CENTURION

SupaHelix™

ADVANCED
ACCESS CONTROL
AND MONITORING
SYSTEM

Company Profile

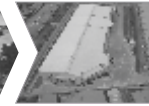**1986**   **1990**   **1995**   **1999**   **Centurion Systems today**

In-house R & D development team

Manufacture to international quality standard ISO 9001:2008

QAS INTERNATIONAL
ISO 9001:2008
REGISTERED FIRM

100% testing of products

Competent after-sales technical support from 07h00 - 18h00 (GMT+2) Monday to Friday
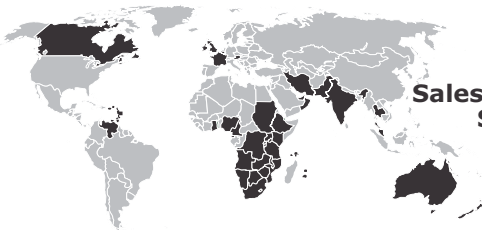
Sales and support throughout Southern Africa and over 50 countries worldwide

Contents

Icons used in this Manual

This icon indicates tips and other information that could be useful during the installation.

This icon denotes variations and other aspects that should be considered during installation.

This icon indicates warning, caution or attention! Please take special note of critical aspects that MUST be adhered to in order to prevent injury.

Mechanical Setup

These abbreviated instructions are for the experienced installer who needs a checklist to get a standard installation up and running in the minimum amount of time.

Detailed installation features and functions are referred to later in this manual.

Electrical Setup

step 6   Connect all wiring

step 7   Menu navigation map

Commissioning and Handover

step 8   Carry out professional handover to client

Safety FIRST

IMPORTANT
Safety Instructions

Warnings for the installer

CAREFULLY READ AND FOLLOW ALL INSTRUCTIONS before beginning to install the product.

- All installation, repair, and service work to this product must be carried out by a suitably qualified person
- Secure all easily accessed controls in order to prevent unauthorised use of the device
- Do not in any way modify the components of the **SupaHelix**
- Do not install the **SupaHelix** in an explosive atmosphere: the presence of flammable gasses or fumes is a serious danger to safety
- Explain these safety instructions to all persons authorised to use **SupaHelix**, and be sure that they understand the hazards associated with the **SupaHelix** system
- Do not leave packing materials (plastic, polystyrene, etc.) within reach of children as such materials are potential sources of danger
- Dispose of all waste products like packaging materials, etc. according to local regulations
- **Centurion Systems** does not accept any liability caused by improper use of the product, or for use other than that for which the automated system was intended
- This product was designed and built strictly for the use indicated in this documentation. Any other use, not expressly indicated here, could compromise the service life/operation of the product and/or be a source of danger

Anything not expressly specified in these instructions is not permitted.

1. Glossary of Terms

Channel:
An electrical gateway implemented as a physical terminal on the **SupaHelix** that provides the external interface to input or output signals.

Input:
A potential-free normally-open electrical signal that is linked to an appropriately configured channel to provide an action-inducing stimulus to the **SupaHelix**.

Output:
A potential-free open collector electrical signal that is generated by an appropriately configured channel to trigger an external system.

Open Collector Output:
A common electrical output that is generally potential-free and high-impedance when inactive, but provides a current path to system ground (negative) when active.

Normally-open:
The contacts of the 'switch', being either a relay or an open collector output, are by default in an open state, i.e. current cannot flow between the contacts unless the switch is actuated.

Normally-closed:
The contacts of the 'switch', being either a relay or an open collector output, are by default in a closed state, i.e. current perpetually flows between the contacts until opened by the switch action.

Rising edge:
A rising edge describes the transition of a digital signal from low to high. In other words, the circuit becomes active when its clock signal goes from ground or 0V to a perceivable voltage.

Falling edge:
A falling edge describes the transition of a digital signal from high to low. In other words, the circuit becomes active when its clock signal 'falls' from a voltage to ground.

Log/logging:
Logging refers to the capturing of a transaction and the data associated with it.

Firmware:
This is the product code, data and set of digital instructions unique to the **SupaHelix** Programming Console. Firmware can be updated to keep the **SupaHelix** up-to-date.

Momentary:
A momentary output is an output that is only active while the activating signal is present, for example while a remote control button is being held down.

Pulsed:
A pulsed output will remain active for a predefined time after the activating signal has occurred, for example after a remote button has been released.

Latched:
A latched output remains in a certain state after the activating signal has been removed, and will only change state once the signal is applied again.

2. General Description

The **SupaHelix** is a three-channel multi-user access control device capable of working with up to 10,000 unique CENTURION code-hopping remote control buttons, plus up to 10,000 GSM mobile phones★ providing for a total of up to 20,000 possible users. Basic functionality can be field-programmed via an intuitive four-button interface and 2.4 inch back-lit LCD graphic display. More comprehensive programming can be carried out via the Internet.★

Transmitters can be learned into up to 10,000 individual units, for example a house number, with each unit containing between one and 255 possible sub-units, for example individual tenants. While it is possible to delete sub-units individually, when learning a new remote control, the new remote control will fill the first available sub-unit. Mobile phone numbers are organised into individual units. Individual remote control buttons may be edited✹ if the remote control is present.

