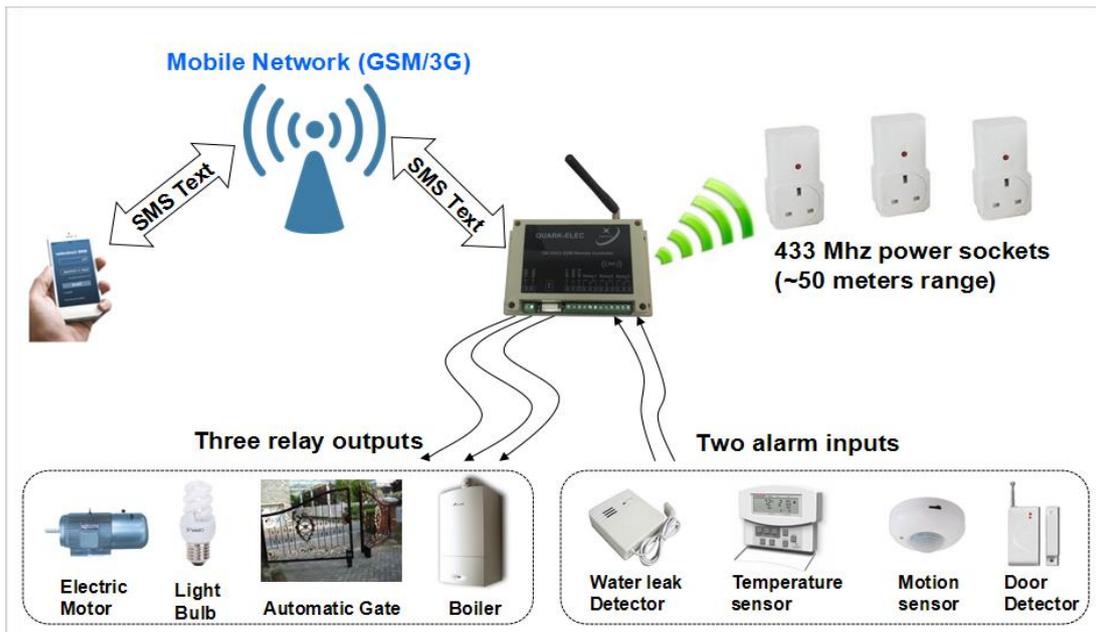


Figure 1 System diagram

## 2 PREPARING THE SIM CARD

All new SIM cards must be registered with the network provider before they can be used, usually by calling the network provider or by registering online. Please refer to the instructions supplied with your SIM card.

After successfully registering the SIM card, ensure there is sufficient credit on the card for programming confirmation texts to be sent from QK-G021/022 module. The PIN request option should be disabled from the SIM card before inserting it into the QK-G021/022 module. To check the PIN request status of your SIM card, place the card in an unlocked mobile phone and switch the phone on. If normal calls can be made without entering a PIN number, then it is disabled. Please also make sure voicemail is disabled before inserting the SIM card into the module.

If a 'pay as you go' (PAYG) SIM card is used, it is recommended that users choose to automatically 'Top-Up' when the credit falls below a certain limit. Some PAYG SIM cards will be de-activated by the network if they are not used to make an outgoing voice call or send an SMS text message within a specific period. To prevent this, simply send the QK-G021/022 a text 'DQSJ' (this can be done through the APP) and QK-G021/022 will reply with the local time by text message. This should be done once a month to keep the SIM card active.

### 3 HARDWARE

#### 3.1 Module

A general view of the module is shown below and details of the function of each component is described in the next section.

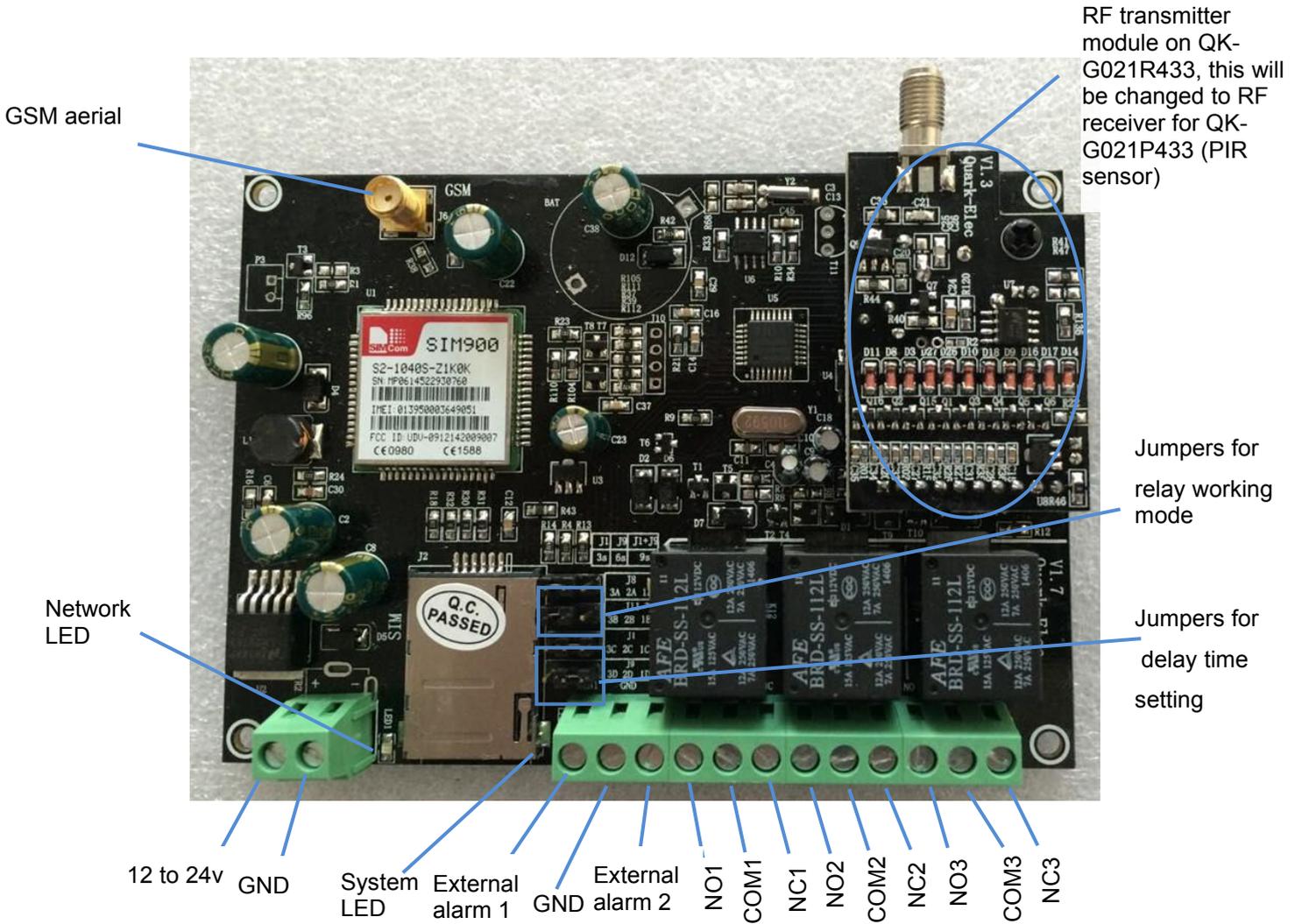


Figure 2 General view of the control module (V1.7)

