



Central Unit for Alarm System (CUAS) Evaluation Board

Introduction

The Central Unit for Alarm System (CUAS) Evaluation Board provides a complete reference system addressing the low- to middle-end security sectors. The tool is ready, from hardware and software point of view, for the development of a complete alarm platform based on a bus network. Thanks to a PC graphical user interface (GUI), it is also possible to easily set up all control parameters (in addition to a control/programming panel connected through the bus).

The entire system consists of four boards: Central Unit (CU) board, Control Module (CM) board, Power Supply (PS) board and the PC interface board. There is also PC GUI software that enables the user to easily configure all CU parameters and to execute certain system tests. It is possible to expand the system by means of input/output expansion boards, a GSM board (a connector is available on the CU Board) for managing the CU using a cell phone and other modules using radio-frequency identification (RFID), smartcard or keyboard devices connected through the bus.

Contents

- 1 System features 6**
 - 1.1 System description 6
 - 1.2 Getting started 8

- 2 System parameters 11**
 - 2.1 Introduction 11
 - 2.2 Zones 11
 - 2.3 Outputs 11
 - 2.4 Partitions 12
 - 2.5 Log events 12
 - 2.6 Options 12

- 3 System hardware configuration 13**
 - 3.1 Introduction 13
 - 3.2 Sensor connections 13
 - 3.3 Control module connections 14
 - 3.4 Power supply connections 14
 - 3.5 Central unit connections 14
 - 3.6 Output connections 15
 - 3.7 Tamper line 16

- 4 Configuring system parameters 17**
 - 4.1 Introduction 17
 - 4.2 Configuration using the PC GUI 17
 - 4.3 Configuration using the Control Module 17
 - 4.4 Password protection 18
 - 4.5 Access levels 19
 - 4.5.1 User level 19
 - 4.5.2 Service and owner levels (S/O-L) 19

- 5 Menus 21**
 - 5.1 Using the key pad 21

5.2	System Enable/Disable	21
5.3	Partition Enable/Select	21
5.4	System status	22
5.5	Log event	22
5.6	Setup	24
5.6.1	Zones	24
5.6.2	Outputs	27
5.6.3	Partitions	29
5.6.4	Installation code	30
5.6.5	Access code	31
5.6.6	Options	31
5.6.7	Timer events	32
5.6.8	Date and time	32
5.6.9	Bus modules	33
5.6.10	Central Unit	36
5.7	CM Setup	36
6	Electrical characteristics	37
	Appendix A Miscellaneous	38
A.1	Keyboard character association	38
A.2	Module address ranges	38
A.3	Output assignments	38
	Revision history	39

List of tables

Table 1.	CU connectors	15
Table 2.	Password protection for each access level.	18
Table 3.	Menus available by access level	19
Table 4.	Electrical characteristics	37
Table 5.	List of available characters	38
Table 6.	List of possible module addresses	38
Table 7.	Output assignments	38
Table 8.	Document revision history	39

List of figures

Figure 1.	System overview	7
Figure 2.	Central unit board layout.	9
Figure 3.	PC interface board layout	10
Figure 4.	Control module board layout.	10
Figure 5.	Power supply board layout	10
Figure 6.	Sensor wiring diagram	13
Figure 7.	Control module connections	14
Figure 8.	Siren connection	16
Figure 9.	Status/alarm connector	16
Figure 10.	Central unit connected message	17
Figure 11.	Control module keypad	18
Figure 12.	User level menus	19
Figure 13.	Service / owner level menus	20
Figure 14.	Text entry	21
Figure 15.	Partition selection	22
Figure 16.	System status menu	22
Figure 17.	Log event menu	23
Figure 18.	Setup menu	24
Figure 19.	Zone setting menus	25
Figure 20.	Zone filter menu	27
Figure 21.	Output associated menu.	27
Figure 22.	Output settings menus	28
Figure 23.	Output timing menu	29
Figure 24.	Partition menus	29
Figure 25.	Input and output association menu	30
Figure 26.	Installation code menu	30
Figure 27.	Option menus	31
Figure 28.	Zones testing	32
Figure 29.	System date and time	33
Figure 30.	Bus modules menu	33
Figure 31.	Control module menus	34
Figure 32.	User management menu	34
Figure 33.	Partition association menu	35
Figure 34.	I/O Expander menu.	35
Figure 35.	Control module setup menu	36

1 System features

- 8 Configurable hard-wired inputs with programmable balance control
- 7 Configurable hard-wired outputs that can be associated to each input (4 SSR, 2 transistorized, 1 relay)
- Alarm-on and CU-active output indicators
- 16 configurable partitions for inputs/outputs
- Inputs and outputs expandable with the I/O Expander modules connected to the bus
- Balanced and programmable Tamper line (not yet managed by firmware)
- Programmable Fire/Smoke sensor inputs
- Mains loss and low battery indicators (not yet managed by firmware)
- Test mode for inputs/outputs
- Timer events for inputs/outputs
- Date and Time stamp for up to 999 log events
- Up to 8 users with programmable access code for all partition combinations
- Encrypted Communication Bus for I/O expansion and system management
- Three-level password access control
- Protected Bus Installation and Setup mode for additional security
- PC interface connected directly via the communication Bus with a user-friendly GUI

1.1 System description

An Alarm System consists of a Central Unit (CU) that manages a certain number of inputs (typically connected to sensors and detectors, called zones), outputs (connected devices such as sirens, indicators, etc.) and other devices (i.e. RFID keys, Smartcards, Expansion Modules, GSM, Keyboards, RF module, etc.) connected to the communication bus for system management and configuration as shown in [Figure 1](#).

The system is controlled using up to 8 Control Modules that regulate system installation, parameter configuration and switching on/off the CU and partitions.

Each zone of an alarm system can be configured, logically regrouped, separately processed and associated to a group of outputs in a different way. The outputs are also configurable in terms of timing, working mode and normal status (High or Low).

This CU is composed of 8 zones directly hard-wired to the CU board. It is possible to expand the number of zones by connecting one or more I/O Expansion modules through the bus.

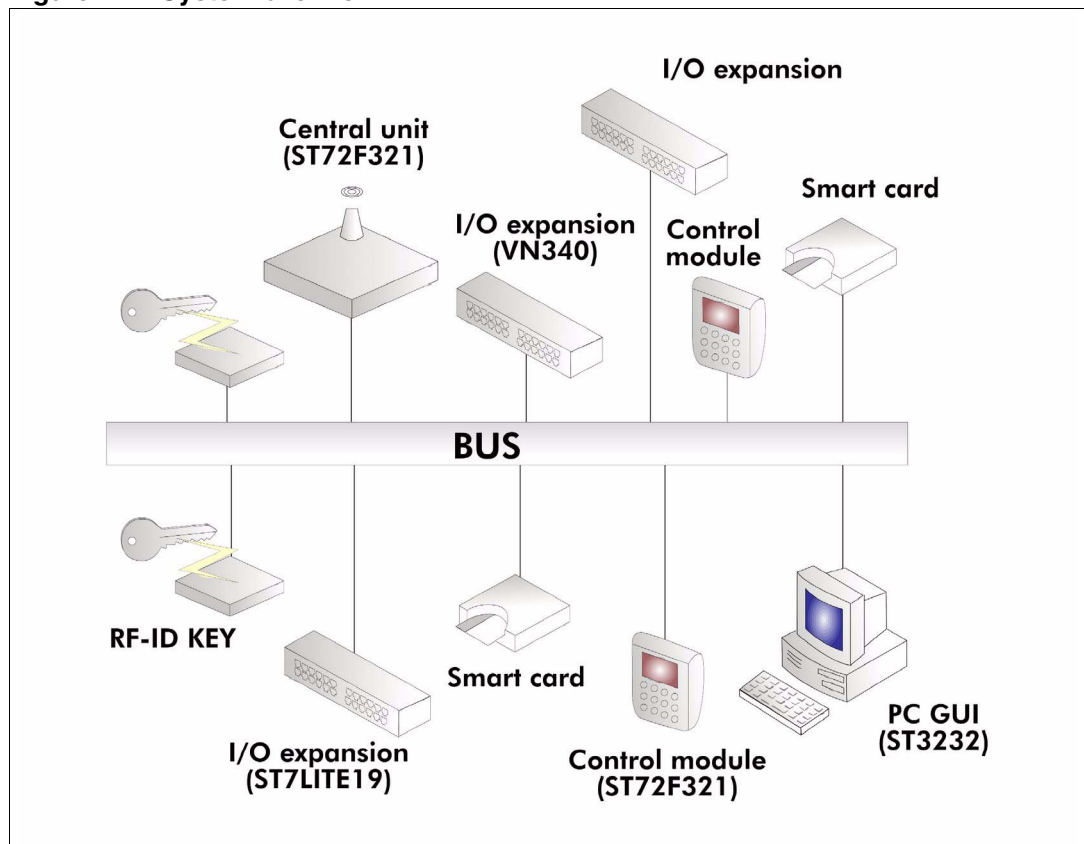
Seven hardwired outputs are available:

- Four outputs are separately driven by a solid state relay (SSR - VN340SP) and can deliver up to 1A for each output. These outputs are normally used for connecting sirens and other external devices (auxiliary outputs).
- Two outputs are transistorized and typically used for indicating the system status (alarm condition, CU status, etc.).
- One output is a micro relay for general purpose uses such as connecting a video recorder, external GSM, etc.

Special inputs are also available on the CU board such as the Tamper line used to indicate any tampering with the system. This line is normally connected in series with the Tamper inputs of each sensor or device connected to the CU. A fire/smoke line is also present on the CU board and is used to continuously monitor all fire or smoke sensors; immediately signaling any warnings depending on the line configuration, but independently of the CU status.

The system works using an RS-485 communication bus. This is a 4-wire bus (2 wires for power, 2 for communication) that complies with RS-485 standards and guarantees good noise immunity. The communication algorithm provides an encrypted protocol that prevents information sniffing on the communication bus. Thanks to this bus, system modules can be placed far away from the CU using a reduced number of wires. This configuration reduces setup time, wiring and the wiring costs.

Figure 1. System overview



1.2 Getting started

In order to correctly operate your alarm system using the CUAS Evaluation Board, follow the steps listed below. (Refer to [Figure 2](#), [Figure 3](#), [Figure 4](#) and [Figure 5](#).)

