# Cellcop Communicator
## Nokia Version
**November 2008**

# Instruction Manual

# ABOUT THE GSM COMMUNICATOR SYSTEM

The GSM communicator system is based on GSM SMS technology. It uses a standard **Nokia 5110, Nokia 6110 or Nokia 6150** for communication and has been designed to provide you with the greatest possible flexibility and convenience. Read this manual carefully and have your installer instruct you on your system's operation and on which features have been implemented in your system. All users of this system should be equally instructed in its use.

## 1. Features

**8 / 4 / 2 Inputs to communicate 8 / 4 / 2  separate alarm conditions**
- Each input can be triggered to send an SMS to up to 16 Cellphone numbers
- The time delay before the input is triggered can be set for each input
- Separate messages can be configured for On and Off states of the input signal
- Messages to be send can be programmed by the user
- On or Off states can both be reported to predefined cellphone numbers.
- Reporting can be disabled for an input
- The states of the inputs can be requested from the unit by SMS

**4 / 2 Outputs to control any electrical device**
- Outputs can be controlled by cellphone using SMS (Switching the output on, off or pulse)
- Outputs can be controlled using missed calls (Voice, Fax and data)
- The duration of the pulse can be programmed for each output
- Outputs can be set to follow the state of an input
- Output can be set to switch on when the unit is dialed
- Status of an output can be requested from the unit by SMS

**Monitor AC power using the cell phone charger as input** AC power can be monitored by monitoring the cellphone charger state
- SMS can be send to up to 16 numbers when an power failure occur and when the power return

**Monitor AC power using the charger input (Not available on Cellcop 2x2N)**
- AC power can be monitored by using the charger input.
- SMS can be send to up to 16 numbers when an power failure occur and when the power return

**Monitor the battery status (Not available on Cellcop 2x2N)**
- The battery status can be monitored by the system.
- SMS can be send to up to 16 numbers when the battery go faulty.
- The battery is monitored by disconnecting it from the main supply and to measure the battery voltage while connected to a load.

**Log Events**
- The system will log events configured to be logged
- Logged events will be time stamped from the Cell phones Date/Time
- Events can be downloaded into a comma delimited file for analysis
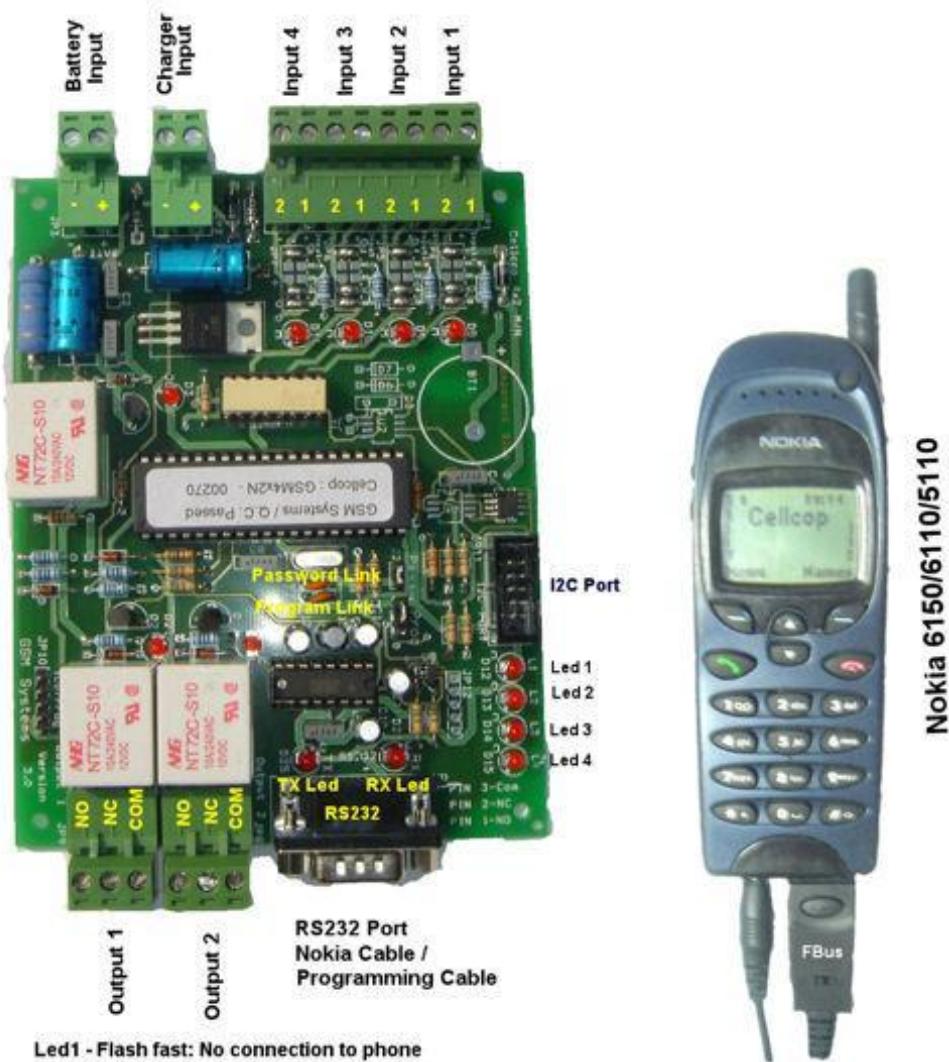
## 2. Operation of the GSM communicator