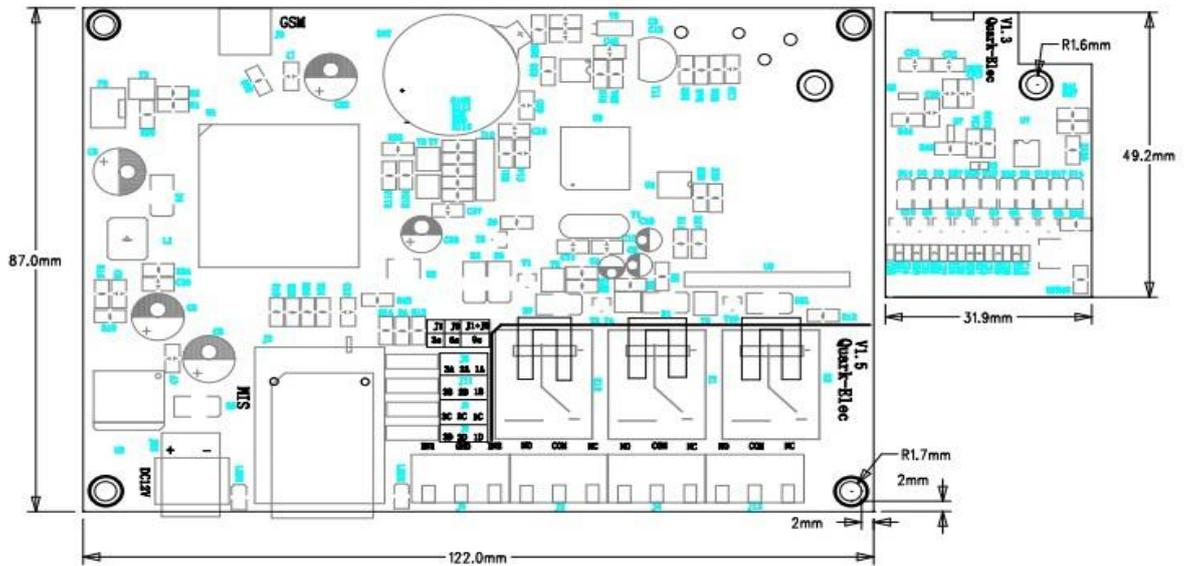


Figure 3 QK-G021 mechanical drawing (V1.7)

### 3.2 Power connections

The QK-G021/022 module can be powered by 12V DC (V1.7 or higher hardware version support 12V DC to 24 VDC power supply). Connect a 12V DC power supply to the power screw terminals 1 & 2, ensuring positive is connected to terminal 1 and switch on the power supply. The red power LED will flash at 1 second intervals once the system has finished initialization. The blue network LED indicator will initially flash quickly and, once logged onto the network, it will flash more slowly, approximately once every 3 to 4 seconds.

### 3.3 Relay working modes

The QK-G021/022 is equipped with three digital output relays. Two of them support the daily timers of the actions of the output. The relays can switch to ON/OFF states according to the timer settings. These two relays also support two working modes, self-lock and latching control.

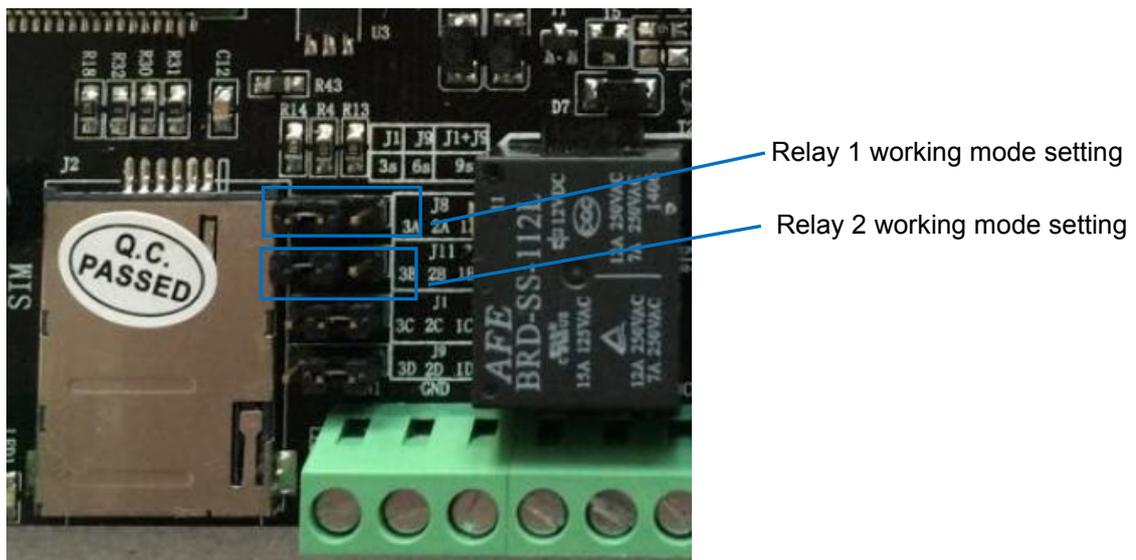


Figure 4 Relay working mode configurations

	Self-lock control.
	Latching control, which means the relay reverts back to normal status after a period of seconds.

### 3.4 Delay time setting on latching mode

Working in latching mode, operators can configure QK-G021 with different delay times for Relay 1 and Relay 2 by setting the delay time jumpers.