1. Connect the Power Supply board to the power supply connector on the Central Unit (J2).
2. Connect the Control Module board to the Bus connector on the CU (CM BUS - J6) using connector J11 or J13. (Ensure that the keyboard is connected to connector J16).
3. Connect the PC interface board to the Bus by the connector J36 either on the connector COMM BUS J5 of the CU or the connectors J13 or J14 of the CM.
4. Connect the PC interface board to the PC serial port through an RS-232 serial connector (not a null-modem).
5. Connect the mains power to Mains connector on the Power Supply board.
6. Power the PS with the mains.
7. Connect the battery on the Power Supply board.
8. Push the Initial Setting push button for at least 5 seconds. After a brief delay, the CM screen will display the date, time and CU status.

Note: Perform Steps 3 and 4 only if a PC is required.

The following figures show the block diagrams of the CU, CM, PC Interface and the Power Supply boards.

Figure 2. Central unit board layout

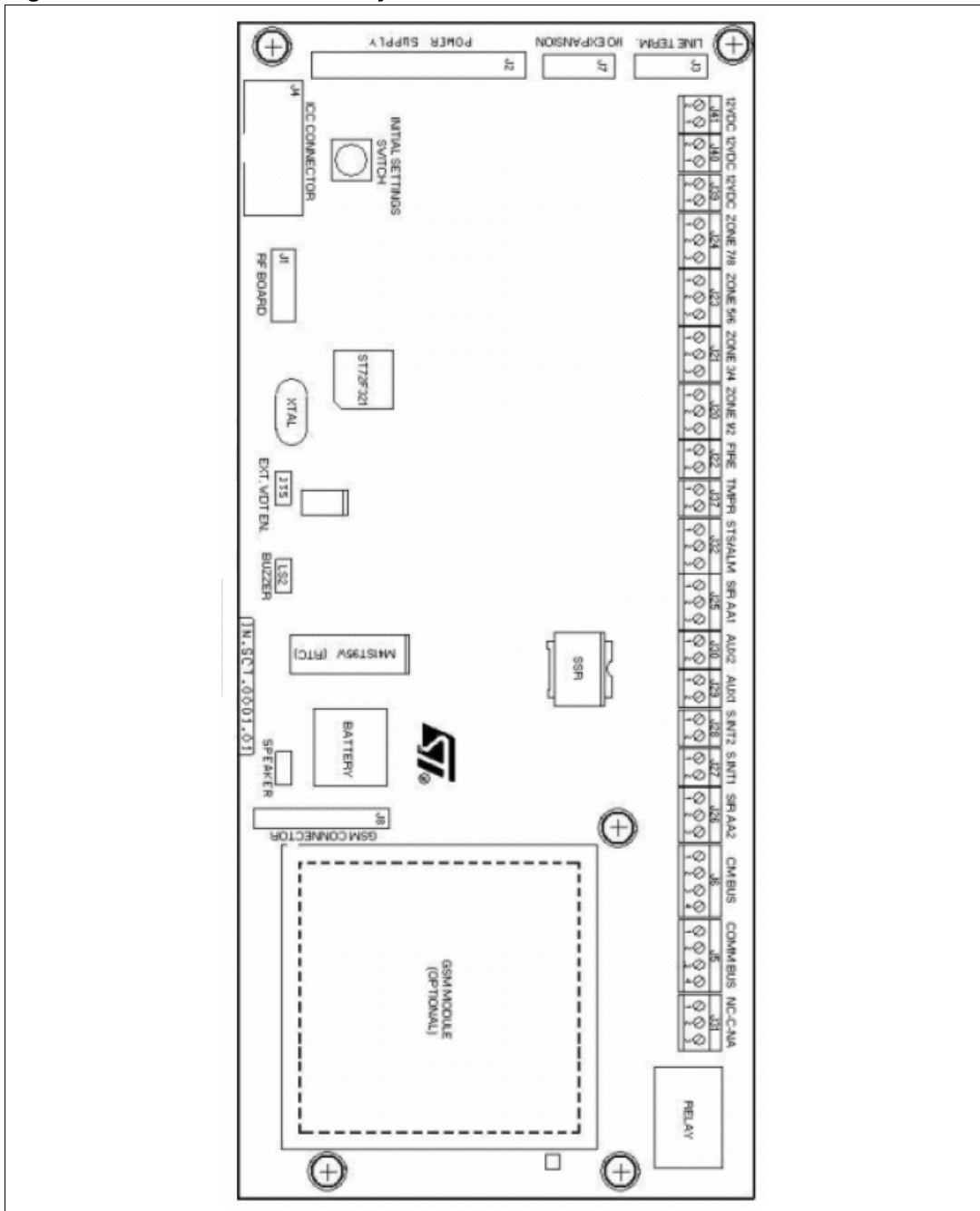


Figure 3. PC interface board layout

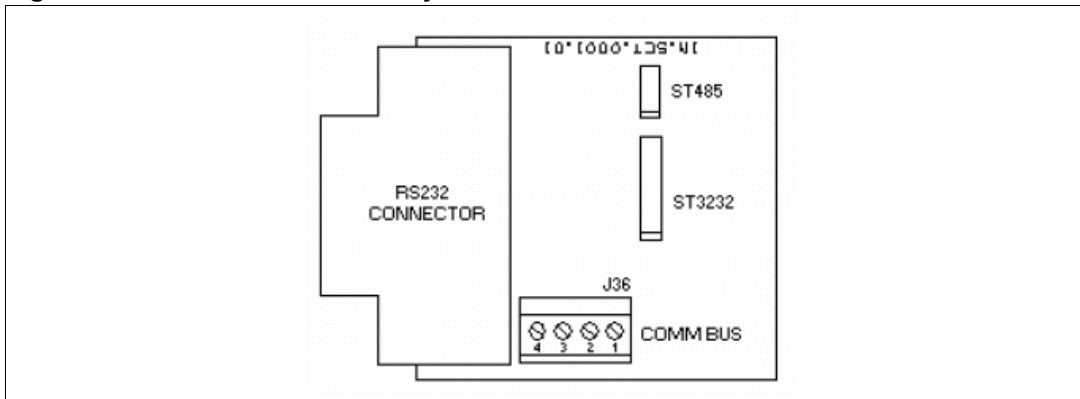


Figure 4. Control module board layout

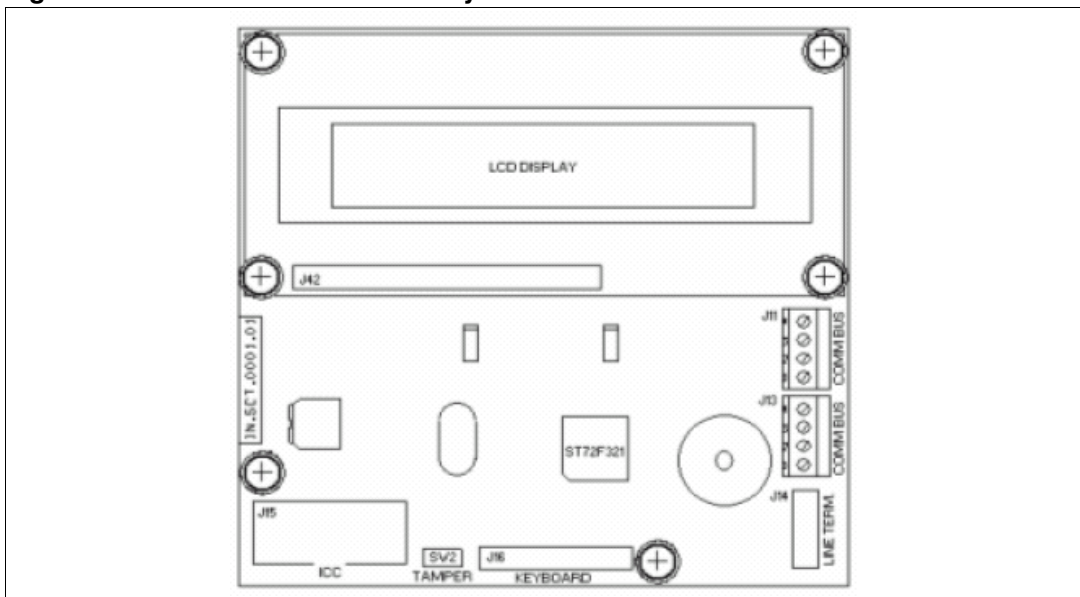
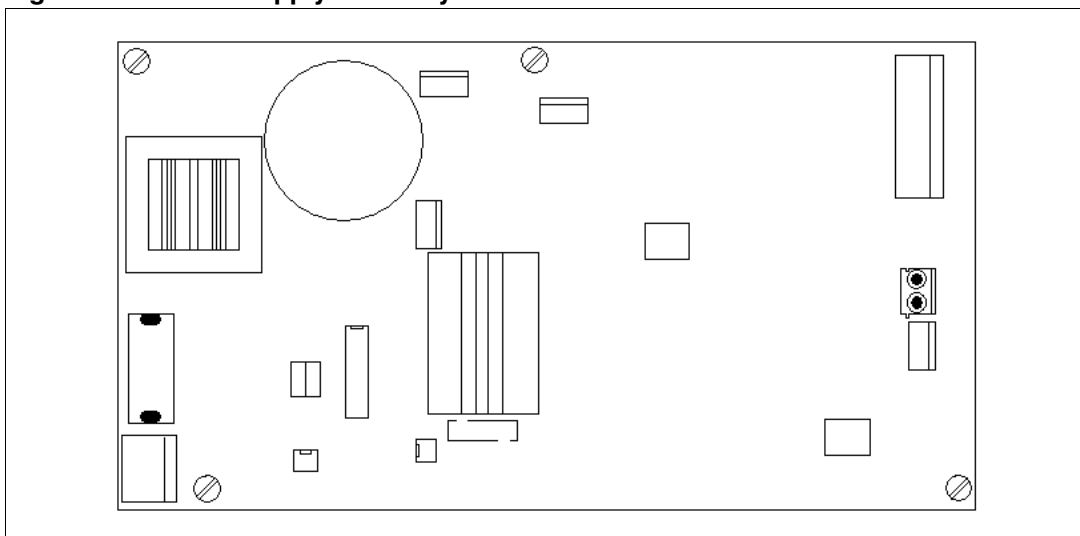


Figure 5. Power supply board layout



2 System parameters

2.1 Introduction

System parameters can be configured by using either the Control Module or the PC Interface. Using the PC interface provides the advantage of using a user-friendly graphic interface (GUI) to configure the system parameters off-line. Once the system is configured on its own PC, it is possible to download information to the CU. For safety reasons and in order to avoid any tampering from a different installer, a system installation code is required before entering Parameter Setting mode on the CU.