### 2.1 Setting up the Unit for operation
The following steps should be followed to use the GSM communicator
1. Program the unit using the supplied programming software (See Programming the GSM Communicator)
2. Wire up the inputs to sensors.
3. Wire outputs to devices to be controlled
4. Connect cellphone to cellphone charger
5. Connect cellphone to GSM Communicator
6. Connect power and battery to the unit



Led1 - Flash fast: No connection to phone
Led1 - Normal flash: Connected to the phone
Led2 - On: Power off on the cellphone
Led2 - Off: Power on on the cellphone
Led3 - On: Not connected to the network
Led3 - Off: Connected to the network
Led4 - On: Board in cable programming mode
Led4 - Off: Board in normal operating mode

Input configuration using solder pads
Input Pins    Solder pad Number

| 1 | 2 | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|---|
| DC1 | DC2 | • | | | • | • | DC - Voltage free contact |
| Pos | N/C | | • | | | • | Pos - Pos supply |
| N/C | Neg | • | • | • | | | Neg - Neg supply |
| Pos | Neg | | | | • | • | N/C - No connection |

**Figure 1: Setup used by the Cellcop 8x4 Nokia Communicator**

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Led1 - Flash fast: No connection to phone
Led1 - Normal flash: Connected to the phone
Led2 - On: Power off on the cellphone
Led2 - Off: Power on on the cellphone
Led3 - On: Not connected to the network
Led3 - Off: Connected to the network
Led4 - On: Board in cable programming mode
Led4 - Off: Board in normal operating mode

Input configuration using solder pads

| Input Pins | | Solder pad Number | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 2 | 3 | 4 | 5 | |
| DC1 | DC2 | * | | | * | * | DC - Voltage free contact |
| Pos | N/C | | * | | | * | Pos - Pos supply |
| N/C | Neg | * | * | * | | | Neg - Neg supply |
| Pos | Neg | | | * | * | | N/C - No connection |

**Figure 2:  Setup used by the Cellcop 4x2 Nokia Communicator**

Input 2
Input 1
Power Input

I2C Port

Password Jmp
Program Link

Led 1
Led 2
Led 3
Led 4

RX Led

TX Led

RS232 Port
Nokia Cable /
Programming Cable

Output 2
Output 1

Nokia 6150/6110/5110

Cellcop

FBus

Led1 - Flash fast: No connection to phone
Led1 - Normal flash: Connected to the phone
Led2 - On: Power off on the cellphone
Led2 - Off: Power on on the cellphone
Led3 - On: Not connected to the network
Led3 - Off: Connected to the network
Led4 - On: Board in cable programming mode
Led4 - Off: Board in normal operating mode

Input configuration using solder pads

| Input Pins | | Solder pad Number | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 2 | 3 | 4 | 5 |
| DC1 | DC2 | * | | | * | * |
| Pos | N/C | | * | | | * |
| N/C | Neg | * | * | * | | |
| Pos | Neg | | | * | * | |

DC - Voltage free contact
Pos - Pos supply
Neg - Neg supply
N/C - No connection

**Figure 3: Setup used by the Cellcop 2x2 Nokia Communicator**

## 2.1.1 Programming the GSM Communicator

**Cable programming:**

1. Connect the Cellcop 8x4N / 4x2N / 2x2N to the PC using the RS232 cable
2. Power-up the Cellcop 8x4N / 4x2N / 2x2N using a 12 V DC supply. L4 the Status Led should be on to indicate that the unit is in the program mode (insert link on board to enter in program mode).
3. Run the supplied programming software
The following window will appear :
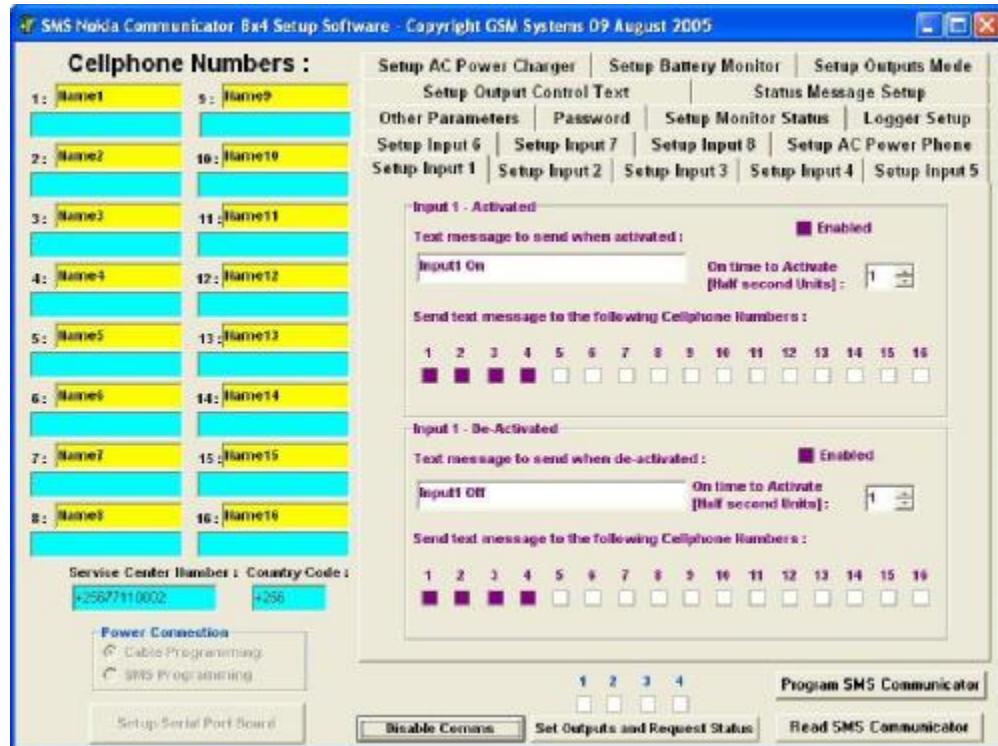