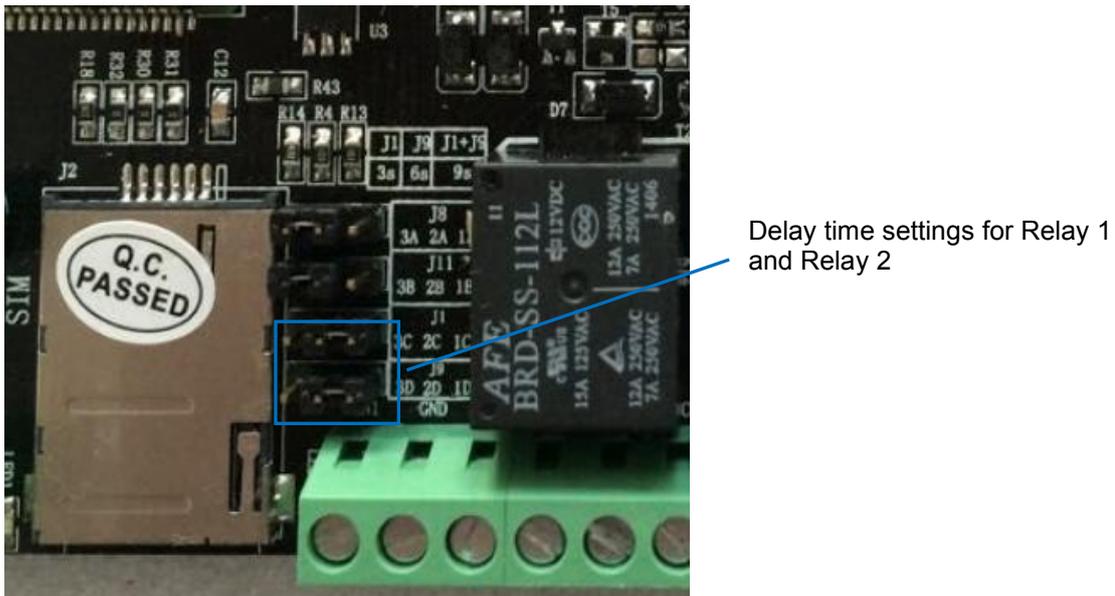
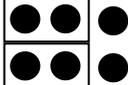
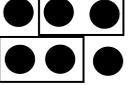
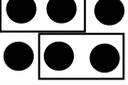
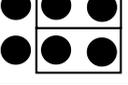


Figure 5 Delay time setting for relays

	Delay time set as: 12 seconds
	Delay time set as: 9 seconds
	Delay time set as: 6 seconds
	Delay time set as: 3 seconds

On V1.6 and later hardware versions, QK-G021/022 provides SMS commands in 'ONOFFRnxx#' format to support other delay times (from 3 seconds to 99 seconds), where 'n' indicates the relay number (1 or 2) and xx means the delay times (from 03 to 99 seconds). More details about this command can be found at section 6.

### 3.5 Alarm function and digital input connection

QK-G021/022 has two external alarm input connectors and various sensors can be connected to them. For example, door/windows sensors, motion sensors, temperature/wind detectors, carbon dioxide detectors and water leak detectors. Using these sensors/detectors, QK-G021/022 can be set up as a protection/alarm system.

QK-G021/022 external alarm inputs are active when a trigger pulse or a constant level of 0 V is applied. If the sensor/detectors are triggered and they send the low level signal (0 V) to QK-G021/022, QK-G021/022 will send out an SMS to the registered mobile terminals. Meanwhile, the corresponding relays will also be activated.

Alarm input port	Corresponding relay number
External alarm 1 (INT1)	Relay 1
External alarm 2 (INT2)	Relay 2

Note: Alarm input function does not support Relay 3 on the standard QK-G021/22. However, the wireless PIR detector works with Relay 3 on the QK-G022P433 variant. More details can be found at the 'Wireless PIR detector (QK-G022P433 variant)' section.

There are two typical ways to connect the external alarm inputs to QK-G021/022. External alarm devices can be used as switches or as an input source for INT1/INT2 of the QK-G021/022 module.

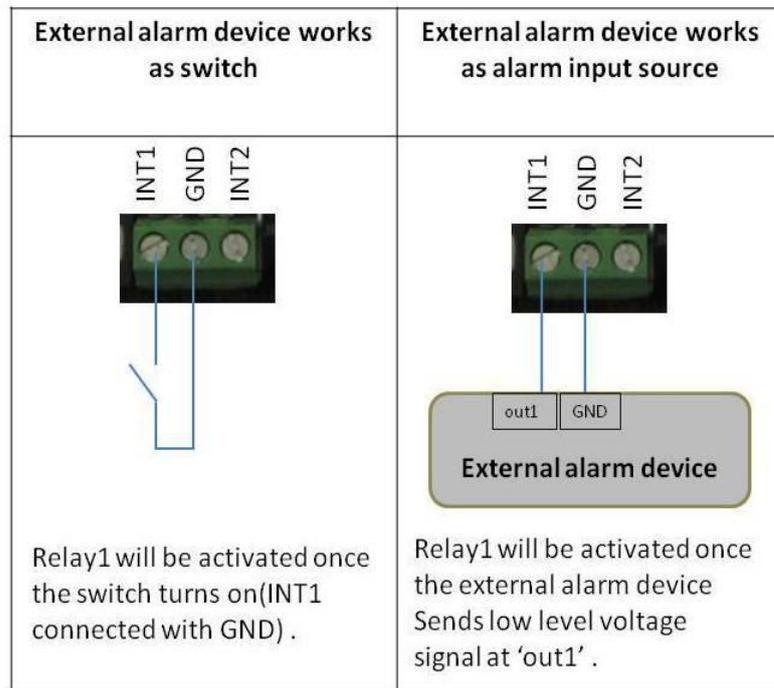


Figure 6 External alarm device connecting methods

### 3.6 Registration of SIM cards

Users can setup the authorised telephone numbers within QK-G021/022. The controller will verify the incoming number if they are indexed in the registered SIM numbers, the QK-G021/022 controller will hang up and then execute the actions.

### 3.7 SIM card slot

The SIM card should be inserted into the SIM card slot before applying the power. Most 3 V SIM cards can work with the QK-G021/022 module. SIM registration can take a few minutes after powering up and the network LED flashes at 1 Hz after registration is completed.

### 3.8 RF transmitter pairing (QK-G022R433 variant)

The QK-G022R433 series controller has a 433 Mhz RF transmitter module. It can pair with up to four RF switch sockets. The operator is able to switch sockets ON/OFF using SMS messages from the remote end. Please note that the QK-G022R433 variant does not support wireless PIR sensor alarm input (which QK-G022P433 does support).



Figure 7 RF power socket & QK-G022

QK-G021/022 RF module works at 433.92 MHz with ASK modulation. It can communicate with the paired switch sockets within 50 meters range in an open area.

The switch sockets have been paired and ready to use if they are ordered together with QK-G021/022. However the operator can always pair or release the pairing using the following steps:

- Insert the RF switch socket into a powered mains wall socket.
- The LED light on the socket should flash at 1 second intervals, indicating that it is ready to pair with the QK-G021/022. If the light does not flash, press and hold the ON/OFF button for 5 seconds to clear the memory indicated by the quickly flashing LED.
- Send the SMS as 'ONRFn', where n is the RF socket number (this could be 1, 2 or 3). This step can also be operated through the APP by pressing the corresponding RF switch n 'ON' button.