The **SupaHelix** has three channels which can be configured as either an input or an output (open collector). When learning new users, a mappable channel can be specified, and this channel can later be mapped to any of the available outputs (by default points to Channel 1).

Outputs can be set as either momentary (active while the activating signal is present), pulsed (active for *t* seconds after the activating signal has occurred, in 0.5 second increments), or latched. The outputs can also be specified as normally-open or normally-closed.

1. Outputs would typically be used to activate an external device, such as a gate motor or to arm an alarm panel.

Inputs can be set to trigger on rising, falling or both edges, can have a filter (debounce) time applied (set in one second increments), and can be mapped to activate any of the output channels.

2. Inputs are generally used for monitoring and data logging purposes. For example, an input can be connected to the door contact of a safe and used to track how many times the safe was opened during a given time period, or inputs can be used in conjunction with the GSM functionality★ and used to send SMS alerts to learned-in users.

An onboard Real Time Clock and Calendar (RTCC) allows time-stamped logging of the last one million transactions to a removable 2GB micro SD card. These logs (stored by month) can be viewed line-by-line on the built-in display, can be backed up to a USB flash drive for viewing on a PC using Microsoft Excel or a similar program, or uploaded to the user's profile using G-WEB.★

The **SupaHelix** firmware can be field-upgraded via USB flash drive, or over-the-air using a 2G GSM data connection.★

⚠ If the SD card is removed, the system will not function at all

★ Requires the optional GSM Module (available in 2014), and a SIM card enabled for voice and data.

✹ Any editing needs the remote control to be present.

3. Specifications

Physical Dimensions

Available from 2014 only

135mm

29mm   90mm   53mm

FIGURE 1. OVERALL DIMENSIONS FOR THE SUPAHELIX

75mm

67mm   28mm

FIGURE 2. OVERALL DIMENSIONS FOR THE CP104 RECEIVER V3.1 (OR LATER)

Technical Specifications
SupaHelix Programming Console

Physical	SupaHelix Programming Console
Supply voltage	10.5V - 30V DC
Standby current	12V 100mA (110mA★) 24V 70mA (80mA★)
Maximum current	12V 270mA (500mA★) 24V 230mA (400mA★)
Operating temperature	-20°C - +70°C
Output rating	Open collector - Max current 50mA per channel
Display	2.4 inch 128 x 64 transflective with backlight
Housing material	ABS
Degree of protection	Programming Console: IP50

Technical Specifications
CP 104 Receiver V3.1(or later)

Physical	CP104 Receiver
Supply voltage	10.5V - 30V DC (powered through the SupaHelix)
CP104 operating frequency	433.92 MHz
Sensitivity	110 dBm
Degree of protection	CP104 receiver: IP65
Maximum distance between a Programming Console and receiver	250 metres

Functional Specifications

Function	
Memory capacity	10,000 individual buttons plus 10,000 mobile numbers
Output pulse time range	0.5s - 9999s in 0.5s increments
Input activation	Rising edge, falling edge, both
Input filter	0 - 9999 seconds in 1 second increments
Network compatibility	GSM 900/1800MHz
SIM card required★	Yes (with voice and data services enabled, and airtime)
Inputs/outputs	Maximum three (selectable as any combination of open collector outputs and/or switch-to-negative inputs)

★ With optional GSM Module (available in 2014) fitted.

4. Product Identification

FIGURE 3. PRODUCT IDENTIFICATION

1. **SupaHelix** Programming Console
2. LCD screen
3. USB port
4. Control interface
5. Terminals cover
6. Terminals
7. CP104 receiver V3.1(or later)
8. Optional GSM module (available in 2014)
9. Removable side panel
10. Mounting slots
11. Mounting bracket

5. Required Tools and Equipment

- Screwdriver - 3.5mm flat
- Drill
- Side cutter
- Drill bits - 5mm masonry; 6mm drill bit
- Silicone sealant
- Fasteners and rawl plugs
- Six metres of 6-core communication cable

6. Mounting Instructions

Important Considerations

- To prevent tampering and potentially compromising the integrity of the system, the **SupaHelix** Programming Console must be mounted in a secure location
- The **SupaHelix** Programming Console must be mounted in a location where it will not come into direct contact with the elements, preferably indoors or in a suitably sealed enclosure
- The enclosure of the CP 104 receiver is weather-resistant and thus it can be fitted outdoors in an optimal position

Ensure that there is enough space (± 60mm) around the **SupaHelix** Programming Console in case you want to add the Optional GSM Module later (available in 2014)

Mounting the SupaHelix Programming Console

1. Find a suitable surface on which to mount the Console, open the terminal cover and unscrew the two M4 pan-head Pozi screws connecting the panel to the mounting bracket.
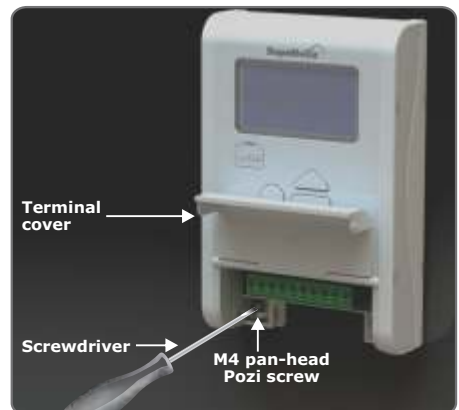

Terminal cover

Screwdriver

M4 pan-head Pozi screw

FIGURE 4.