Select the serial port that the Cellcop 8x4N / 4x2N / 2x2N is connected to using the Com Port Setup
Click on the Enable Comms button to enable the communications
Click the read SMS communicator button to read the information from the GSM communicator
Change the information and parameters to fit your setup
- Service Center Number
- Country Code
- Cellphone Numbers and names
- Input Parameters
- Output Parameters
- AC Power monitor parameters

4. Click "Program SMS Communicator button" to program your setup into the unit
5. Switch of the power
6. The unit is now ready for installation

**SMS programming:**
1. Connect a Cellphone to the PC using a Data cable.
2. Start the programming software
3. Select SMS programming
4. Select the correct serial port where the cellphone is connected.
5. Enable communications
6. Enter the number for the unit that must be programmed
7. Enter the service center number for the sim-card used by the programming phone.
8. Program each section by clicking the buttons that appear.

The cellphone numbers are programmed by right click on the cellphone number block. A menu will appear and the numbers can be programmed.
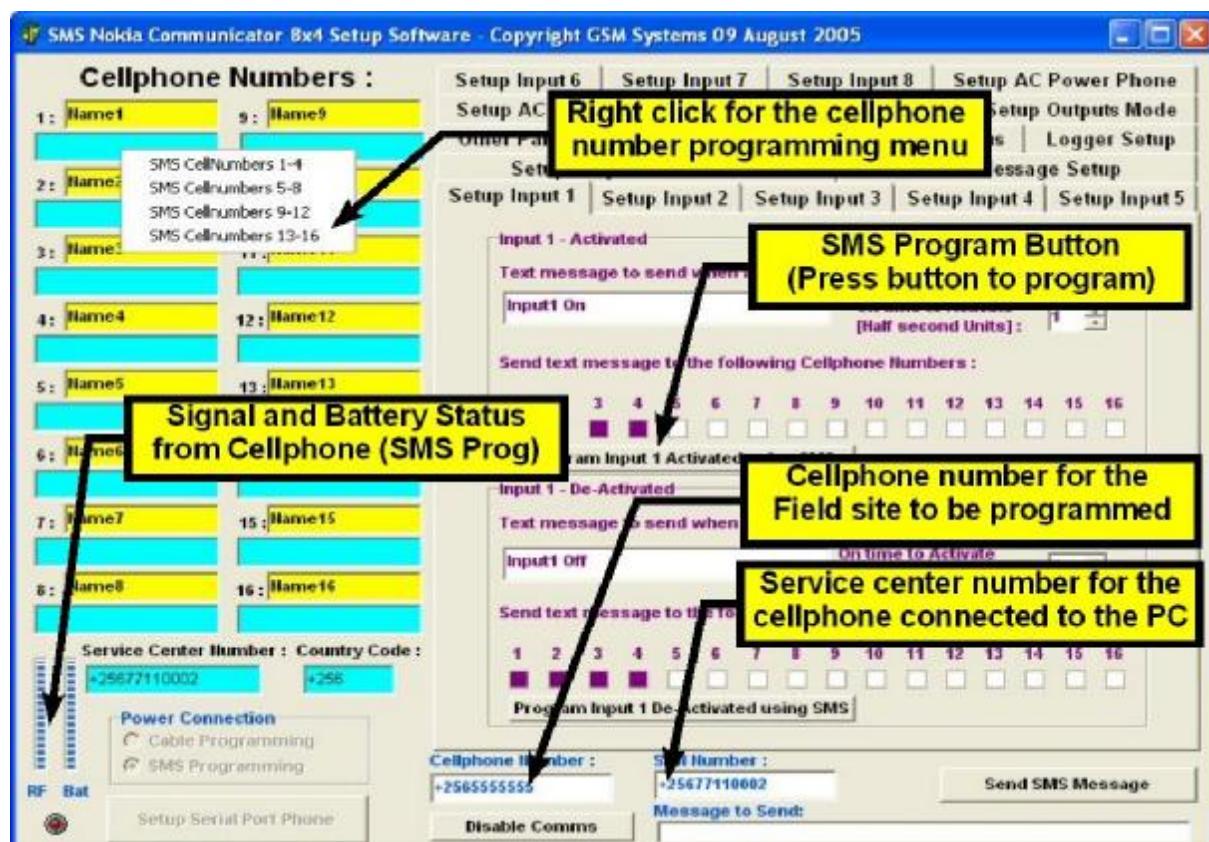


**Note:** The password that is programmed on the board must be used or it will not accept programming messages. The password can be changed using cable programming. If the programming cable is plugged in before the board is powered then the password will be reset to 12345.