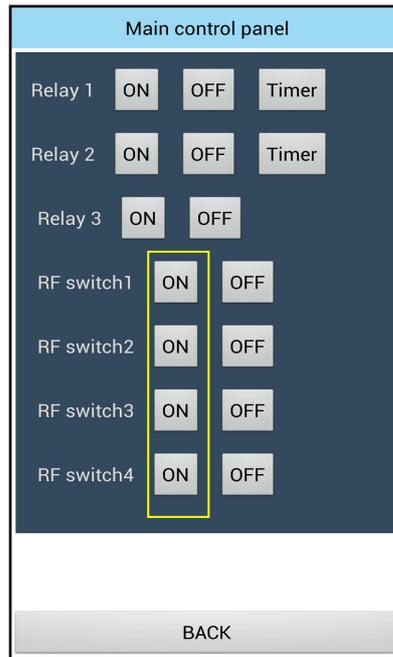


Figure 8 RF switch ON buttons

- Once QK-G021/022 receives the SMS and sends out the pairing signal, the LED light on the socket will briefly flash more quickly and then flash at 1 second intervals. The RF switch socket should be successfully paired at that point.
- Repeat above process for each different switch socket.

Simply plug the appliance which you want to operate remotely into the socket and press the corresponding ON button on the APP that is paired to the socket. The appliance will then turn on.

### 3.9 RF mains sockets

Customers can select US, European or UK type RF mains sockets. Like most of the similar RF mains sockets in the market, users should keep at least a 0.2 meter distance between one RF mains socket and another. This is due to EMC interference between the RF mains sockets.

Although QK-G021/022 has specific algorithms running to increase the RF transmission reliability, Quark-Elec cannot guarantee a 100% action rate of RF mains sockets. The QK-G021/022 RF signal could be affected by other nearby RF devices, such as bell rings, car keys, cordless phones, mobile phones and RF alarm systems. The following table shows actual test results taken in a house environment:

Distance between QK-G022 and 433 Mhz RF mains sockets	Proper action rate (RF mains sockets successfully triggered by QK-G022)
2 meters	100.0%
5 meters	100.0%
8 meters	99.7%
10 meters	98.1%
15 meters	95.6%
20 meters	93.2%

### 3.10 Wireless PIR detector (QK-G022P433 variant)

QK-G022P433 series controller has a 433 Mhz RF receiver module. It can pair with one wireless PIR (passive Infrared sensor motion detector, also called a PIR sensor). Please note that QK-G022P433 cannot pair with any RF mains sockets.

QK-G022P433's RF receiver module works at 433.92 MHz and can talk to the paired wireless PIR sensor within 25 meters range in open areas. Once QK-G022P433 receives an alarm signal from the paired PIR detector, Relay 3 will be activated and locked until 'EXTRT' has been sent to unlock Relay 3. The main mobile terminal will receive the warning message '[Port 3 has been triggered](#)' at the same time.

The switch sockets are paired and ready to use if they are ordered together with QK-G021/022. However the operator can always pair or release the pairing by the following steps:

- Switch off the PIR detector.
- Power up QK-G021/022 module, wait at least 60 seconds.
- Using a small flat head screwdriver, press and hold the button on the receiver module. The LED light on the receiver module will turn off. Release the button until the LED light turns on. Once the LED light turns on, the memory on the module has been erased and is ready for pairing.



Figure 9 QK-G022P433 module

- Press the button on the module quickly again. The LED light will turn off again. Now the module is in 'ready-to-pair' mode and will only stay in this status for 10 seconds. During these 10 seconds, switch on the PIR detector with the sensor side facing the operator's body. This allows PIR detector to send a detecting signal. The LED will flash six times when the PIR is paired with the QK-G022P433 module. If the pairing process could not be completed during 10 second, the operator can press the button again to repeat this step.
- QK-G022P433 will now be successfully paired with the wireless PIR detector.

To confirm this, restart QK-G022P433 and hold the wireless PIR detector in the hand (facing the sensor side to the operator's body). After about 10 seconds, a click sound from QK-G022P433 will be heard. This comes from the Relay3 action triggered by the PIR detector.

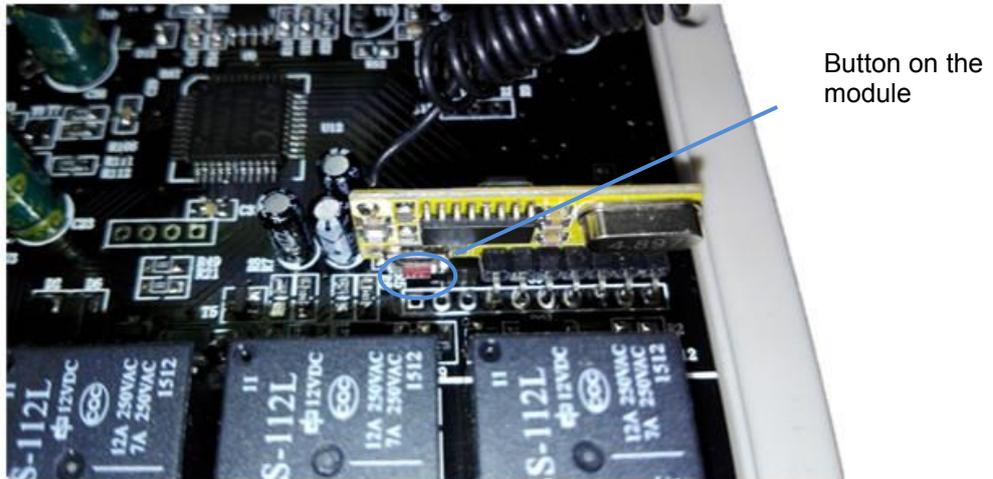


Figure 10 RF receiver module

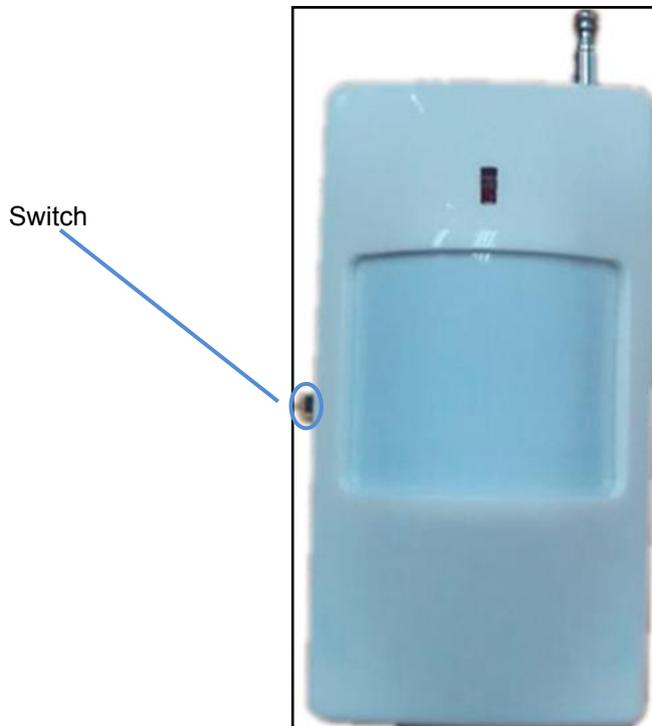


Figure 11 Wireless PIR detector

### 3.11 GPS receiver (QK-G022G variant)

QK-G022G series controller has a build-in high performances GPS receiver module. This GPS receiver accurately provides position, velocity, and time readings as well possessing high sensitivity and tracking capabilities. The receiver supports 38 channels in search mode and 16 channels “all-in-view” tracking.