2.2 Zones

Each zone is balanced, meaning that the CU detects any resistance variations on the input line. A certain resistance value is assigned during the installation and when an imbalance is detected, it is considered as an infraction and processed.

In each zone, a resistor can be placed between each zone terminal (i.e. J20 to J24 for the hard-wired zones). In this case, the value of each resistor can be decided by the installer and it is not necessary to set the same value for each zone. Using this feature ensures that any additional resistance values coming from the wiring do not affect system performance.

Each zone can be included or excluded from the control flow (i.e. if a sensor is broken the zone in which it is connected can be temporary excluded), and the working mode can be set either as normally closed (NC or balanced) or normally opened (NO or unbalanced). The zone status variation is immediately stored by the CU when detected, but it is processed only once the delay time associated to the zone is elapsed (if any delay is set).

Each zone can be logically associated to all the others in OR (as default) or in AND modes. In AND mode, status variations are detected and processed by the CU only if all the zones in AND mode have their status changed too. Each zone can be in AND mode with another zone, but the vice versa is not mandatory. For example, Zone 4 can be in AND mode with Zone 5 (Zone 4 is now seen as Group 4), but Zone 5 is not in AND mode with Zone 4 (Zone 5 is associated to Zone 4 in OR mode).

Each zone is protected against negative voltage, over voltage and ESD.

2.3 Outputs

Each output behavior can be configured as “change status” (ON for a certain time followed by an OFF period or vice versa) or “toggle status” (each time an alarm condition occurs, the output status is toggled). One or more outputs can be associated to each zone and can be enabled or disabled from the system. The default level of each output can be configured as high or low.

Four outputs are SSR outputs that can supply up to 1A (internally limited) depending on the power supply capacity (connectors J25/J26, J27/J28, J29 and J30). Typically such outputs are dedicated to sirens (self-powered and internal) and for other devices that require power (connectors AUX1 and AUX2).

Two outputs (J32) are transistorized general purpose outputs that can be configured for signaling alarm conditions or the CU status.

The last output is a micro relay with the NC, C and NO clean contacts available. The maximum voltage and current applicable to the contacts is 0.4A @ 125VAC and 2A @ 30VDC for resistive load and 0.2A @ 125VAC and 1A @ 30VDC for inductive load.

2.4 Partitions

A partition is a logical group of zones with an assigned name and behavior that can be activated or deactivated by an activation device existing on the system (i.e. keyboard, smartcard, etc.). On each partition, it is possible to associate two or more zones present on the system; a single zone may belong to several different partitions.

Zones are associated as inputs or outputs:

- An input association means that when the partition is deactivated by a device (i.e. by a smartcard when entering a protected area) ONLY all the zones associated to the Input will be excluded by the control flow. If any of the zones not associated to the deactivated partition is forced, an alarm condition will be detected and processed.
- An output association means that ONLY the associated zones will be controlled by the CU once the system is activated by a device.

Each partition can be associated to one or more user codes and vice versa. Each time a user enters his code, all the partitions associated to that code can be enabled or disabled even individually.

2.5 Log events

The CU automatically records a certain number of events in the internal E2 memory once they occur. The event log feature enables the owner or the installer (not the users) to view the event history using the appropriate menu feature (or, these events can be downloaded through the PC interface and analyzed). The system can record up to 999 events. If more events occur, the oldest ones are automatically replaced by the newest.

2.6 Options

During the installation it is possible to enter Test mode. Test mode enables the installer to test (by watching the signal level associated to the selected zone) zones installed on the system individually or all together once all the sensors are wired on the CU and the zone balanced. The CU automatically stores the balance values after the command is properly sent by the installer to the CU.

In Output Test mode, it is possible to toggle each output level each time the installer presses a key (or when the appropriate command is sent to the CU using the PC GUI). In this way, it is possible to test each device connected to the outputs.

A Module Acquisition feature is available from the Option menu. This feature enables the installer to update the communication bus module address table; adding new modules and removing any deleted modules on the system. Once the update is started, the CU starts scanning for modules and stores all the modules that acknowledge the CU interrogation. Of course, this feature is available only at the service level.

Once an owner or service password is entered, it is possible to enter the system status menu to display the actual status of each zone and output.

3 System hardware configuration

3.1 Introduction

The hardware configuration greatly depends on the area to protect. The CU is very flexible due to its easy way to program each input and output line. It is possible to configure a more powerful system using bus modules to expand the features.

It is possible to manage, for example, two different areas independently or with one or more zones in common; it all depends on how the CU is configured.

Using the GSM module, it is possible to know the CU or the zones status, enable or disable the partitions, or perform several actions on the outputs remotely.

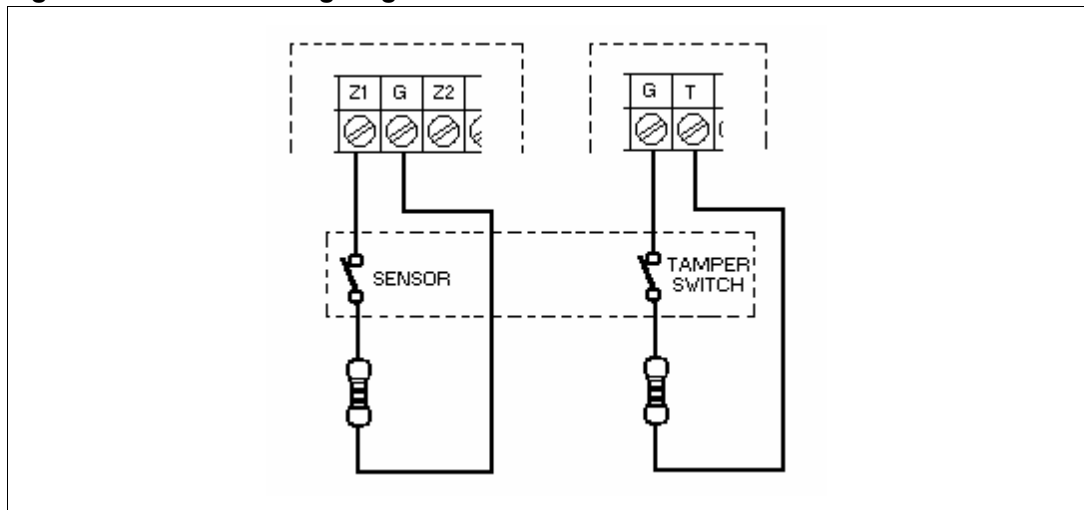
Thanks to the fully configurable outputs, it is possible to decide which device to connect (sirens, external devices, etc.), the activation time, working mode, etc.

3.2 Sensor connections

The sensors must be connected to the zone terminals (connectors J20 and J21, connectors J23 and J24) as shown in [Figure 6](#). It is possible to connect a balance resistor in series with the sensor switch to detect both line cutting and line short-circuiting. Even the tamper line can be balanced.

Moreover, thanks to the autobalance control feature (see [Zones Autobalance on page 31](#)), it is possible to place more than one resistor in series with the tamper line (each tamper switch must be connected in series to all the others). This configuration enables a more efficient balance control of the tamper line than when placing only one resistor.

Figure 6. Sensor wiring diagram

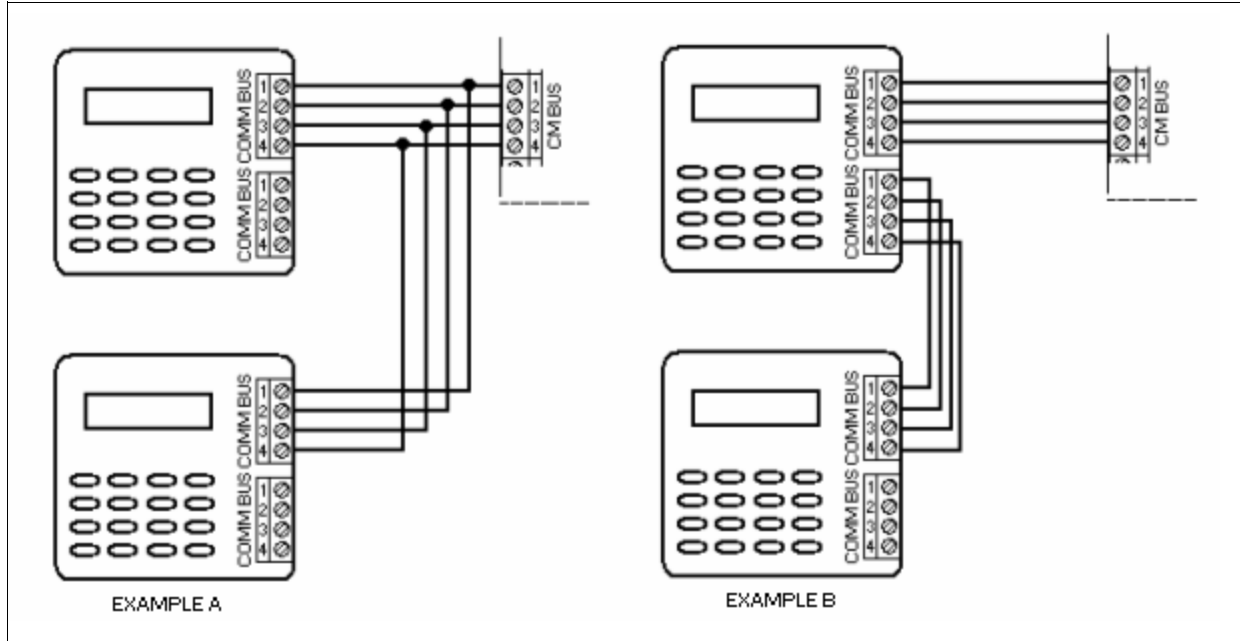


3.3 Control module connections

Either connectors J11 or J13 can be used to connect the control modules (CM) by wiring the 4 terminals using a twisted and shielded cable. This cable has to be connected to jumper J6 (CM BUS) of the CU.

It is possible to connect up to 8 CMs on the bus line in different ways as shown in [Figure 7](#).