**Service Center Number :**



**MTN :** +27831000002 Pay as you go : +27831000113
**Vodacom :** +27829119 or +27829129
Hint: Right click on window to select the SCN.

## Cellphone Numbers and names:

**Cellphone Numbers :**

| | | | |
|---|---|---|---|
| 1 : | Johan Pretorius | 9 : | Name9 |
| | +27833086972 | | |
| 2 : | Willem | 10 : | Name10 |
| | +278212345678 | | |
| 3 : | Name3 | 11 : | Name11 |
| 4 : | Name4 | 12 : | Name12 |
| 5 : | Name5 | 13 : | Name13 |
| 6 : | Name6 | 14 : | Name14 |
| 7 : | Name7 | 15 : | Name15 |
| 8 : | Name8 | 16 : | Name16 |

## Input parameters:

## Example 1 :

| Setup Input 4 | | Setup AC Power Monitor | | Setup Outputs | |
|---|---|---|---|---|---|
| Setup Input 1 | | Setup Input 2 | | Setup Input 3 | |

**Input 1 - Activated**

Text message to send when activated :   ■ Enabled

Input1 On

On time to Activate [Half second Units] :   20

Send text message to the following Cellphone Numbers :

1   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16
■  □  □  □  □  □  □  □  □  □   □   □   □   □   □   □

**Input 1 - De-Activated**

Text message to send when de-activated :   □ Enabled

Input1 Off

On time to Activate [Half second Units] :   10

Send text message to the following Cellphone Numbers :

1   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16
□  □  □  □  □  □  □  □  □  □   □   □   □   □   □   □

Input 1 is setup to send a SMS containing text "Input1 On" to Cell phone number 1 only if the input 1 was on for 10 seconds. No SMS will be send when Input 1 go Off.

**Example 2 :**



Input 2 will send an SMS to Cell numbers 1 and 2 when Input 2 go on containing the text "Dam is vol" and it will send an SMS to Cell numbers 1 and 3 when Input2 go off containing the text "Dam is leeg"

## Setup Output Mode:



The default state sets the state of an output when the board is switched on or reseted. In this example outputs 1,2,and 3 will start in the off state and output 4 in the on state.  The pulse timers is the time that a output will be switched on when a pulse command is issued to the board. In this example Output 1 will be switched on for 5 seconds and output 2,3 and 4 will be switched on for 2 seconds.  A call from a cellphone number with control rights can be used to control certain functions. In this example output 1 will switch on for 5 second when a voice call is received from a cellphone with control rights. Output 2 will Toggle the mode and anwer the call when a fax call is received and output 3 will Toggle the status of the output when a data call is received. Note for the different call types you must get the different numbers from your service provider. Only MTN contract phones allow different numbers in South Africa. NB: The caller ID must be on and only numbers with control rights will be able to control the outputs.

### AC Power monitor parameters Phone:



The communicator will send an SMS to cellphone number 16 containing "Krag is aan" when the cellphone charger is connected to the cellphone and it is switched on. It will send an SMS to cellphone number 1 and 16 containing "Krag is af" when the cellphone charger is connected to the cellphone and it is switched off.

### AC Power monitor parameters battery charger:
### (Not available on the Cellcop 2x2N)



The communicator will send an SMS to cellphone number 1 and 2 containing "Charger On" when the cellphone charger is connected to the cellphone and it is switched on. It will send an SMS to cellphone number 1 and 2 containing "Charger

Off" when the cellphone charger is connected to the cellphone and it is switched off.

**Status of the battery:**
**(Not available on the Cellcop 2x2N)**

| Setup AC Power Phone | Setup AC Power Charger | Setup Battery Monitor |

**Battery Ok**

Text message to send when activated :          ■ Enabled

Battery Ok          Battery Ok Limit:          185
                    [x0.0588 V]

Send text message to the following Cellphone Numbers :

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| ■ | ■ | ■ | ■ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |

**Battery Faulty**

Text message to send when de-activated :          ■ Enabled

Battery Faulty          Battery Faulty Limit:          180
                        [x0.0588 V]

Send text message to the following Cellphone Numbers :

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| ■ | ■ | ■ | ■ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |

The battery status will be tested once every 24 hours. If the battery voltage is above the predefined voltage it will send a message "Battery Ok" to the predefined cellphone numbers. If the battery voltage is below the predefined voltage it will send "Battery Faulty" to the predefined voltage. The current status of the battery is determined at start-up and only changes in state will be reported. This mean that you will not get an SMS every 24 hours telling you the state of the battery but only when the state changes.

**Other parameters:**



The first setting is to get a status message every day atn the time set. In this example you will get a status SMS every day at 8h00 to Numbers 1 and 2.

The interval SMS send an SMS to the selected cell phone numbers on the interval specified. The interval can be up to 250 hours. The time is counted from when the board is reseted or switched on.

Add the site name to the SMS messages send. If the box is ticked then the site name specified here will be added to all messages.

Add status to text messages - If this is ticked the status of the inputs and outputs will be added to the text message send.