By sending ‘DQGPS’, the registered mobile terminal will receive a message which have the speed of the module and a web link similar like this:

\*\*\*0.984Km#<http://maps.google.com/maps?q=51.961718,-0.269798> .

In the message, 0.984km indicated the moving speed is 0.984km/h. And this link contains the position information of the QK-G022G. Open the link in any web browser, Google map with the position icon will be displayed. The following is a example of the page.

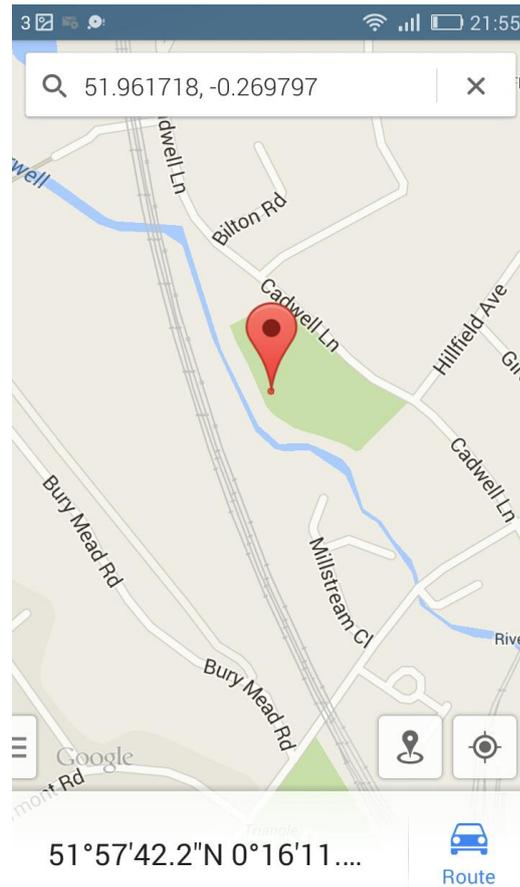


Figure 12 Google map with QK-G021 current position

### 3.12 Enclosure

The enclosure is made of IP56 Insulation Class 2 plastic, 145 x 90 x 41 mm external dimension.

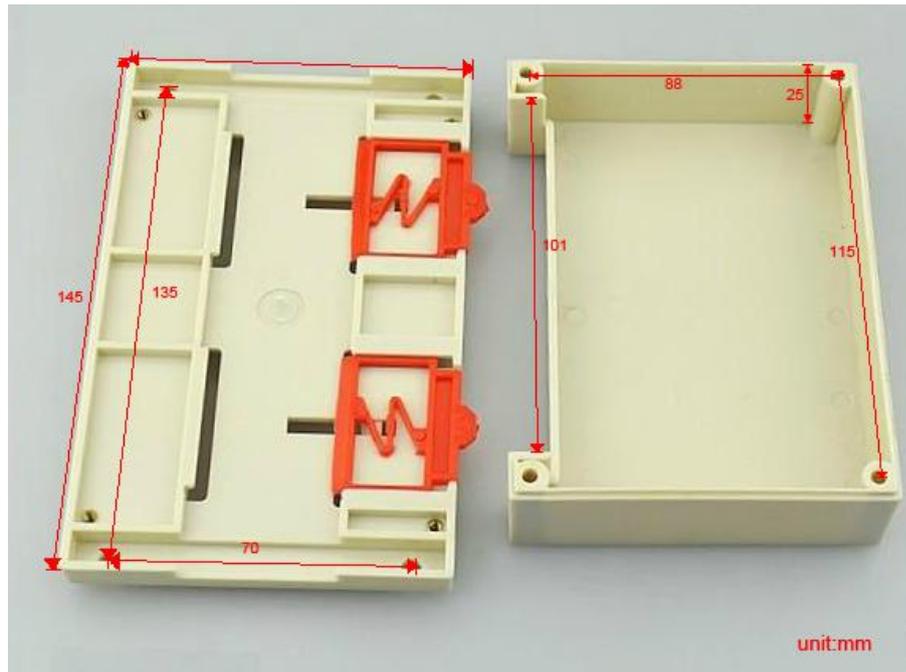


Figure 13 Enclosure drawing



Figure 14 GK-G022 (with enclosure)

## 4 APP ON ANDROID AND IOS

APP provides a touch sensitive, user friendly interface (text free) for operators to control GK-021/022.

The latest APP for the Android platform can be downloaded from the following link:  
<http://www.quark-elec.com/download/apps>

The Android platform should be at least V 2.1 or higher. An APP for the iOS platform can be downloaded from Apple store.

### 4.1 Setup

After installation, on opening the APP for the first time, users will see the following page for finishing the setup process:

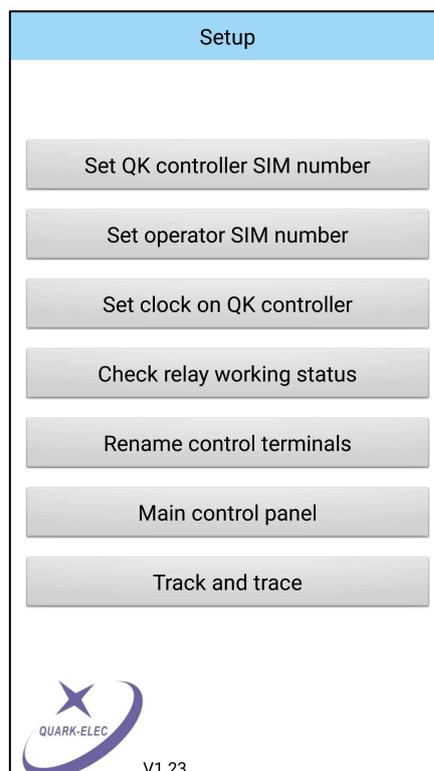


Figure 15 Setup page

### 4.2 Set QK controller SIM number

Input the number of the SIM card which is inserted in GK-021/022. All command SMS messages will be sent to this number via the APP.