SupaHelix Programming Console

Mounting bracket

FIGURE 5.

2. Separate the mounting bracket from the **SupaHelix** Programming Console.

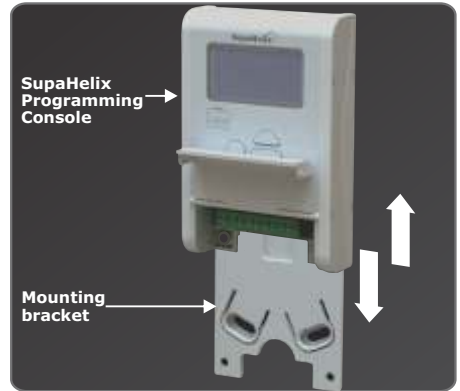**5mm mounting hole**

Mounting bracket

Mounting surface

FIGURE 6.

3. Mark the position of the unit on the wall.

4. Use a 5mm masonry drill bit to drill the mounting holes in the wall.
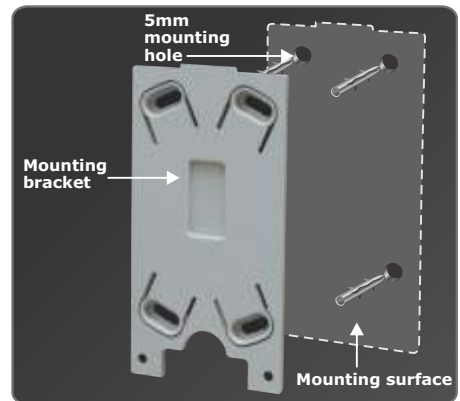

Fasteners

Mounting bracket

FIGURE 7.

5. Mount the bracket using the fasteners provided.

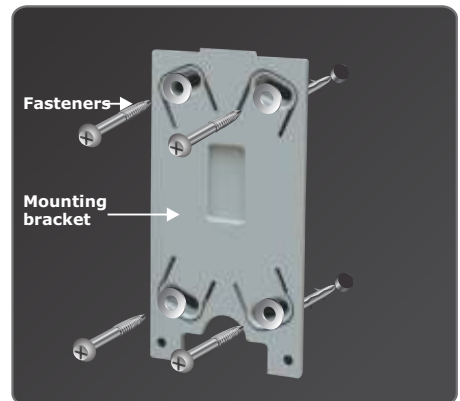6. Slide the panel onto the bracket as shown.

The position of the unit can be adjusted according to the diagonal mounting slots in the bracket in the event that the surface is not completely even.
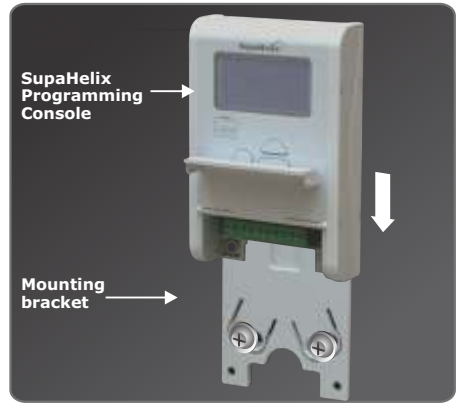

FIGURE 8.

7. Replace the Pozi screws.
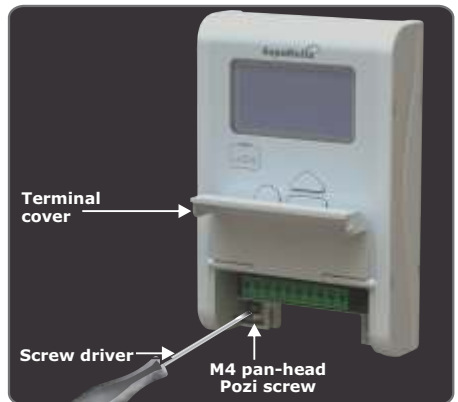
FIGURE 9.

Mounting the CP104 receiver (V3.1 or later)

1. Remove the cover from the enclosure using a flat screwdriver.
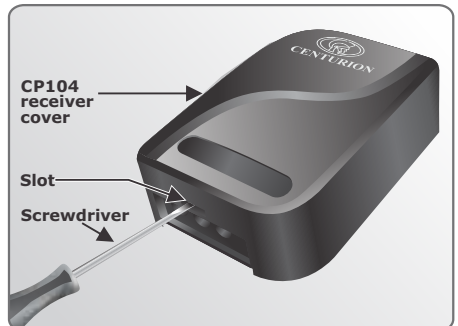
FIGURE 10.

2. Remove the cover and unclip the circuit board from the retaining clips.

CP104 receiver cover

Circuit board

FIGURE 11.