The cellphones with control rights are identified here. Control rights give access to controlling outputs (SMS and ringing in) and to request status.

## Setup  Monitor mode
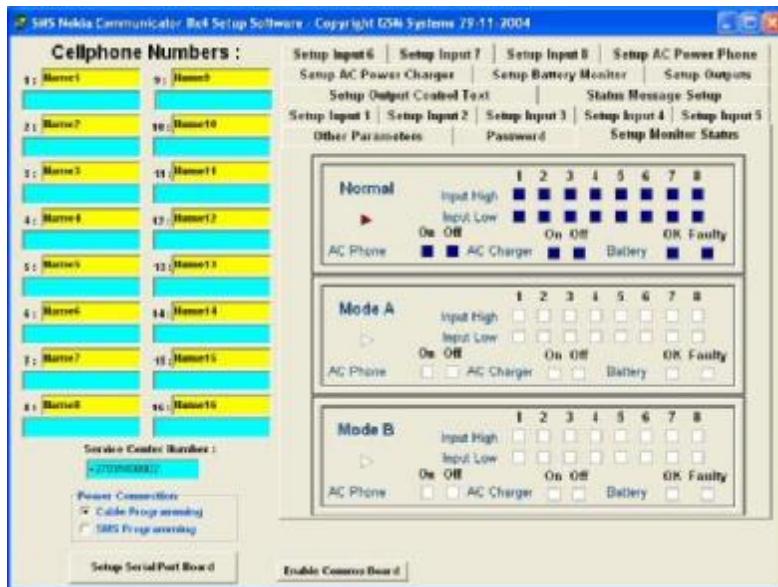


The system can be programmed to monitor inputs according to the selected monitor mode. Setup the monitor mode using the configuration software. Modes can be changed using SMS. The monitor mode can be used to control what is monitored in a specific mode. As an example you can define Mode N to monitor all inputs, ModeA be to monitor only certain inputs and Mode B to monitor nothing. Then by switching the monitoring mode using the mode switch command u can control the monitoring.

### Switch monitor mode by SMS

MN – Set to mode N
MA – Set to mode A
MB – Set to mode B

## Setup  Monitor Status Outputs



This setup is used to control the way that outputs switch on to indicate the monitor mode currently selected. In this example output 1 will generate pulses when you change the monitoring mode using the inputs 1 and 2. Output 2 will go on when Mode normal is selected. Output 3 will go on when Mode A is selected and output 4 will go on when Mode B is selected. The bottom you select how the triggering of an input change the monitoring mode. Three options are available.

None – No mode changed using inputs
Input 1 & Input 2 – Input 1 triggering select between mode A and mode N. Input 2 triggering select between mode B and mode N.
Input 1 only – Input 1 triggering will select between Mode A, Mode B and ModeN sequentially

## Logger Functions

The unit can be used to log events. Make sure that the date time is set on the phone connected to the board. Date and time can be set using the SETDT SMS Command.
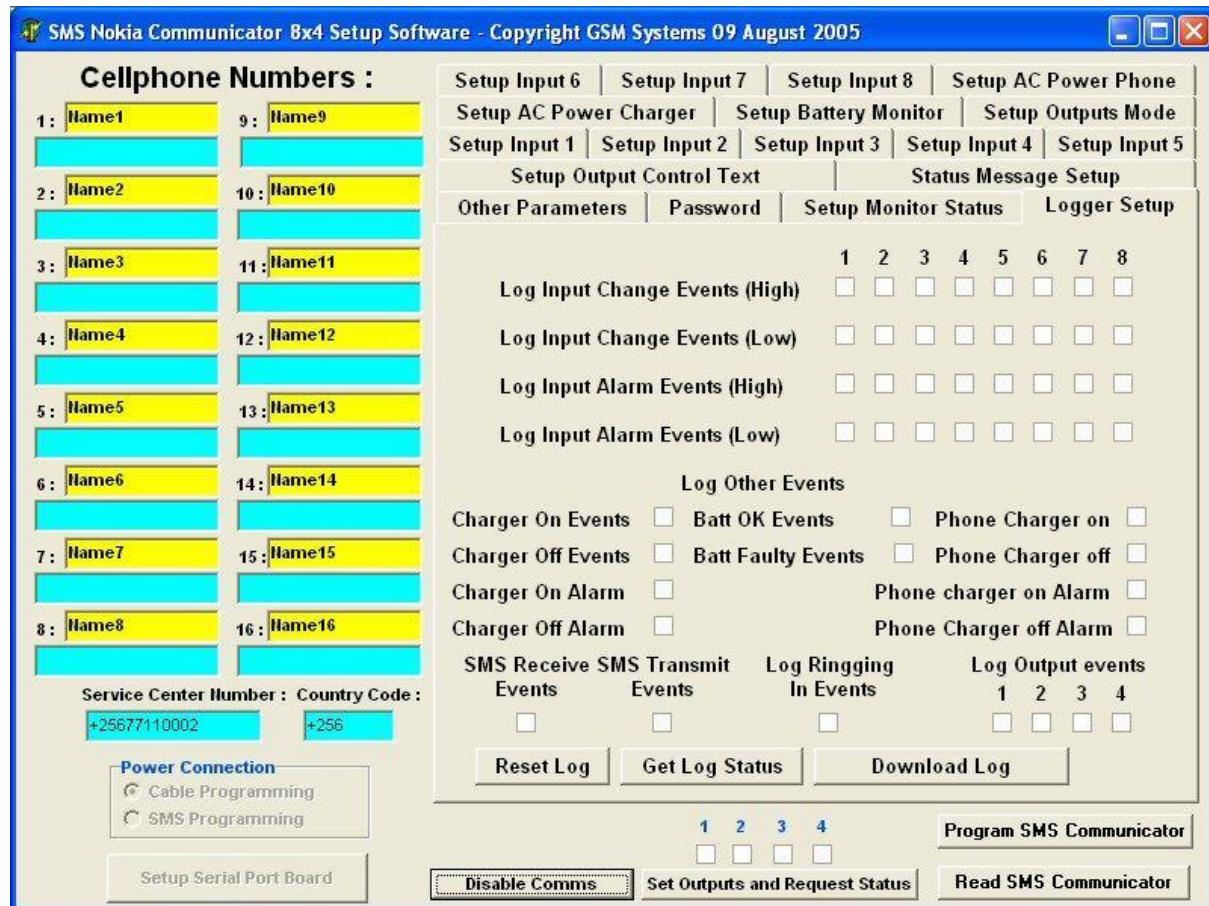