Figure 7. Control module connections



Once the system is powered up, program the CM address for each module installed. Refer to [Section 5.7: CM Setup](#) for more information on programming CM addresses. [Table 6](#) lists allowed address ranges.

3.4 Power supply connections

Connect the power supply cable to jumper J2 of the CU.

3.5 Central unit connections

[Table 1](#) describes all the CU main board connectors.

The Initial Settings switch is used the first time the system is installed or to completely erase all the setup information. Press this switch for approximately 5 seconds when the CU is completely disabled, to reset all previously programmed parameters (except for the system date and time) with the factory parameters (see [Section 4.3: Configuration using the Control Module](#)).

Table 1. CU connectors

Ref.	Name	Description
J1	RF-Board	Not used in this version
J2	Power Supply	Power Supply connector
J3	Line Term	Line termination device (if needed)
J4	ICC Connector	ICC Connector for microcontroller programming
J5	Comm Bus	BUS connector for modules
J6	CM Bus	BUS connector for the CM
J7	I/O Expansion	BUS connector for I/O Expansion Module (is the same as the J5 and J6 connectors)
J8	GSM	Connector for the GSM module (not for this version)
LS2	Buzzer	Connector for the CU buzzer
N/A	Speaker	Not used in this version
J20/21 and J23/24	Zones	Connectors for the sensors
J22	Fire	Fire sensor connector
J25	SIR AA1	SSR Output. Normally used for the external siren (with the backup battery)
J26	SIR AA2	Connected in parallel with J25 (for the connection of two sirens in parallel)
J27	SINT 1	SSR Output. Normally used for the internal siren
J28	SINT 2	Connected in parallel with J27 (for the connection of two internal sirens in parallel)
J29	AUX 1	SSR Output. Can be used for sirens or other devices.
J30	AUX 2	SSR Output. Can be used for sirens or other devices.
J32	STS/ALM	Transistorized outputs
J35	EXT. WDT EN.	Not used in this version.
J37	TMPR	Tamper Line Connector
J39, J40 and J41	12VDC	Power supply for sensors

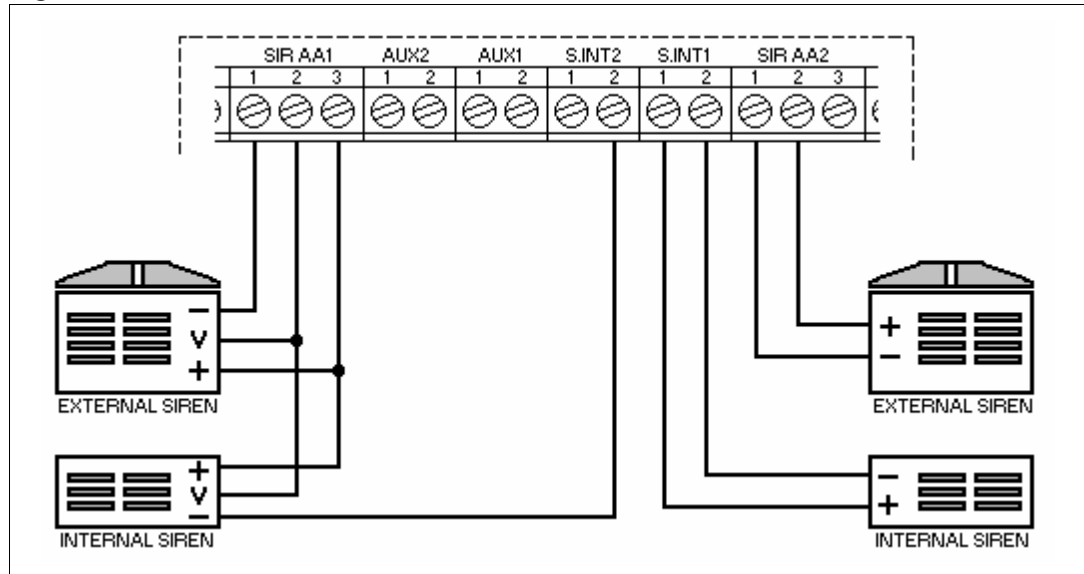
3.6 Output connections

Output connections are not strictly predetermined enabling a flexible configuration for your system. Certain outputs are best used for siren connections, while others for general purpose devices depending on the required current and device type. [Figure 8](#) shows a typical siren connection that takes into account different types of both internal and external sirens.

Certain external sirens require a third terminal (V) in addition to the power supply (also used to charge the backup battery). In this case, connect the siren power terminals to the SIR AAx connectors; the "+" terminal with Clamp 3 and the "-" terminal with Clamp 1 (permanently connected to +13.8VDC), and the terminal V with Clamp 2. Only Clamp 2 is programmable using the CU setup (see [Section 5.6.2: Outputs](#)) in either normally high

(typical setting for the sirens) or normally low voltage levels. Refer to [Table 7](#) for the correspondence between the output number and the board layout label.

Figure 8. Siren connection



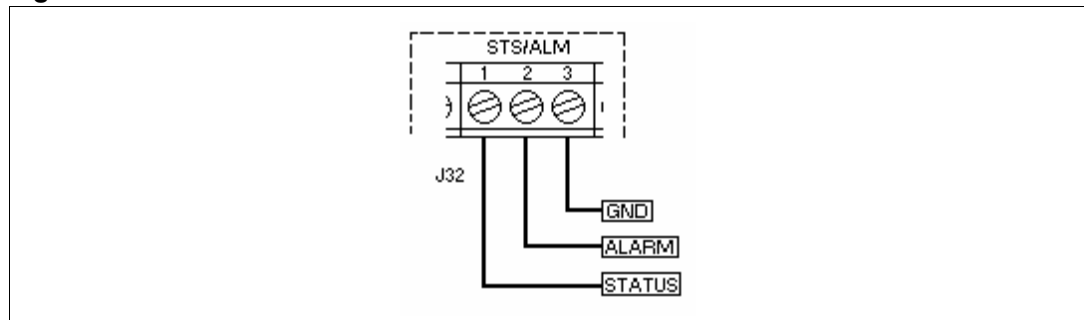
Outputs AUX 1 and AUX 2 from the solid state relay can be used to connect external devices and are fully programmable.

As shown in [Figure 9](#), there are two other fully programmable outputs (transistorized) that include one more option allowing to configure the STS output as a CU status output.

The value of the STS output depends on the CU status (enabled/disabled) and the ALM output as an alarm output where the value of the ALM output changes each time there is an alarm condition.

Note: In the current version, outputs STS and ALM can be configured as a normal output. The current software version does not manage the alarm and CU status signaling.

Figure 9. Status/alarm connector



3.7 Tamper line

This option is not implemented in this version.

4 Configuring system parameters

4.1 Introduction

The system can be configured in one of two ways:

- using the PC GUI
- using the Control Module

The system is configured by entering Setup mode; this is possible only if the Central Unit (CU) is in Idle mode (CU disabled).

During the first installation or each time a new module is installed or removed from the system, the connected modules must be registered in the CU memory. When using the PC GUI, the software automatically registers connected modules in the CU memory. When using the Control Module, follow the instructions provided in [Section 4.3: Configuration using the Control Module](#).

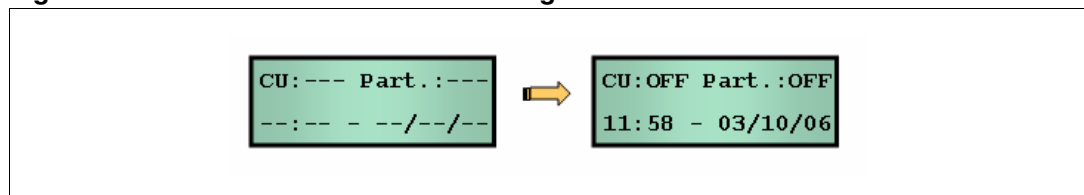
4.2 Configuration using the PC GUI

This feature is not implemented in this version.

4.3 Configuration using the Control Module

At first installation, communication with the CM is impossible since no modules are registered in the CU memory. For this reason (or each time a new module is installed or removed from the system), press the Initial Setting button on the CU board for approximately 5 seconds. The CU scans the bus and registers all the modules installed on it. Once this procedure is successfully completed, the CM displays the system date/time and the CU status (OFF) as shown in [Figure 10](#).

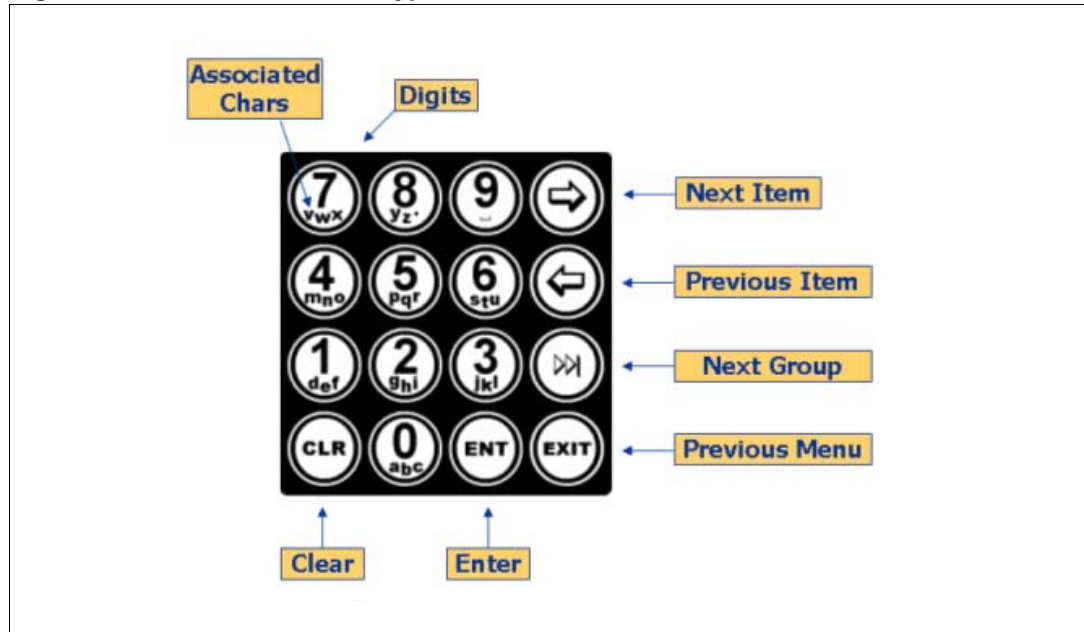
Figure 10. Central unit connected message



Note: Pressing the Initial Setting button resets all the system settings on the CU to their factory settings (except for the system date and time).