3. Mark position of the unit against the mounting surface.

4. Using the 5mm masonry bit, drill a hole into mounting surface.

5. Mount the unit using suitable fasteners.

Mounting surface

Fastener

Mounting hole

FIGURE 12.

6. Use a 6mm drill bit to open the required cable entry hole.

Cable entry hole

6mm drill bit
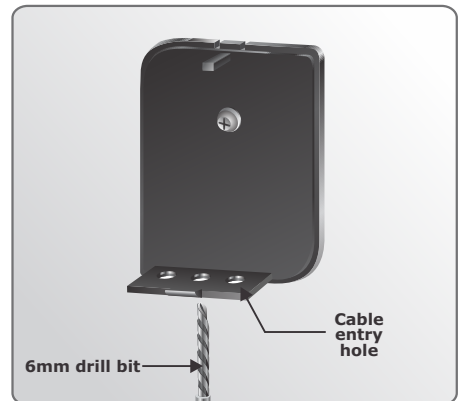
FIGURE 13.

7. Fix the cable to the wall using cable saddles.

8. Seal all the holes with silicone sealant.

9. Re-insert the circuit board and ensure that the retaining clips are holding it in place.

Cable saddles

Cable
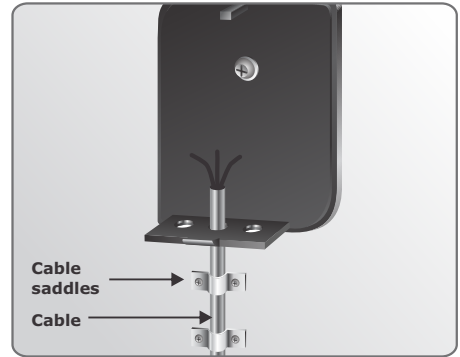
Fitting the Optional GSM Module (available in 2014)

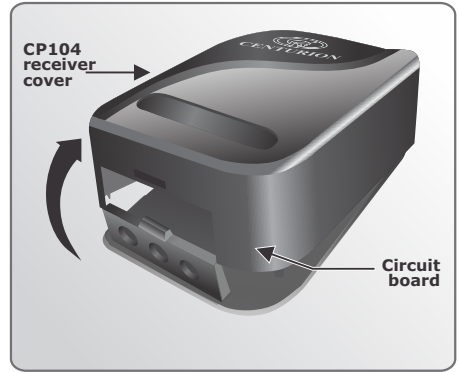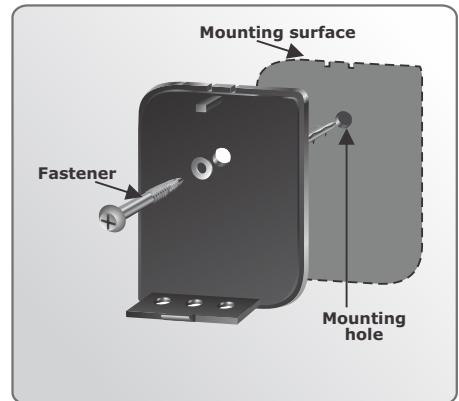The Optional GSM Module has male connectors with ten pins that simply slot into the female connectors provided on the Programming Console, as shown below.

Ensure that the SIM card used in the GSM Module is:

- Activated
- Has been registered in terms of the RICA act
- CLID (Caller Line Identification) has been enabled on both the SIM and all learned in phones
- Has the PIN code disabled
- Has some airtime loaded
- Call forwarding must be disabled

1. Insert a screwdriver in the slot and remove the removable side panel as shown in Figure 15.

Removable side panel

SupaHelix Programming Console

2. Insert the SIM card into the GSM Module as shown in Figure 16 before you attach it to the **SupaHelix** Programming Console.

SIM card

GSM Module

3. Align the ten-pin GSM Module's male connectors to the **SupaHelix** Programming Console and slide it in.

It is easier to fit the GSM Module when it is angled back slightly.

10-pin male connectors

GSM Module

SupaHelix Programming Console
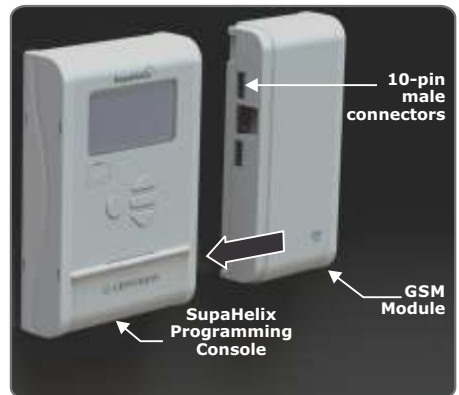
4. Replace the removable side panel onto the GSM Module.