Configure the Events to be logged using the configuration software. Download the logs using the configuration software by reading the Communicator and then download the log. The data will be stored in a comma delimited text file that can be imported into any spreadsheet like excel.

## 2.1.2 Wire up the inputs to sensors

The inputs can be wired up in various configurations.

The inputs can be setup to be used in various configurations by soldering the solder tags correctly.

Solder tag configuration:

| Input Pins | | Solder pad Number | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 2 | 3 | 4 | 5 |
| DC1 | DC2 | * | | | * | * |
| Pos | N/C | | * | | | * |
| N/C | Neg | * | * | * | | |
| Pos | Neg | | * | * | | |

DC – Dry contact (Switch or relay)
Pos – Positive of the supply
Neg – Negative of the supply
N/C – No connection

## Configuration 1  (Dry Contact)

Solder pads 1,4 and 5 must be soldered.



Dry Contact Inputs
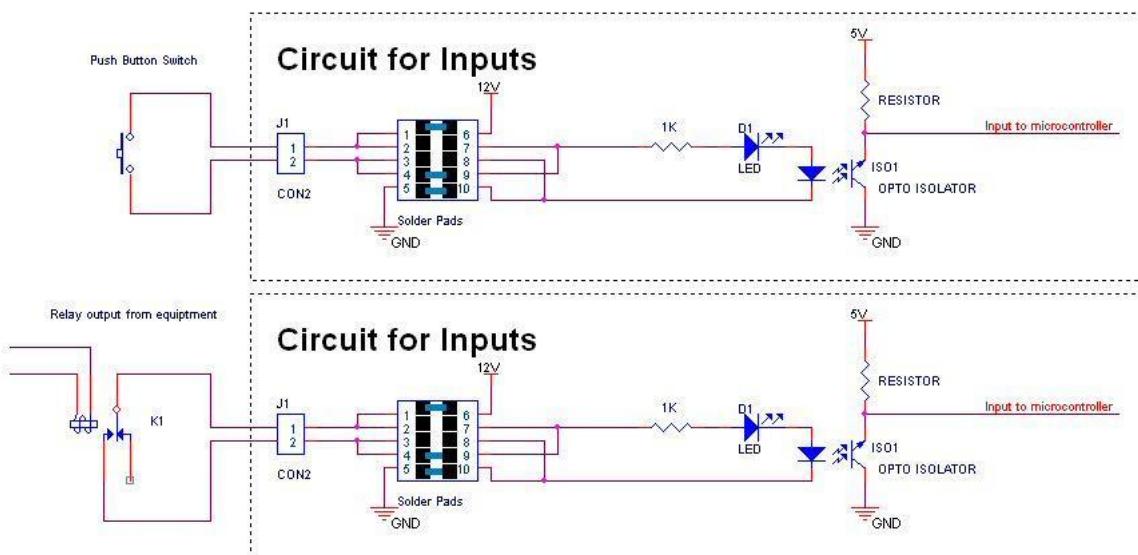
If the switches are closed the corresponding Input will go on and SMS will be send to the configured telephone numbers.

## Configuration 2  (Pos on pin 1 N/C on pin 2)

Solder pads 2 and 5 must be soldered.



**Pos Supply on Input**

Circuit for Inputs

Note: This circuit can only be used if the external equiptment and GSM Communicator use the same supply.
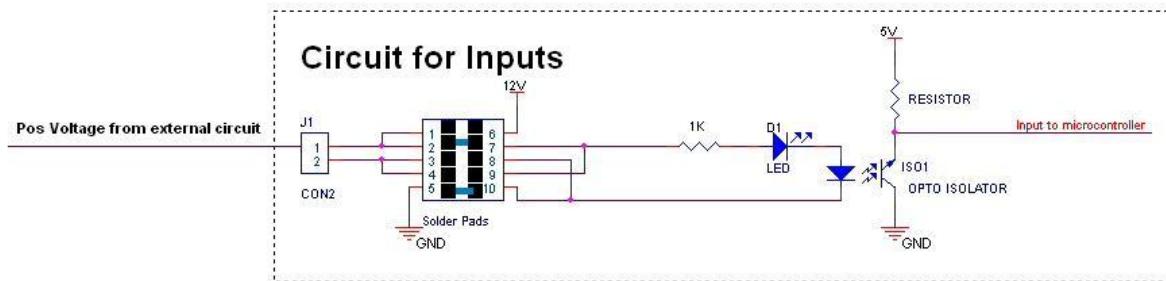
If a common supply is used then a positive from the alarm circuit can be used to trigger the unit.