Figure 11 describes the various key functions. In some cases, the same button has different function in a different context.

Figure 11. Control module keypad



4.4 Password protection

In order to perform any operation, password identification is required. The system is organized with three password security levels. Press any key on the CM keypad to access the password menu.

Table 2. Password protection for each access level

Level	Description
Service	The service level is dedicated to system installation. All CU parameters are accessible and modifiable and passwords can be setup. The CU cannot be enabled or disabled when accessing this level.
Owner	This level is normally assigned to the protected ambient owner. Only parameters that do not affect the hardware configuration are accessible (i.e. the zone timing, output association, etc.). The CU cannot be enabled or disabled when accessing this level.
User	This level switches ON/OFF the CU and available partitions. It is impossible to modify or display parameters.

The service and the owner passwords must be different from each other because the CU automatically recognizes the access level by the password. It is possible (but not recommended) to use the same Owner (or Service) password as one of the User passwords. All the User passwords must be different.

4.5 Access levels

Three access levels are available: Service, Owner and User as described in [Table 2](#).

The CM only displays certain menus for each access level.

Note: The CU automatically recognizes the access level by the password.

Table 3. Menus available by access level

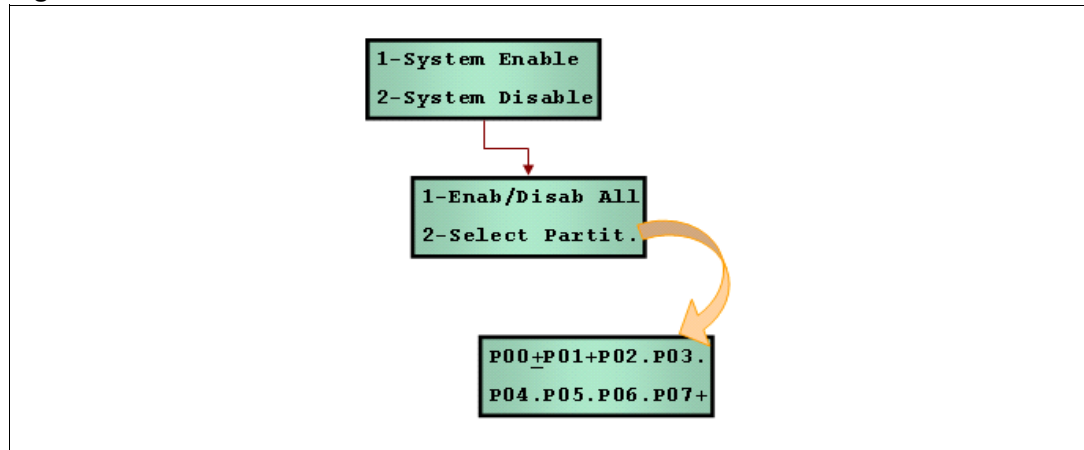
Menu	User	Owner	Service
System Enable/Disable	X		
Partition Enable/Disable	X		
Partition Select	X		
System Status		X	X
Log Event		X	X
Setup		X ⁽¹⁾	X
CM Setup		X	X

1. Certain limitations apply. See [Section 5.6: Setup on page 24](#).

4.5.1 User level

After entering a User password, the CM displays the User menus as shown in [Figure 12](#). Use the Control Module sub-menu in the Bus Module parameter setting menu to define User access rights ([Control Module on page 33](#)).

Figure 12. User level menus

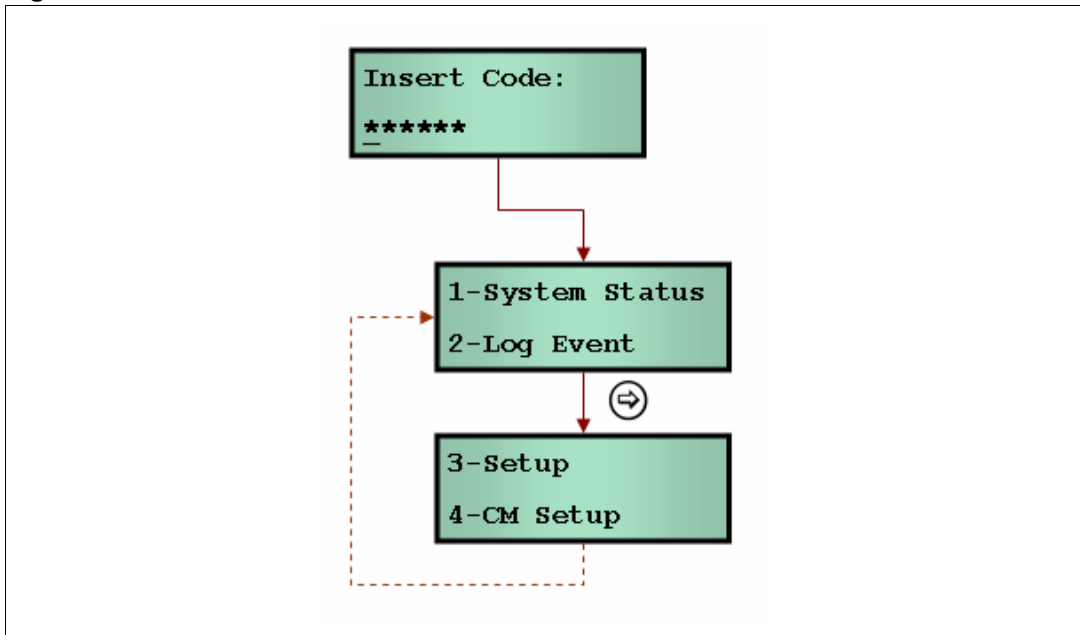


4.5.2 Service and owner levels (S/O-L)

The default service password is 000000 and the owner password is 000001. All passwords can be changed through the Setup menu (see [Section 5.6.5: Access code](#)).

After entering a Service (or Owner) password, the CM displays the Service/Owner menus as shown in [Figure 13](#). Four menus (System Status, Log Event, Setup and CM Setup) are available by pressing the correspondent menu number.

Figure 13. Service / owner level menus



In order to return to the previous menu, press EXIT (in any menu).

5 Menus

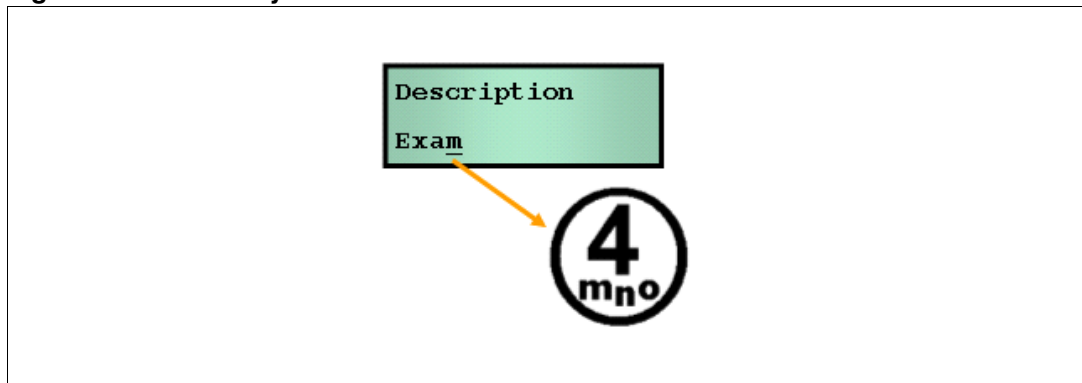
5.1 Using the key pad

To navigate between the different parameter settings of each sub-menu, press the $\leftarrow \rightarrow$ keys. When the required parameter is displayed, press ENT to display its value. Press EXIT to return to the Setup menu, or press ENT again to modify the parameter setting.

Before entering in a specific option, it is possible to change the line number (zone, option, partition, etc.) by pressing the \gg key (the line number is incremented by 1), in this way it is possible to change a specific parameter (as, for example, the line status) for all the lines without entering each time the line number.

Text entry is similar to that of a cellular phone for SMS messaging; each numeric key has an associated text character (*Figure 14*). By pressing repeatedly (within a short time) a digit, each associated character is scrolled.

Figure 14. Text entry



Leave the digit key button or press a different key (for a different character) when the required character is displayed.

Press the CLR key to erase the entire written string. Use the $\leftarrow \rightarrow$ keys to select a single character. Press ENT again to save the description.

Press \gg to switch between uppercase and lowercase characters. *Table 5* lists all character associations.

5.2 System Enable/Disable

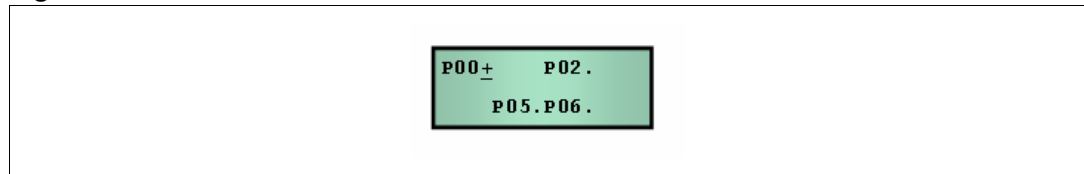
Once a user enters a valid access code (password), the CM displays the System Enable/Disable menu. Use this menu to enable or disable the alarm system.

5.3 Partition Enable/Select

The Partition Enable menu enables the user to switch ON/OFF all the partitions associated to his user access code or to continue and individually select the associated partitions (only partitions associated to the user's access code are available).

In the example shown in *Figure 15*, the entered access code has only 4 associated partitions (00, 02, 05 and 06). Use the ⇐ ⇨ keys to display the available partitions and press ENT to associate/dissociate the displayed partition (the symbol will change from a dot to a cross and vice versa). Press ▶▶ to display the next group of partitions (if available).