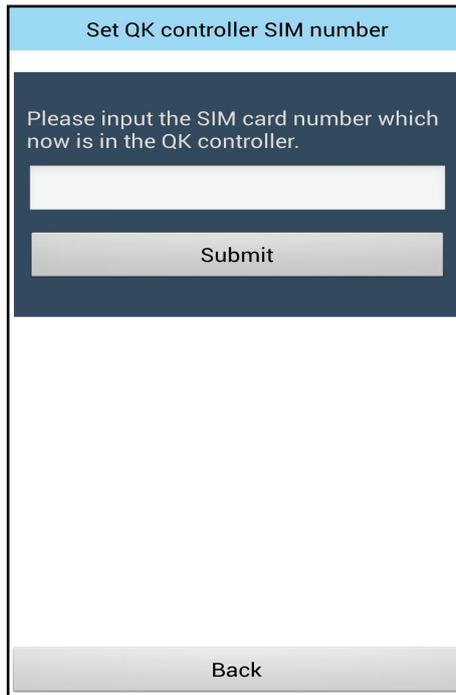


Figure 16 Set QK controller SIM number

Once the SIM card number has been stored, the APP will reply with a successful message shown below:

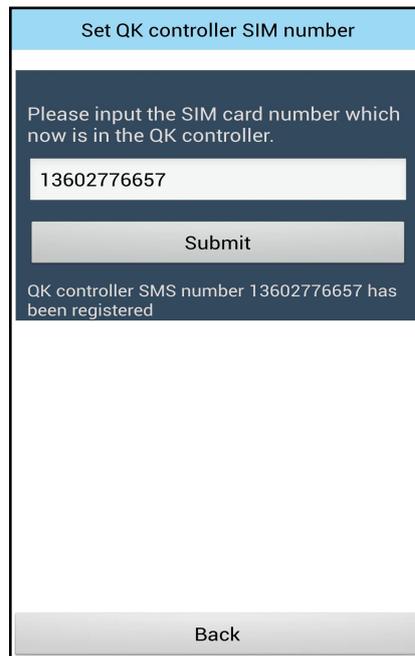


Figure 17 Successful setting of the QK controller SIM number

### 4.3 Register SIM cards

GK-021/022 allows one mobile phone to function as the main terminal and up to 3 additional phones to function as control terminals. The following interface allows the operator to register, delete and check the SIM card numbers:

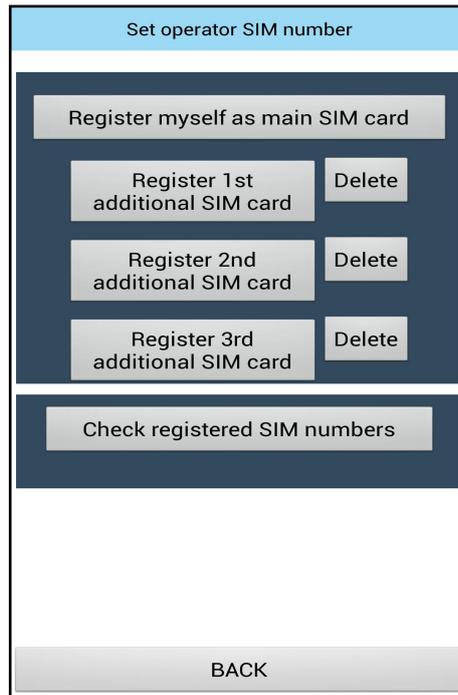


Figure 18 Register SIM cards

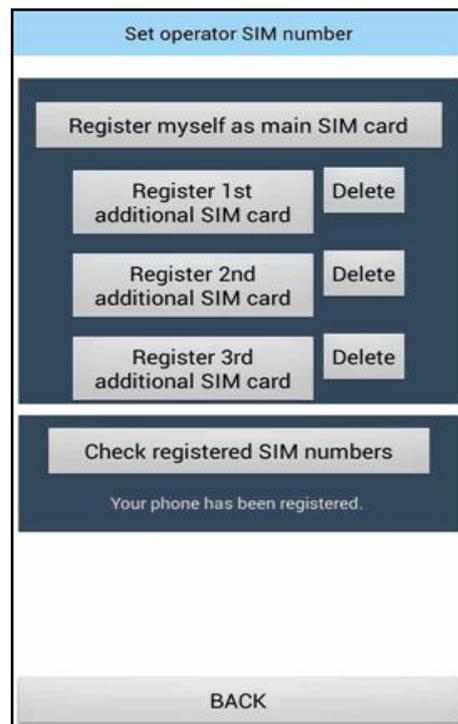


Figure 19 Register successfully

#### 4.4 Setting the clock on the QK controller

GK-021/022 can automatically execute actions at the time set by the operator. To do this, the real time clock on the QK controller should be set. This page allows the operator to check and set the time on GK-021/022. When using this function, the CR2032 battery should be used on the module. On V1.5 or later hardware versions, a solid capacitor is used instead of the CR2032 battery. With a solid capacitor, the real time clock can keep working for at least 12 minutes after power off.

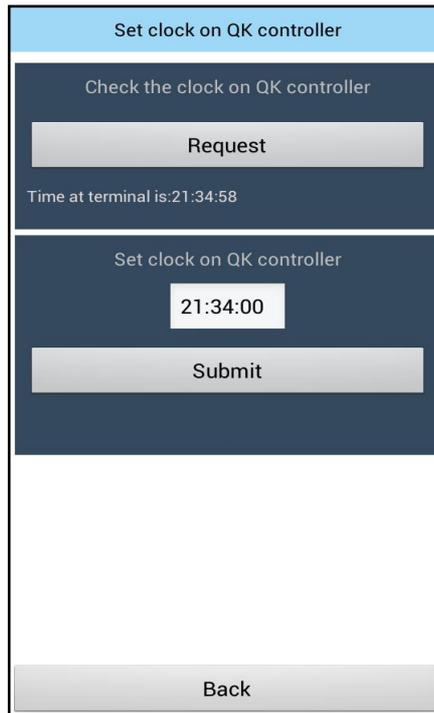


Figure 20 Check the clock on QK controller

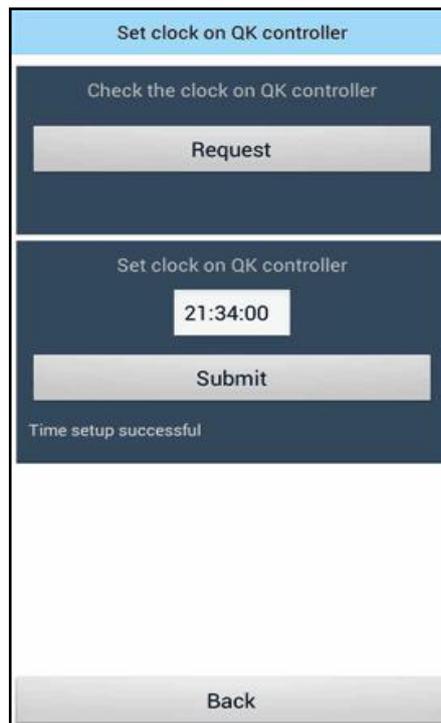


Figure 21 Successful setting of the clock on QK controller

#### 4.5 Check relay working mode

GK-021/022 has three individual relays which support two working modes, namely self-lock and latching control. When working in latching mode, the relay takes active action for a few seconds (depending on the time setting on the jumpers on the board.) and then reverts to normal status. When working in self locking mode, the unit will maintain active status until the next trigger input.