## Configuration 3  (N/C on pin 1 Neg on pin 2)

Solder pads 1,2 and 3 must be soldered.



**Pos Supply on Input**

Circuit for Inputs

Note: This circuit can only be used if the external equiptment and GSM Communicator use the same supply.
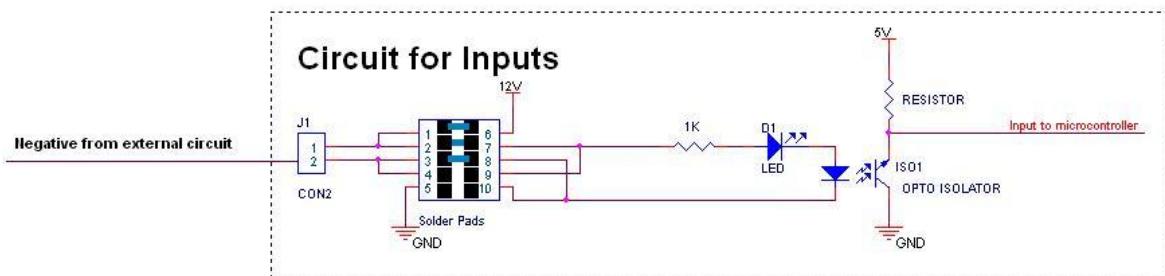
If a common supply is used then a negative from the alarm circuit can be used to trigger the unit.

**Configuration 4  (Pos on pin 1 Neg on pin 2)**

Solder pads 2 and 3 must be soldered.

**Pos Supply on Input**

**Circuit for Inputs**
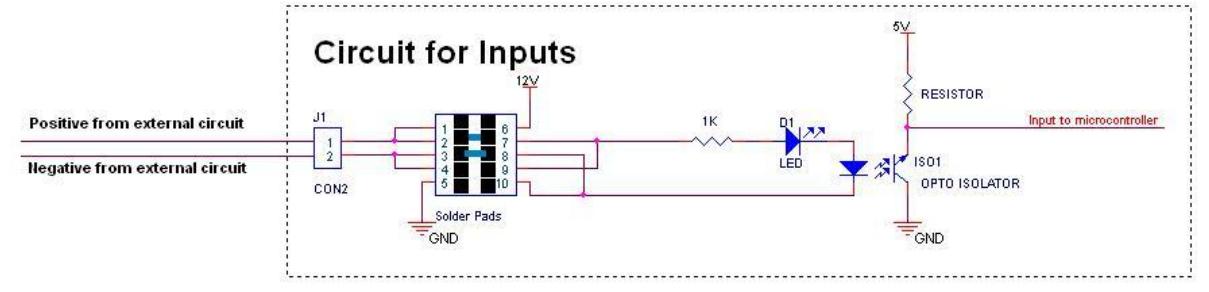
No common supply. Positive and negative is supplied from external alarm circuitry.

### 2.1.3 Wire outputs to devices to be controlled

The outputs are isolated rele outputs and are able to switch 240 VAC 5 A. The relay output are available on the terminals.
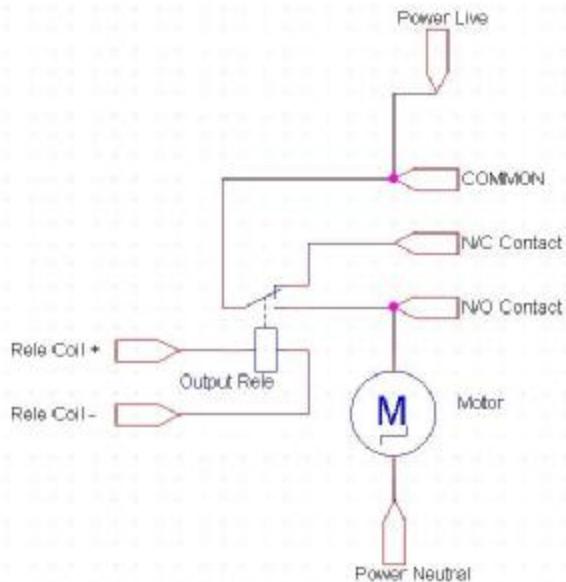
Output used to switch on a motor using less than 240VAC and 5A current

## 2.1.4 Connecting the cellphone

The GSM communicator must be connected to the nokia 5110, nokia 6110 or nokia 6150 cellphone using the supplied connector. The connected cellphone must also be connected to a cellphone charger permanently. If the charger is on the GSM communicator will interpret it as "Power on" and if the charger is of the GSM communicator will interpret it as "Power off".

## 2.2 Controlling the GSM Communicator using a Cellphone

The GSM communicator can be controlled by sending SMS to the cellphone connected to the GSM communicator. If control rights are enabled, then only cellphones with control rights can send command sms's to the communicator. A custom text can be programmed to be used to switch outputs.