GSM Module

SupaHelix Programming Console
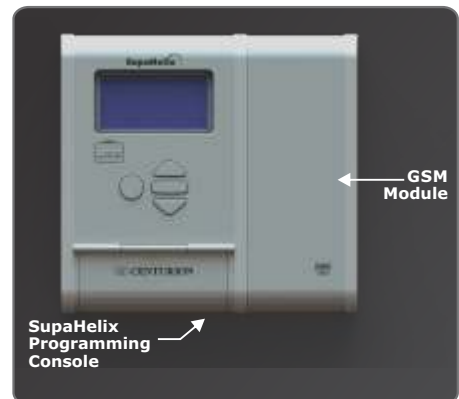
7. Wiring Diagrams

SupaHelix

**Power input
10.5V - 30V DC**

**Channel
input/output**

**Receiver
communication
terminals**

V+ V- CH+ CH- CH1 CH2 CH3 RX+ RX- RXD
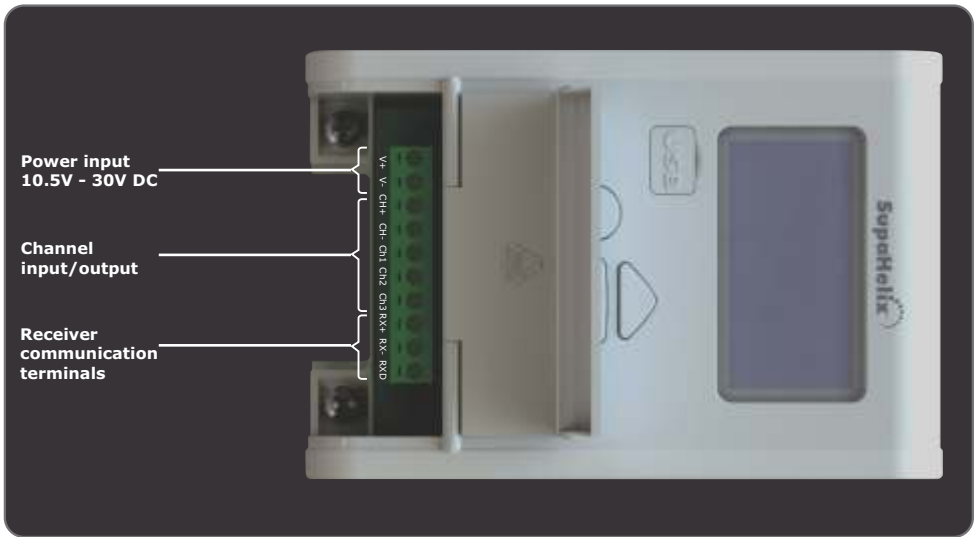
FIGURE 19. PROGRAMMING CONSOLE

**Receiver
communication
terminals**

RX+ RX- RXD
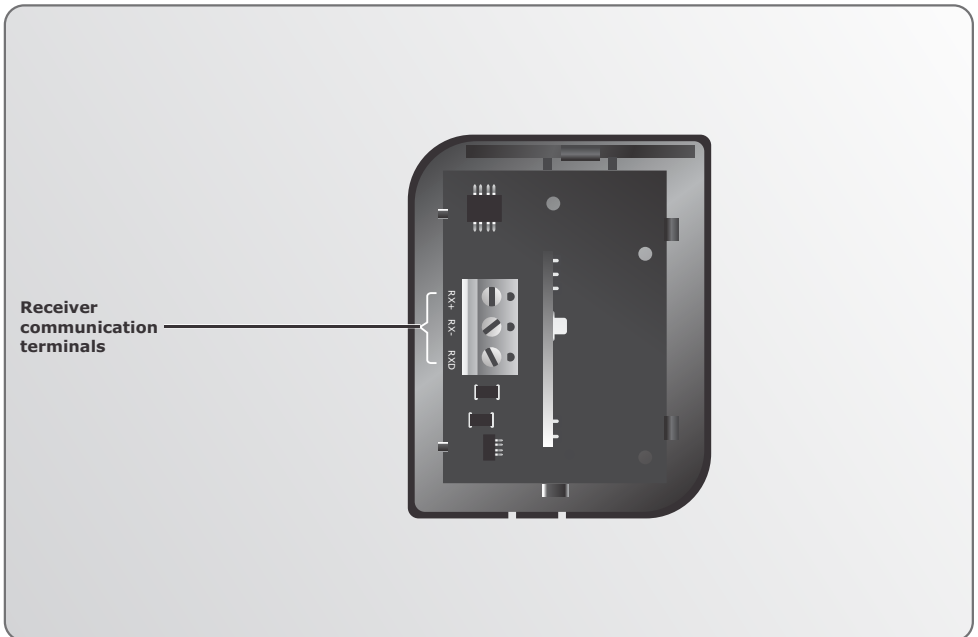
FIGURE 20. CP104 RECEIVER (V3.1 OR LATER)

A maximum distance of 250 metres between the **SupaHelix** Programming Console and the receiver is allowed, and it is recommended that shielded cable is used

FIGURE 21. TYPICAL SUPAHELIX WIRING DIAGRAM TO D10 AND SWITCHING GEYSER

8. Electrical Setup

The full menu of features that can be set up on the system, and an explanation of each feature, is provided in this section.