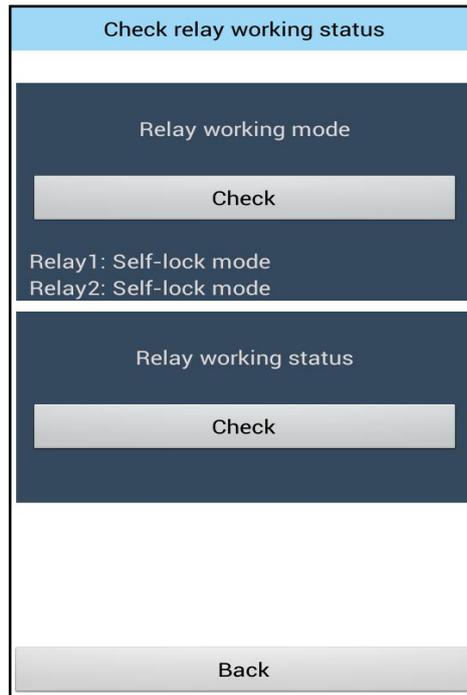


Figure 22 Check relay working mode

GK-021/022 can also report the relay working status via SMS to the operators.

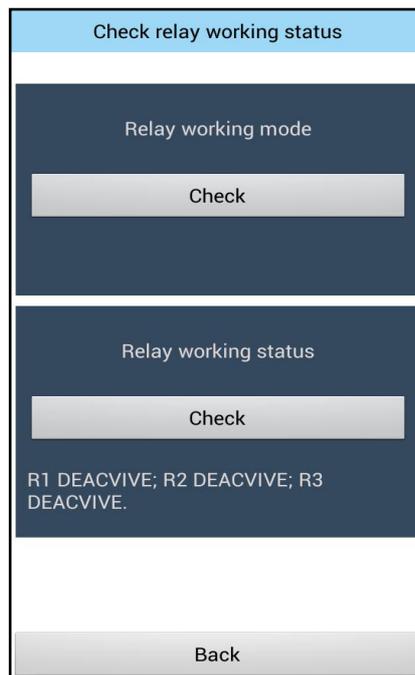


Figure 23 Check relay working status

#### 4.6 Rename control terminals

The control terminals can be recalled as a meaningful name in APP.



Figure 24 Rename control terminals

## 4.7 Control panel

The control panel provides the main operating interface

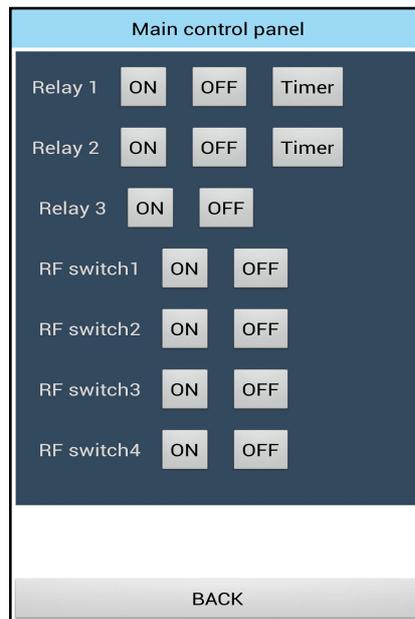


Figure 25 Control panel interface

## 4.8 Track and trace

The speed and the position information can also be checked on APP for QK-G022G variant(with GPS receiver).

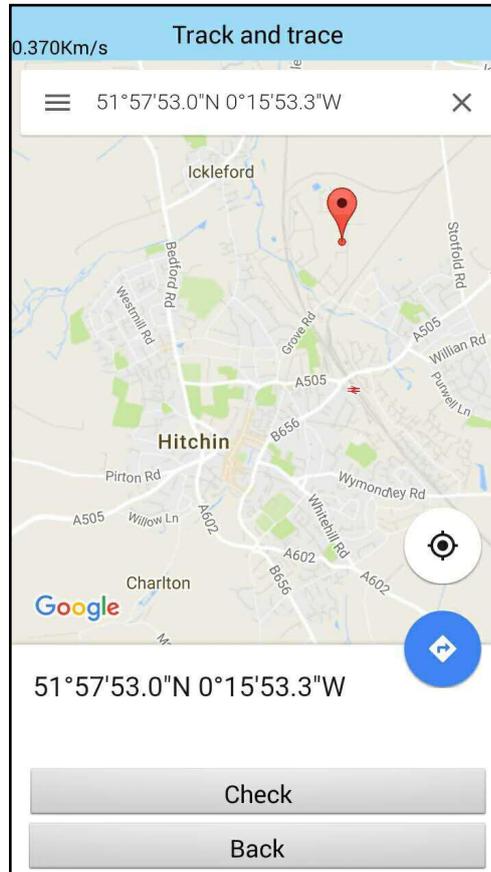


Figure 26 Track and trace

## 5 CONFIGURATION

The following steps are required to configure QK-G021/022 for first time use:

- Insert the SIM card into controller box
- Power up
- Send '888888' as SMS to the QK-G021/022 controller. If successful, the user will receive the message 'Your phone has been registered'.
- If additional mobile terminals are required, the operator should send 'BDn(mobile terminal number)F' to the QK-G021/022 controller. Up to 3 additional terminals can be configured. By now, the operator is ready to use QK-G021/022. Details about the SMS command and response messages can be found in the next chapter.

## 6 COMMAND AND RESPONSE SMS

Remember that all SMS text commands must always be sent using CAPITAL letters. Do not add spaces or any other characters.

Function	Command	Note
<b>Register SIM cards</b>		

## Quark-Elec application note

Register main SIM card	888888	<p>Register the main mobile terminal with QK-G021 module by sending '888888' to QK-G021/022 model.</p> <p>If registration is successful, the module will reply with 'Your phone has been registered.' Each QK-G021 module can only have one main registered SIM card number.</p>
Register additional SIM cards	BDn(mobile number)F n=1, 1 <sup>st</sup> mobile terminal n=2, 2 <sup>nd</sup> mobile terminal n=3, 3 <sup>rd</sup> mobile terminal	<p>Once the main mobile terminal is registered with QK-021/022, another three mobile terminals can be paired with QK-021/022.</p> <p>For example, by sending BD107919157124F, the first mobile terminal (number is 07919157124) has been paired with QK-021/022. Similarly, BD207909135124F means pairing QK-021/022 with the second terminal (whose number is 07909135124).</p> <p>The message 'Your number n phone has been registered' will be returned by QK-021/022, if mobile terminal n is successfully paired.</p>
Delete additional SIM cards	DELn n=1, 1 <sup>st</sup> mobile terminal n=2, 2 <sup>nd</sup> mobile terminal n=3, 3 <sup>rd</sup> mobile terminal	<p>The registered SIM cards can be deleted from the authorized SIM list by sending DELn. The deleted SIM terminals can no longer control QK-021/022.</p>
Check registered SIM numbers	WHORED	<p>QK-021/022 will reply with the authorized SIM list in the following format:</p> <p>'No.1 SIM is xxxxxxxx; No.2 SIM is xxxxxxxx; No.3 SIM is xxxxxxxx.'</p>