Example: "PumpOn" text send to the communicator will switch on Output 1.

| Setup Outputs | | Setup Output Control Text | |
|---|---|---|---|
| Command | Output 1 | Output 2 | |
| On | Out1On | PumpOn | |
| Off | Out1Off | Out2Off | |
| Pulse | Out1Pulse | Out2Pulse | |

The following messages can be send:

| Message send | Action |
|---|---|
| S | Request the status of the SMS Communicator. |
| AN | Switch output 1 On |
| AF | Switch output 1 Off |
| AP | Put a pulse out on output 1 |
| APCX | Pulse Output 1 for X half seconds and set the pulse time to X |
| BN | Switch output 2 On |
| BF | Switch output 2 Off |
| BP | Put a pulse out on output 2 |
| BPCX | Pulse Output 2 for X half seconds and set the pulse time to X |
| CN | Switch output 3 On |
| CF | Switch output 3 Off |
| CP | Put a pulse out on output 3 |
| CPCX | Pulse Output 3 for X half seconds and set the pulse time to X |
| DN | Switch output 4 On |
| DF | Switch output 4 Off |
| DP | Put a pulse out on output 4 |
| DPCX | Pulse Output 4 for X half seconds and set the pulse time to X |
| MN | Select Normal Monitor mode |
| MA | Select A Monitor mode |
| MB | Select B Monitor mode |
| CR | Reset SMS Counter |

NB :  Outputs can only be controlled with SMS if Output follow is None.
On the 2 character commands if 2nd char is a Capital letter then the Status message will be send back

**Other SMS Commands**

**Set Date/Time on Phone:**
<Passwd><Space>SETDT:HHMMSS<Space>DDMMYYYY

Example:

12345 SETDT:214526 06102005 will set Phone clock to 12:45:26 06 October 2005

**Change Cellphone number using text SMS:**
<Passwd><Space>ADDCN<XY><Cellnumber>

<Passwd> : Programming password
<XY> : 01 – 16 Cellphone position
<Cellnumber> : Cell phone number in the international format

Example:

12345 ADDCN01+27835551111 will program cell phone number 1 to +27835551111

**Delete Cellphone number using text SMS:**
<Passwd><Space>DELCN<XY>

<Passwd> : Programming password
<XY> : 01 – 16 Cellphone position

Example:

12345 DELCN01 will erase cell phone number 1

**Set output pulse time and pulse the specific output:**

APCX - Pulse Output 1 for X half seconds
BPCX - Pulse Output 2 for X half seconds
CPCX - Pulse Output 3 for X half seconds
DPCX - Pulse Output 4 for X half seconds

X can be any value from 1 to 60000

Example:

BPC200 – Will Set the pulse time for output2 to 200 and pulse output 2 for 100
seconds

## Set multiple outputs with 1 SMS:

OUTwxyz

w -   A – Switch on Output 1
      a -  Switch off Output 1
      P -  Pulse output 1
      Any other character – No change on output 1
x -   B – Switch on Output 2
      b -  Switch off Output 2
      P -  Pulse output 2
      Any other character – No change on output 2

y -   C – Switch on Output 3
      c -  Switch off Output 3
      P -  Pulse output 3
      Any other character – No change on output 3

z -   D– Switch on Output 4
      d -  Switch off Output 4
      P -  Pulse output 4
      Any other character – No change on output 4

Example:

oUtAbxP

Will Switch on output 1, switch off output 2, No changes on output 3 and Pulse output 4. It will also send back a status SMS because the second letter of oUt ia a capital letter.

## Reset SMS counter remotely:
<Passwd><Space>RESETSMSC

<Passwd> : Programming password

Example:

12345 RESETSMSC

Cellcop will reply with a Status message where the SMS count is Zero.

**Send USSD command to the Phone:**
This functions is used to execute a USSD command remotely and Get the response back via SMS.

<Passwd><Space>USSD:<USSDCommand>

<Passwd> : Programming password

< USSDCommand > : Network related Get balances load airtime ect.

Example:
12345 USSD:*141#  - Request prepaid balance on MTN

MTN

*141# - Balance Enquiry
*141*<PIN># - Recharge Request
*141*6328*<MSISDN># - Me2U Top Up Request
*141*7*<BundleSize># SMS bundle purchase
*141*7*0# - SMS bundle cancellation
*141*8# - Yello Fortune Entries

VODACOM:
*100*01*<voucher no.># - Load Voucher.
*100#; - Balance

## SPECIFICATION

1. Cellphone used                  Nokia 5110 / 6110 / 6150

2. Number of outputs            4 / 2

3. Number of inputs              8 /4 /2

4. Power supply                    12V DC $\pm$ 5%

5. Max. voltage for outputs    240 V AC
   1 to 4

6. Max. current for outputs    10 A
   1 to 4

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**IMPORTANT NOTICE**

**A security system cannot prevent emergencies. It is only intended to alert you and - if programmed - your neighbors and monitoring station of an emergency situation. Security systems are generally very reliable but they may not work under all conditions and they are not a substitute for prudent security practices or life and property insurance. Your security system should be installed and serviced by qualified security professionals who should instruct you on the level of protection that has been provided and on system operations.**