Figure 15. Partition selection

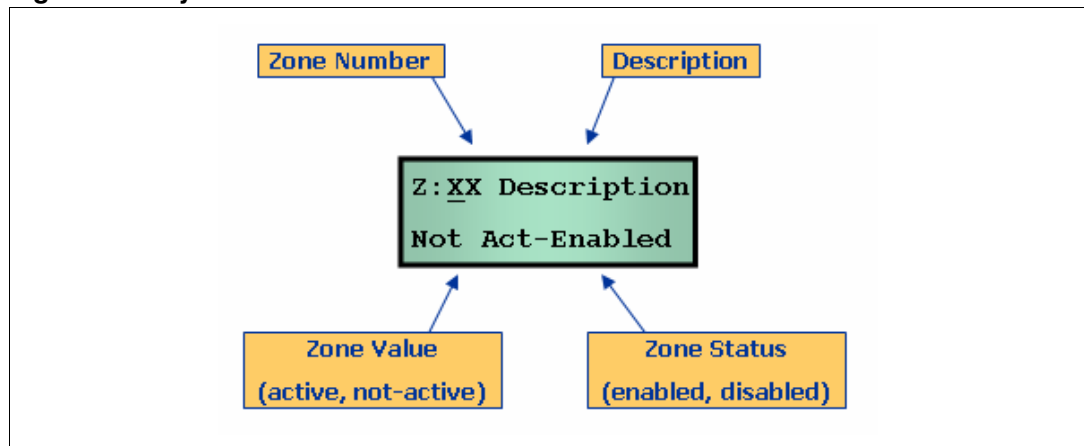


Press EXIT to validate the partition selection values.

5.4 System status

Press 1 to open the System Status menu that displays the status of the inputs and the outputs present on the system. Press 1 again to display the Input menu and the status of Zone 0 is as shown in the example in *Figure 16*.

Figure 16. System status menu



The CM screen displays the zone number, zone value (active or not-active, depending on the zone setting and the actual balance status), zone status (enabled or disabled) and the first 11 characters of the description.

To display the status of the next zone, press ▶▶. It is also possible to select a specific zone number (starting the scroll from this point forward); press ENT, enter the desired zone number and then press ENT again.

5.5 Log event

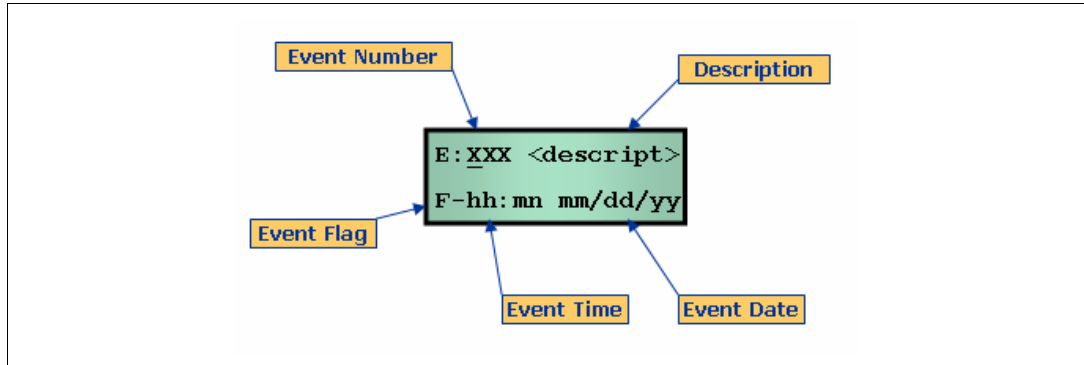
Use the Log Event menu (*Figure 17*) to display all events stored in the internal memory of the CU when they occur.

The log capability goes up to 1000 events (0 based). Once the last log location is reached, new events overwrite the oldest events.

Press ENT button to enter directly an event number, or use the ⇐ ⇒ keys to scroll through log events.

For each event, the CM displays the event description, the occurred time and date and the flag value (for the events that can have the same description but a different status).

Figure 17. Log event menu



5.6 Setup

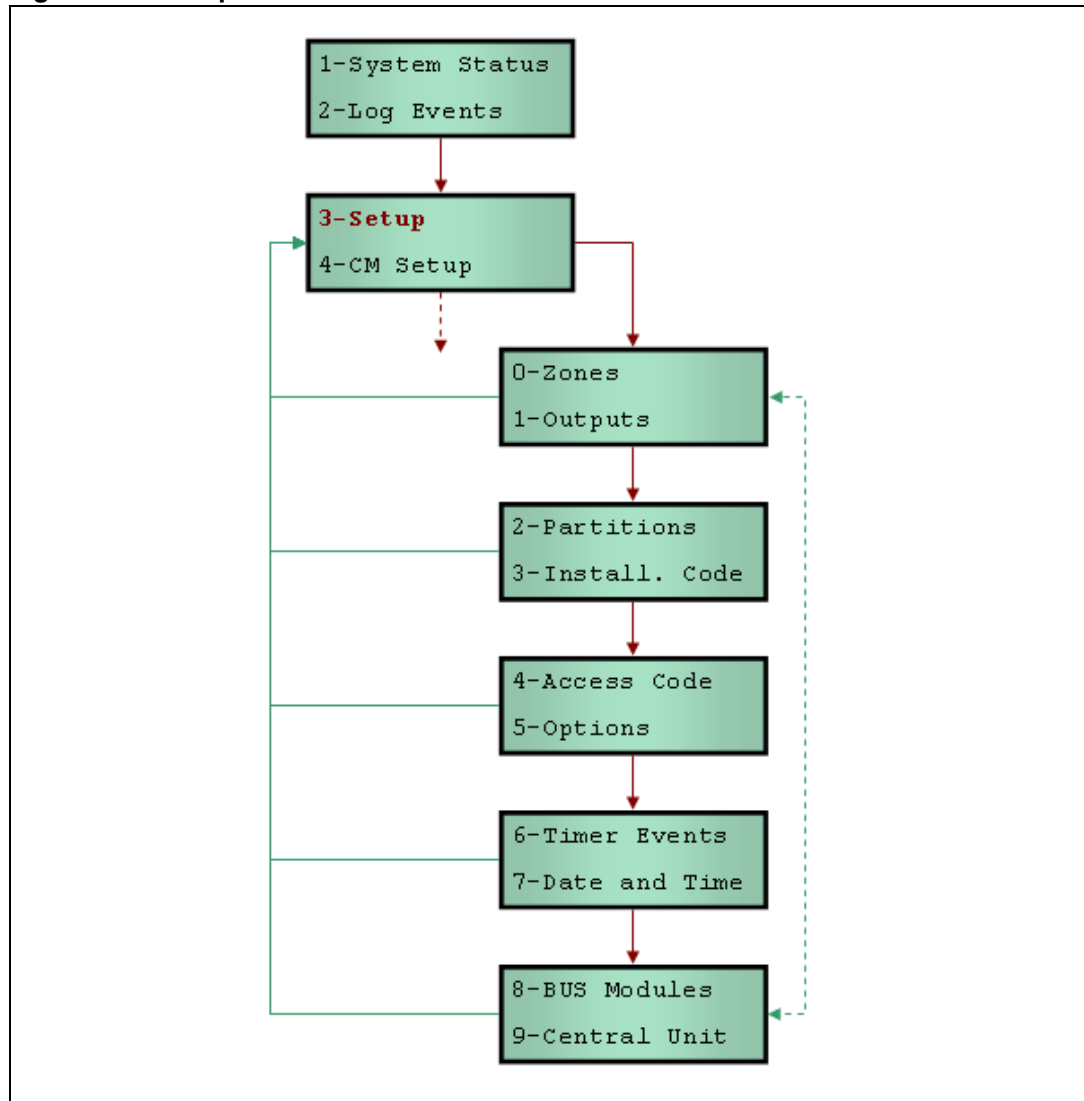
The Setup menu enables the installer (and with certain limitations, the owner) to set up all CU parameters (*Figure 18*).

To enter the Setup section, press 3 to display the first sub menu. To display the other sub menus, press **▶▶** or directly enter the sub-menu number.

Press EXIT to return to the previous menu.

Note: Setup mode is available only when the CU is in Idle mode (disabled).