<b>Switching relay &amp; mode checking</b>		
Switching relay ON	DKYn n=1, Relay 1; n=2, Relay 2; n=3, Relay 3.	QK-021/022 will reply with the relay state information in the following format:  'Port n ON, where n is the relay number.'
Switching relay OFF	GBYn n=1, Relay 1; n=2, Relay 2 n=3, Relay 3.	QK-021/022 will reply with the relay state information in the following format:  'Port n OFF, where n is the relay number.'
Check relay working mode	RMODE	QK-021/022 will reply with the relay working mode information in the following format:  'MMMM1MMMM2', where MMMM could be INCH or SELF. INCH refers to Latching control mode (relay will act for 3 seconds and then revert to the normal position), and SELF refers to Self-lock mode.  For example, INCH1SELF2 means, relay 1 works in Latching control mode and relay 2 works in Self-lock mode.
Check relay working status	WHOACTIVE	QK-021/022 will reply with the relay working status information similar to the following format:  'R1,R2,R3:ACTIVE;DEACTIVE;ACTIVE.'  Where ACTIVE means the related relay has been triggered (COM port connected to NO port),  DEACTIVE means the related relay is on the normal status.
One-off relay switch toggling	ONOFFRnxx# n=1, Relay 1; n=2, Relay 2. xx range from 03 to 99, indicating the delay time in seconds.	For example, by receiving ONOFFR175#, the first relay (Relay 1) will be triggered on for 75 seconds and then switched off, whether QK-G021/022 is working in Latching mode or in Self-lock mode. QK-021/022 will reply with the relay information in the following format:  'Port 1 is ON and will be OFF 75 seconds afterwards.'  This is a one-off command, only valid for one time action. The APP does not support this command, so the operator should use SMS to send this message.
<b>433 Mhz RF module</b>		
Switching RF module ON	ONRFn n=1 for 1 <sup>st</sup> RF terminals n=2 for 2 <sup>nd</sup> RF terminals n=3 for 3 <sup>rd</sup> RF terminals n=4 for 4 <sup>th</sup> RF terminals	QK-021/022 will reply with the relay state information in the following format:  'RFn socket is ON', where n is the RF terminal number.

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Switching RF module OFF	OFFRFn n=1, 1 <sup>st</sup> RF terminals; n=2, 2 <sup>nd</sup> RF terminals; n=3, 3 <sup>rd</sup> RF terminals; n=4, 4 <sup>th</sup> RF terminals	QK-021/022 will reply with the relay state information in the following format:  'RFn socket is OFF', where n is the RF terminal number.
<b>Timer</b>		
Set time on QK-021/022	SThmmss Where hmmss is the current time	For example, by sending 'ST153014', the operator set QK-G021/022 time as 15:30:14. QK-021/022 will return the message 'Time setup successful' to accept this setting. If the operator sends the wrong time format, QK-G021/022 will return the message 'Time setup failed'.
Check the local time on QK-021/022	DQSJ	By sending 'DQSJ', the operator will receive the local time. The message received would be 'Time at terminal is 12:30:32'.
Set Switching Relays ON time	ONnhmmss n=1, Relay 1 n=2, Relay 2 hmmss is the Switch ON time.	For example, by sending 'ON2163000', the operator set Switch Relay 2 ON at 16:30:00. Message as 'Port 2 will switch ON at 15:30:00' will be returned to operator if the setting successful.
Set Switching Relays OFF time	OFFnhmmss n=1, Relay 1 n=2, Relay 2 hmmss is the Switch OFF time.	For example, by sending 'OFF2194520', the operator set Switch Relay 2 OFF at 19:45:20. Message as 'Port 2 will switch OFF at 19:45:20' will be reply to operator if the setting successful.
Switch off the Timer setting	GDSn n=1, Relay 1 n=2, Relay 2	Message 'Timer on Relay n has switched OFF' will be returned to the operator if the setting is successful, where n is '1' or '2'.  Note: The local time will not be affected by switching off the timer.
<b>GPS tracking</b>		
Check the current position of the module	DQGPS	Message similar as ' <a href="http://maps.google.com/maps?q=51.961718,-0.269798">http://maps.google.com/maps?q=51.961718,-0.269798</a> ' will be returned to the operator if the setting is successful. By click the replied link message, QK-G021 module position will be displayed on Google map.
<b>Monitoring/alarm input</b>		
Release relay status which is triggered by the external signals.	EXTRT	After it has been triggered by the external signals, the related relay will be locked in the normal state. By sending 'EXTRT', the relays will be unlocked and available for responding to SMS commands again.
Disable the function of been triggered by	EXTGBn	By sending 'EXTGBn', the external alarm input n will be disabled. Message 'Alarm input n has

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external signals.	n=1, Relay 1 n=2, Relay 2 n=3, only available for PIR wireless PIR detector (QK-G022P433 variant)	<p><b>been disabled.</b>' will be returned to the operator if the setting is successful, where n is '1' '2' or '3'.</p> <p>By sending 'EXTRT' all external alarm inputs will be active. This disable status doesn't affect by re-powering up the module, only 'EXTRT' can.</p>
<p>QK-G021/022 has two digital input ports which can be used to monitor external signals. These two external input ports can accept 0 V to 24 V voltage levels. Should the input voltage level be below 1.0 V, the main mobile terminal will receive the warning message '<b>Port n has been triggered</b>', where n is the relay number. The relay n will switch to the normal state (NC will be the closed state and NO will be the open state). Sending 'EXTRT' will release the relays and make them available for responding to SMS commands.</p>		

## 7 OPERATING SPECIFICATIONS

Item	Specification
Frequency bands	Quad-band: GSM850, EGSM 900, DCS1800, PCS1900.
SMS	MT, MO, CB, test and PDU mode
Operating temperature	- 25°C to + 80°C
Storage temperature	- 40°C to + 85°C
DC supply	12.0-24.0V (+/-5%)
Average supply current (typical quiescent)	40 mA
Maximum supply current (during SMS transceiver activity)	600 mA
GSM receive sensitivity	-107 dBm
GSM transmitting power	Class 4 (2 W) at GSM850, EGSM 900. Class 1 (1 W) at DCS1800, PCS1900.
433 Mhz transmitting power	1 W
433 Mhz modulation mode	ASK (AM)
RF transmission power	<10 mW
RF emission distance	25 to 50 meters (open air conditions)
Rated current on relay	7A 240 V AC
GPS sensitivity	-162dBm
GPS positional accuracy	+/-53.8 meters
Rated voltage on relay	90 V - 245 V
RF main socket power rating	< 2000 W

For more technical information and enquiries please go to the Quark-elec forum:

<http://quark-elec.com/forum/>

For sales and purchasing information, please email us at: [info@quark-elec.com](mailto:info@quark-elec.com)



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