Method of triggering

GSM signal indication

Date and Time

Latest system message is displayed here

Indicating Channel 1 set as OUTPUT

Indicating Channel 2 set as INPUT with a filter on Rising Edge
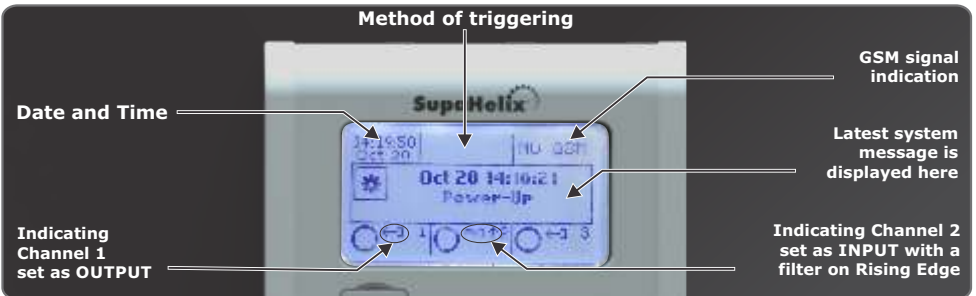
FIGURE 23.

While setting up the **SupaHelix** system via the LCD display, all the steps that have to be followed are clearly provided via the display. It is only necessary to note the following:

- To get into Setup Mode, press the enter (●) button for two seconds and follow the instructions provided from there

- The buttons on the Programming Console for navigating the system are not marked because at each step during the setup, the function of each button is shown on the display

FIGURE 24

Menu Navigation Map

Menu Descriptions
Menu 1 – Remote Controls

The system is capable of learning up to 10,000 CENTURION code-hopping remote control buttons.

1. It is possible to artificially increase the number of buttons of a multi-button remote control by using a two-button combination.

2. One of the buttons is used as a shift button to allow the other buttons to be used again in combination with this button. In other words, the user will press and hold the shift button, before pressing one of the other buttons to create a new button.

3. The shift button cannot be used as a button on its own, it must always be used in combination with the other buttons.

FIGURE 25.

Benefits of the shift button system

4. Use of the shift button system allows a three-button remote control to gain an extra button and operate four channels (for example where two **SupaHelix** modules are installed on a site) and likewise a four-button remote control gains two extra buttons and can operate six channels.
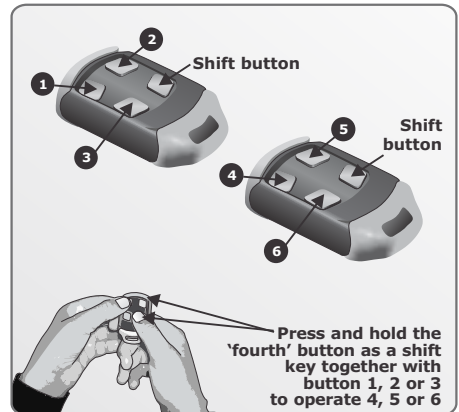
FIGURE 26.

5. **Add New Remotes**
   5.1. **Add Remote**
      a). Any button can be set to control one or more of the three channels provided by the **SupaHelix** system. When adding remote controls, it is recommended that a record be kept of the ID number allocated by the system to each respective remote control and the person to whom the remote control is given. This is necessary should selective deletion be required at a later stage.

      b). Together with the traditional single-press Learning, two secure Learning Modes have been added for remote controls. These are intended to prevent unwanted remote controls from being learned into the system during the remote learning process.

The first is 'Double Press' Learning, where the new button must be pressed twice in order to be learned in, and the second is 'Press for Three Seconds' Learning, where the new button must be pressed and held for a period of three seconds in order to be learned in.

c). Template Learning of Remotes

In order to drastically reduce the time spent learning in new remotes, use an existing remote control as a template – all subsequent remote controls will be learned as 'clones' of the template remote control. When requested, press any button on the template remote control. All new remote controls can now be learned with just one press of any button, and will inherit all the functional settings of the template remote.

5.2. Delete Remotes

Remote controls can be deleted at any stage according to one of the following methods:

a). Delete Remote Button

The operation of a single button of a particular remote control can be cleared. For example, the **SupaHelix** allows the activation of Channel One set on one remote button to be cleared, without affecting the other operations that the same remote control performs. The remote control is required for this operation.

b). Delete Remote by Button

Use this procedure to remove the remote control from the system. All button functionality will be removed. The remote control is required for this operation.

c). Delete Remotes by Unit

This procedure removes all remote controls allocated to a specific unit, or unit sub-number. For example, all remote controls learned to Unit 15 can be removed from the system's memory without affecting remote controls assigned to other units. This is convenient for instances where a household or all the occupants of a flat or townhouse terminate their tenancy. The remote controls are not required for this operation.

5.3. Delete All Remotes

Clears the entire memory of learned-in remotes. All remote controls will be removed from the system.