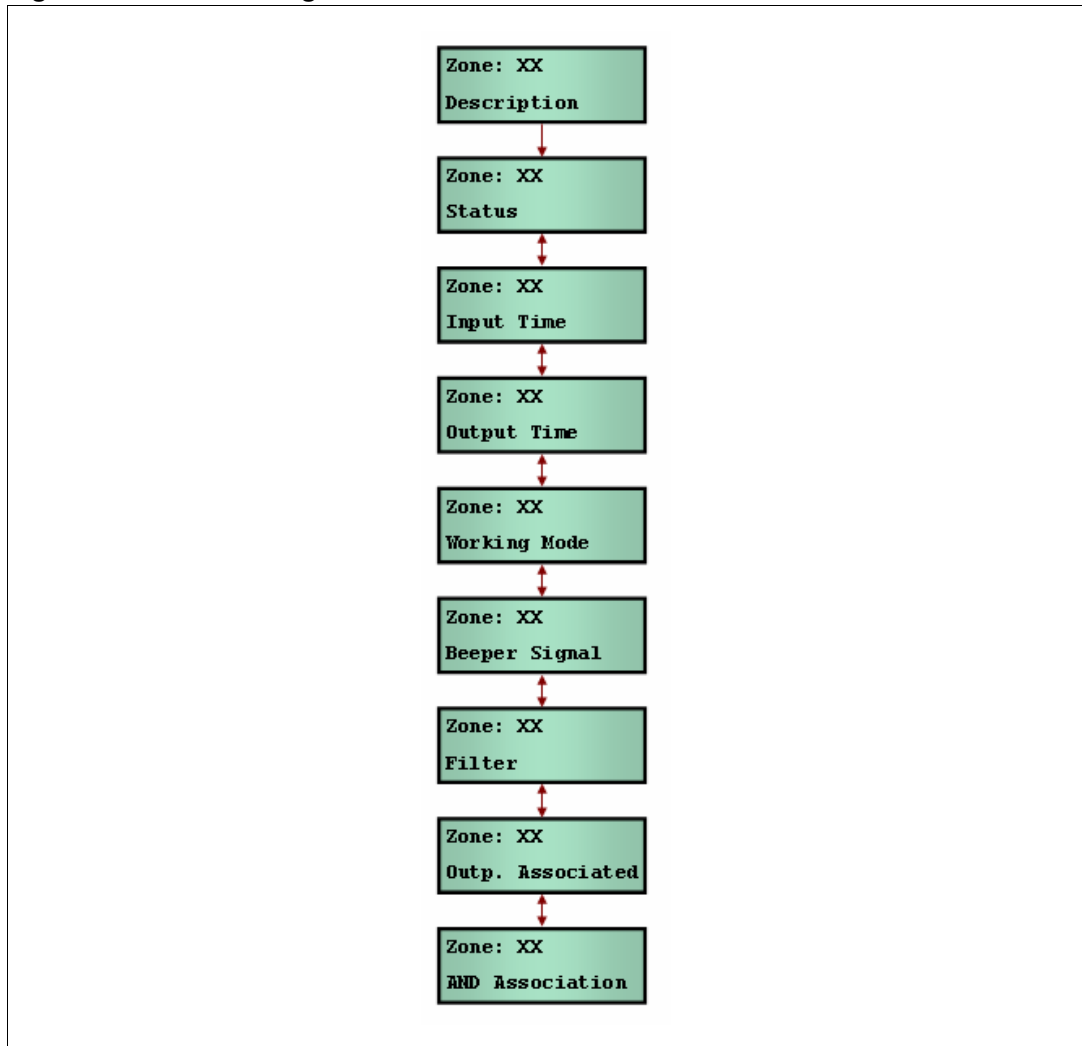
Figure 18. Setup menu



5.6.1 Zones

The Zones sub-menu enables the service provider or owner to modify zone parameters. Press the 0 key to enter the Zones sub-menu and display the zone number prompt. Enter a zone number to display the zone options. *Figure 19* shows the Zone option sub-menus.

Figure 19. Zone setting menus



Description

The Zone description is 16 characters long and is displayed on the System Status ([Section 5.4: System status](#)) and Log Event (see [Section 5.5: Log event](#)) menus. This displays a more significant name rather than a number. To change the description, press ENT, enter the new text and press ENT again to store the new description.

Status

The Status sub-menu adds or removes the selected zone from the control flow. Once disabled, the zone is no longer under control, even if included in an enabled partition.

This option is used for disabling the zone if it is not used, if a sensor connected on it is broken (waiting for a replacement) or to temporarily disable the zone without losing any settings. Press ENT to switch between the two possible values (enabled/disabled).

Input time

The input time is delay between the detection of an alarm condition and the triggering of the associated outputs. Normally this time is assigned to zones that protect the area (and the

path) where the CU insertion device (keyboard, smartcard device, etc.) is installed. The alarm condition is immediately stored, but is processed only once the input time is elapsed.

To change the input time, press ENT; the minutes will be changed first and the seconds immediately after. Press ENT to store the new values. If the input time is set to 0 minutes and 0 seconds, the zone will be considered as instantaneous in input. The input time can be set from 00:00 to 59:59 (mm:ss).

Output time

As with the input time, it is possible to associate an output time in order to allow authorized personnel to leave the protected area once enabled the CU.

The time is set as described in [Input time](#).

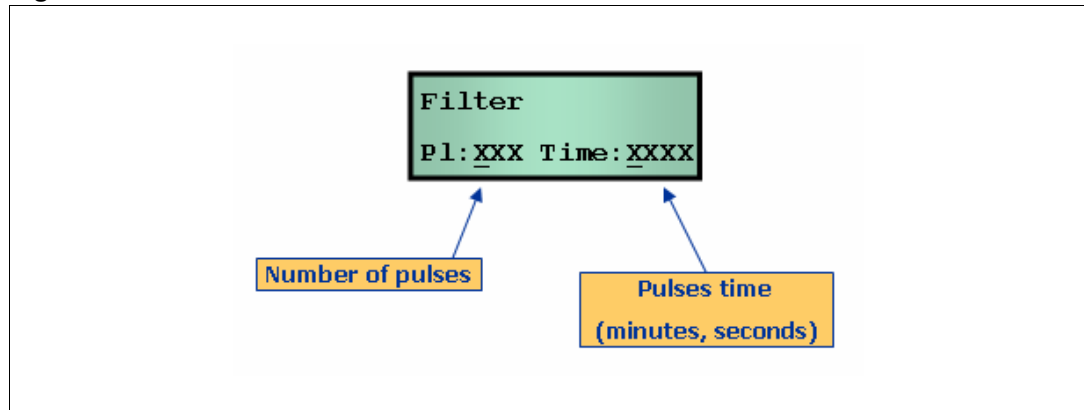
Working mode

The Working mode indicates the way the CU detects an alarm condition. The following Working mode values are possible:

- Normally opened: The zone is normally unbalanced from its stored value (see [Outputs Test on page 32](#)). Once the zone is balanced, the CU processes the alarm condition (after an input or output time, if set).
- Normally closed: The zone is normally balanced and an alarm is processed when an unbalanced state is detected.
- Change: This is a mixed working mode where the CU process an alarm condition each time a different value from the previous one is detected (unbalanced if the zone is balanced and vice versa). Once the alarm is processed, the CU considers the new zone status as the normal one. Press ENT to switch between the different working modes.
- Beeper signal: This feature triggers a buzzer when an installed control module detects an alarm condition in the zone. Press ENT to switch between enabled/disabled. (Not included in this version.)
- Filter: The zone filter enables the CU to detect an alarm condition only after a certain time (the counter is reset once the filter time is elapsed). As shown in [Figure 20](#), press ENT to first modify the number of pulses (zone value changes), up to 999 pulses can be programmed, and the time within which the pulses must occur (mmss). (Not included in this version.)

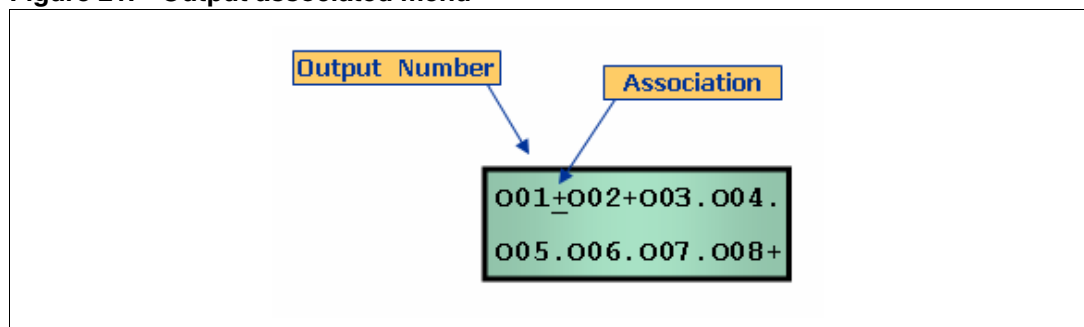
Note: The Working mode for inputs is always normally closed. The option for changing the Working mode is already implemented but has no effect in this release.

Figure 20. Zone filter menu



- **Outp. associated:** This function associates one of the installed outputs to the selected zone. Once the zone alarm condition is processed, the corresponding outputs are triggered.
 Press ENT to display the output associated menu (Figure 21) and the first 8 outputs hardwired on the CU. If more outputs are present on the system by means of one or more IO Expanders, press **▶▶** to display the next group of 8 outputs. Press **◀⇒** to scroll through each displayed output. In order to associate the pointed output, press ENT. The symbol displayed after the output number will change from a dot (.) to a plus sign (+).
 See Chapter 5.6.2 for possible output configurations.

Figure 21. Output associated menu

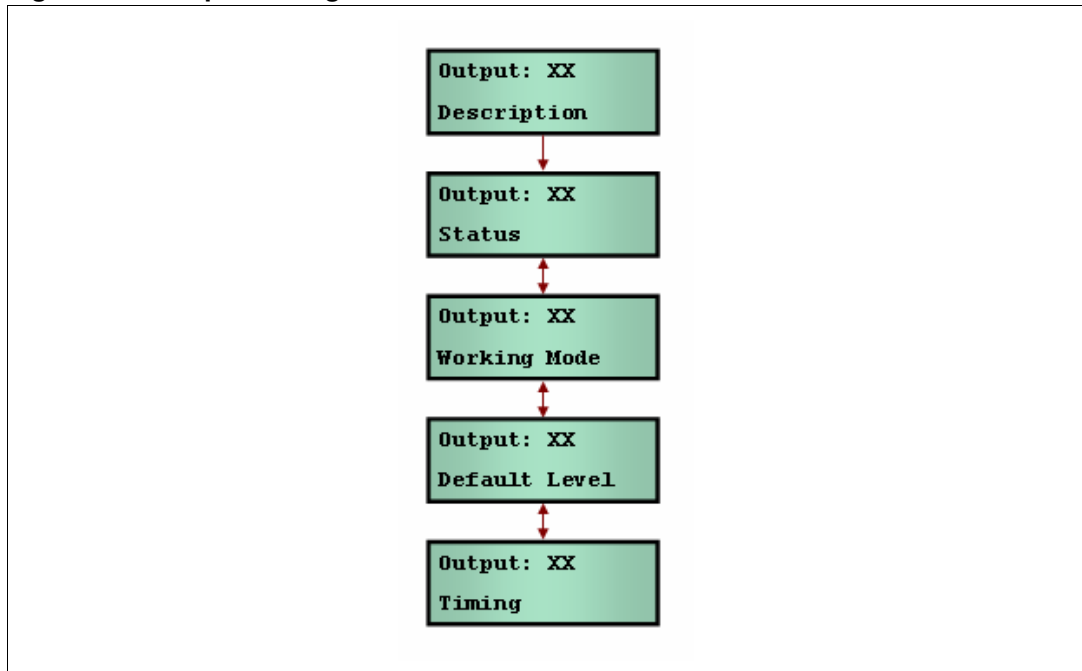


- **AND association:** This feature allows the installer to logically regroup the selected zone to one or more of the other zones installed on the system. If a zone is in AND mode with another zone, the CU will detect an alarm condition only if all the other zones associated in AND mode detect an alarm condition also. This feature can be useful, for example, in a corridor where two sensors are installed; the alarm condition is processed only if an infraction is detected in one direction but not the other. The AND association menu is similar to the output association menu.

5.6.2 Outputs

The Output settings menu (Figure 22) is used to configure both the outputs hardwired on the CU and those installed by means of the IO Expander present on the system (if installed).