5.4. Edit Remote Button

Change the group of a button, or the output(s), that a button activates to another output(s), or other Outputs. For example, Button One activates output 2. To change this, use the Edit Remote Button function, select Outputs 2 and 3, and button one of the same remote will now activate both Outputs 2 and 3 upon being pressed.

5.5. Count Remotes

Displays the number of remote control buttons learned into the system.

This is the number of individual buttons, not remote controls.

Menu 2 – Input/Output

1. **Setup Channel 1,2,3**

   The functionality of each individual channel can be configured according to the following settings:

   1.1. **Set Direction of Channel (Input/Output)**

      Each channel can be configured as either an input or an output. **Inputs are used for monitoring purposes**, for example to send users an SMS notification when an alarm is activated (when used together with the Optional GSM Module), or to log how many times a safe has been opened. **Outputs are used for controlling electrical devices**, for example to trigger a gate motor or to turn a geyser on and off. The channel direction will be indicated visually on the display as shown in Figure 23.
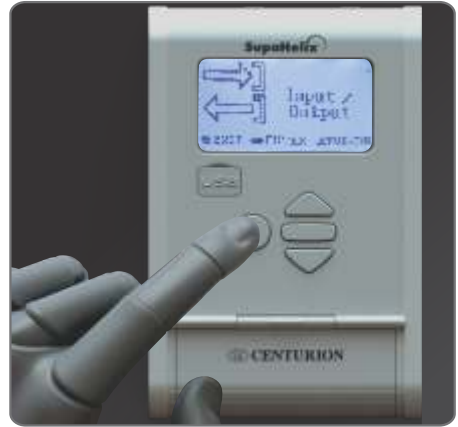

FIGURE 27.

   The following additional functionality can be programmed per channel:

   a) **Set Mode**

      The output mode can be either:

      Momentary: The output will be activated when the remote control button is pressed, remain activated while the button is held in and deactivate once it is released.

      Pulsed: When the remote control button is pressed, the output will be activated and remain in this state after the button has been released for the pre-set pulse time. The pulse time can be set from 0.5 seconds to 9999 seconds in 0.5 second increments.

      Latched: The output will be activated when the remote control button is pressed and remain activated until the same button is pressed again. The output state is 'sticky', and will be remembered if power is cycled.

   b) **Set Contact Type**

      The output contact type can be configured as either a normally-open or a normally-closed open collector output. The default contact type is normally-open.

      The following additional functionality can be programmed per input:

      Trigger On: The input can be set to trigger on a rising edge, a falling edge, or both.

      Input Filter Time: (Applicable to both rising and falling edges if set). Sets the time for which a signal must be present before activating the input. For example, an input can be set to only activate if power on the input device has been absent for a period of 60 seconds. The filter can be set from 0 seconds ('filter disabled') to 9999 seconds in one second increments.

Basic Function: This feature allows one or more outputs to be triggered upon the activation of the specific input. For example, Input 1 can be configured to activate Outputs 2 and 3 when activated. This is useful in instances where the user wants to create a feedback loop within the system. The **SupaHelix** automatically calculates which outputs are available.

c). Change Mappable Output

This operation changes the default output that new remote controls are programmed to activate. It is a dynamic output that can be changed at any stage should the need arise, and all remote control buttons that have been assigned to the 'Mappable Output' will then be moved to the newly chosen output. For example, if Output 1 is currently being used to open the gate fully, and it later becomes necessary to use the output to perform a different function, the Mappable Output can simply be changed to Output 2 for example, and all remote controls learned to the mappable output will automatically be transferred to Output 2. This obviates the need for relearning or editing each individual remote control button. Certain functionalities may require additional interface devices, such as relays, isolators, etc.

Menu 3 – Date and Time

1. Set Date and Time

Sets the current date and time in the format **yyyy-mm-dd** for the date and **hh:mm:ss** for the time. It is important that the date and time be configured if the unit is to be used for data logging applications. The onboard Real Time Clock and Calendar will retain the date and time information for a period of one week without power.

2. Daylight Savings Time

This is set up via the G-WEB online user interface (functionality available in 2014)

FIGURE 28.

Menu 4 – General Options

1. Reset Options

The controller settings can be reset through the Reset Options menu. Two reset options are available:

• **Restore Factory Defaults**

All settings will be restored to the default values indicated in the following table overleaf.

FIGURE 29.

Parameter Description	Unit	Minimum	Default	Maximum
Channel direction	Input; Output		Output	
Mode	Pulsing; Latching; Momentary		Momentary	
Mappable channel	Channel 1; 2; 3		Channel 1	
LCD backlight brightness	%	0%	50%	100%
LCD backlight timeout	Mm:ss	00m:01s	00m:15s	01m:00s
LCD contrast	Level	1	30	50

- **Reset All**

  Clears and defaults the system completely. The unit will be reset to the Factory Default settings, in addition to clearing all remotes and phone numbers.

2. **Backup and Restore**

   2.1. **Back up ALL to USB**

   Allows all controller settings, remote controls and phone numbers to be backed up onto a USB device via the Programming Console's USB host.

FIGURE 30.

   2.2. **Restore from USB**

   Allows all controller settings, remote controls and phone numbers that have previously been backed up, to be restored.

3. **Available Memory**

   Displays the amount of memory available on the unit's 2GB removable micro SD card. This is expressed as a percentage.

4. **Self Test**

    Any of the tests can be skipped by momentarily pressing the oblong button. All inputs and outputs must be disconnected prior to performing the Self Test

   When selected, this option initiates a series of diagnostic tests to query the system's health and operation of the following system components:

   - All three input/output channels
   - The up, down and 'back' buttons
   - The receiver
   - The onboard buzzer
   - The backlight
   - The USB host
   - The EEPROM
   - The operation of the GSM Module (available in 2014)

   At the end of the Self Test, a diagnostic report will be displayed indicating which operations passed, which failed, and what tests were skipped.

- **Delete Logs**

  The system administrator can choose to either delete all log files currently saved to the unit's memory, or select a specific log file to be removed.

Menu 5 – G-SWITCH Options (Available in 2014)

Reserved for future development.

Menu 6 – Display Options

1. **Adjust Display Contrast**

   Alters the contrast between the LCD background and the text and graphics. The contrast is adjusted between one and 50 in increments of one, up to a maximum of 50. The default value is 30.

2. **Adjust Backlight Intensity**

   Sets the brightness of the backlight. This can be set from 0% ('disabled') to 100% in 1% steps.

3. **Adjust Backlight Timeout**

   Sets the amount of time for which the backlight will remain on after the last action has been performed. This can be set from one second to one minute in one second steps. The default Backlight Timeout is 15 seconds.

FIGURE 31.

Menu 7 – Security Options

1. **Menu Locking**

   Various options are available to limit access to the menu and help prevent tampering of the unit and unwanted altering of the settings.

   - **No security** – the menu is accessible to anyone
   - **Any remote in Group 0** – Any remote learned to Group 0 can access the menu
   - **Any remote in the system** – Any remote learned into the system's memory can unlock the menu and access settings

FIGURE 32.

Menu 8 – Logging Options

The following logging options are available:

1. **View Logs**

   Allows the system administrator to select a log file to view. The user can scroll through the available logs by using the directional arrows and select them using the oblong (⬤) button.

2. **Upload Logs**

   Allows log files to be uploaded from the system's memory to a USB device. The user can scroll through the available logs by using the directional arrows and select them using the oblong (⬤) button.

3. **Delete Logs**

   Allows the administrator to either delete all log files or select a specific one to be removed from the system's memory. The user can scroll through the available logs by using the directional arrows and select them using the oblong (⬤) button.

FIGURE 33.

Menu 9 – Firmware Upgrade

The administrator can bootload the unit with the latest firmware file either by downloading it from the **Centurion Systems** website and transferring it to the unit via a USB device, or the file can be bootloaded over-the-air(OTA)＊ via the G-WEB online interface if the optional GSM module has been connected
＊ (OTA functionality available in 2014).

FIGURE 34.

9. Diagnostics

The **SupaHelix** system provides useful visual diagnostic feedback of the overall system health via a series of diagnostic screens which are easily accessible from the main screen by pressing either of the directional arrows.

The following three diagnostic screens and related diagnostic indicators are provided:

Supp Voltage: This is the current supply voltage read by the system as provided by the power source.

Pup: The date and time that the device was last powered up.

Pdn: The date and time that the device was last powered down.

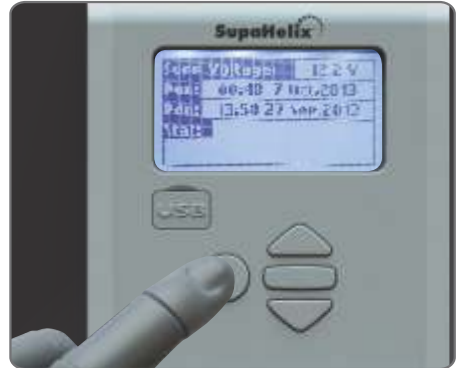**Stat:** Displays important messages related to the system health.

FIGURE 35. SCREEN 1

Lang File Version: The version number of the current language file on the SD card.

Micro Version: The version number of the current language file on the micro controller.

FIGURE 36. SCREEN 2

Hardware Version: Denotes the version number of the physical components, electronics, etc., used in the construction of the unit.

Device Firmware: The version number of the current product code and persistent memory loaded to the system.

Firmware Revision: This is the actual repository firmware for the application segment of the product code.

Bootloader Version: The repository firmware for the bootloader segment of the product code.

Serial Number: A unique eight-digit number allocated to each manufactured unit.

FIGURE 37. SCREEN 3

10. Installation handover

Once the installation has been successfully completed and tested, it is important for the installer to explain the operation and safety requirements of the system.

Centurion Systems (Pty) Ltd does not accept any liability caused by improper use of the product, or for use other than that for which the automated system was designed**.**

Notes

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