Figure 22. Output settings menus



Description

The Output description is 16 characters long and is displayed on the System Status ([Section 5.4: System status](#)) and Log Event (see [Section 5.5: Log event](#)) menus. This displays a more significant name rather than a number. To change the description, press ENT, enter the new text and press ENT again to store the new description.

Status

The Status sub-menu adds or removes the selected output from the control flow. Once disabled, the output will not be activated by the CU even if associated to a zone where an alarm condition is detected.

This option is used for disabling the output if it is not used, if a sensor connected on it is broken (waiting for a replacement) or to temporarily disable the output without losing any settings. Press ENT to switch between the two possible values (enabled/disabled).

Working mode

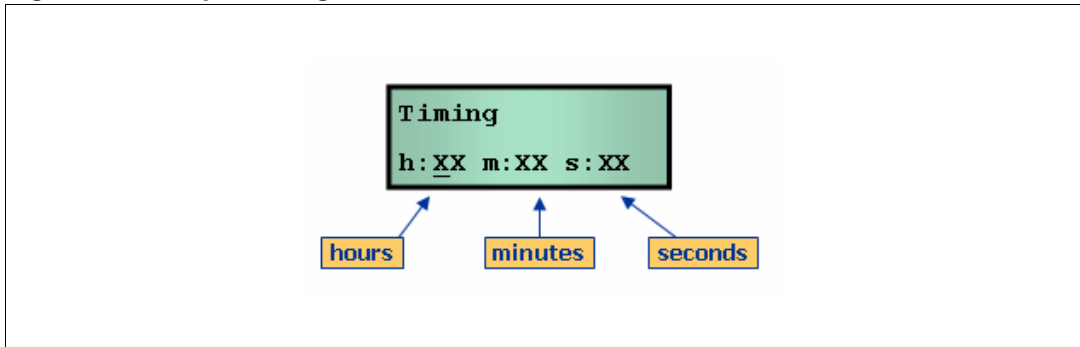
The Working mode indicates the way the output is managed once enabled and associated to a zone. The possible working mode values are the following:

- Change Status: The CU changes the output value during an alarm condition and restores the previous value once the time associated to the output is elapsed.
- Toggle: The CU toggles the output value each time it detects an alarm condition. In order to switch between the different working modes, press ENT.
- Default Level: The default level can be normally high (the SSR outputs and the transistorized outputs are at 12 VDC level, the Relay will close the contacts between the C and NA terminals, the Buzzer is normally activated) or normally low (the opposite

condition). In order to switch between the different default levels, press ENT; the output will immediately change its value.

- Timing: The output time is the time that the output remains active (the active status depends on the default level setting) when the CU processes an alarm condition. Press ENT to display the menu shown in [Figure 23](#). Press ENT again and the cursor will underline the hour field. Press ENT again to save the Hour value and pass to the minutes field, and finally to the seconds field. The maximum time allowed is 11h 59m 59s.

Figure 23. Output timing menu

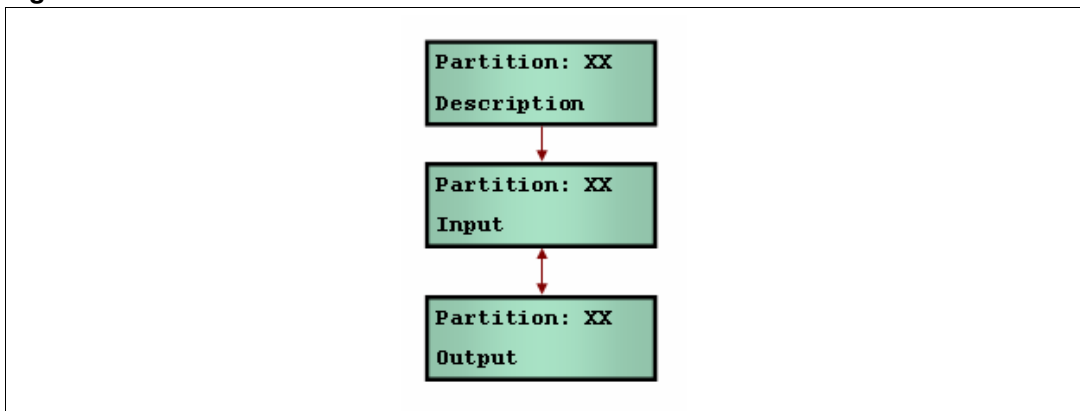


5.6.3 Partitions

Partition menus ([Figure 24](#)) are used to configure partitions which are logical groups of zones. Each time a partition is activated by an activation code (see [Section 5.6.9: Bus modules](#)), all associated zones are controlled by the CU to detect an alarm condition (infraction). Alarm conditions in inactive partitions are ignored and not processed (even when detected) by the CU.

Partitions are associated to zones both in input and in output. The input association is the group of zones that will be removed from the control flow of the CU once this partition is disabled by any activation code (normally when entering the protected area). The output association is the group of zones controlled (and processed when an alarm condition is detected) by the CU when leaving the protected area.

Figure 24. Partition menus



Description

The Partitions description is 16 characters long and is displayed on the Log Event (see [Section 5.5: Log event](#)) menus. This displays a more significant name rather than a number. To change the description, press ENT, enter the new text and press ENT again to store the new description.

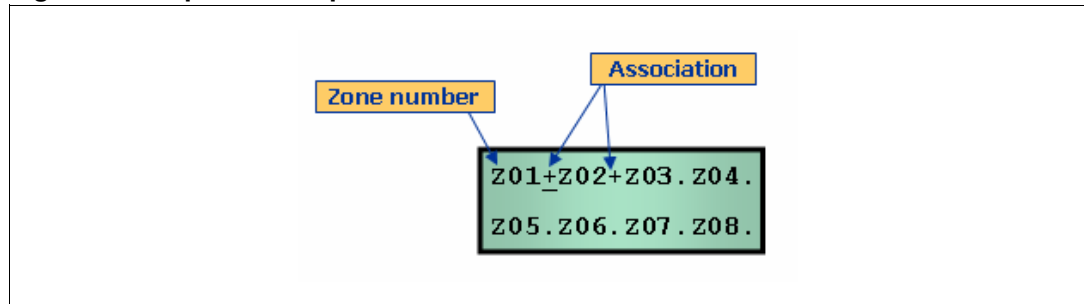
Input

The Input sub-menu associates the selected partition to one or more zones installed on the system. Press ENT to display the association menu ([Figure 25](#)) and the first 8 zones hardwired on the CU. If more zones are present on the system by means of one or more IO Expander, press **▶▶** to display the next group of 8 zones. Press **↔** to scroll through each displayed zone. To associate the partition to selected zone, press ENT. The symbol displayed after the zone number will change from a dot (.) to a plus sign (+).

Output

Similar to the Input sub-menu, this sub-menu associates partitions and zones that will be monitored once the selected partition is activated.

Figure 25. Input and output association menu

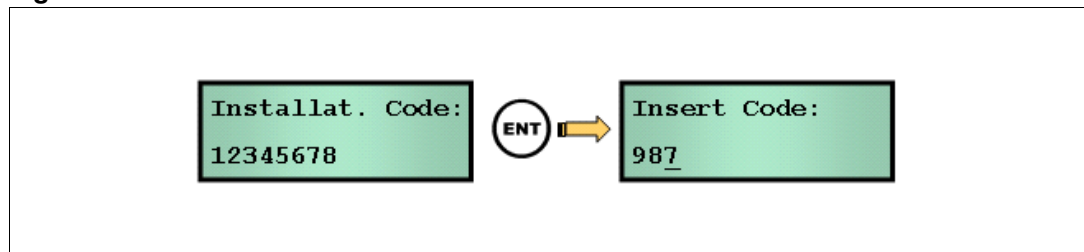


5.6.4 Installation code

For security reasons, an installation code is required to enter the CU in Setup mode using any programming device (either a Control Module or the PC GUI). The factory value (both for the CU and the CM) for the installation code is 00000000.

Changing the installation code from this menu affects both the installation code of the CU of the CM programming the CU. If more than one CM is installed on the system, the old installation code must be changed manually for each module. See [Section 5.7: CM Setup](#) for more information about changing the installation code for Control Modules.

Figure 26. Installation code menu



Press ENT to display the current installation code ([Figure 26](#)). Press ENT again to modify the installation code.

Note: The CU installation code is displayed in clear and not encrypted with the star symbol (*) as this menu is only available in Setup mode; the correct password to access the Service level must have previously been entered.

5.6.5 Access code

The access code is required to enter the CU Setup mode.

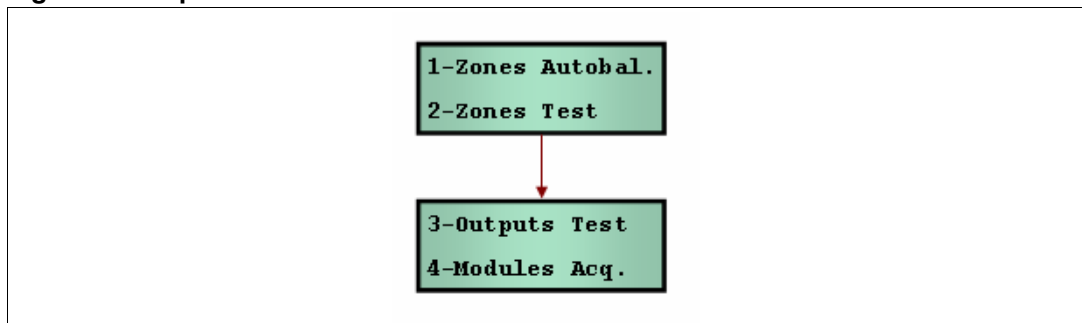
- If an Owner (access level) password is entered, the menu shows the current code. Press ENT to enter the new code.
- If a Service (access level) password is entered, the menu shows the current code. Press ENT to enter the new code. Press ENT to define the code as the Service or Owner code. Both the owner and the service codes can be modified at this access level.

After having entered the new code, press ENT to save the new code. At the prompt, press the 7 key to confirm the new code.

5.6.6 Options

The Options menu sets the parameters of several CU features. Four Option sub-menus are available ([Figure 27](#)). Press the corresponding number to enter the selected sub-menu.

Figure 27. Option menus



Zones Autobalance

The Zone Automatic Balance sub-menu memorizes the zones balance values once the installer has installed the balance resistors on the sensor lines. When using this system, a resistor ([Figure 6](#)) without a predetermined value can be used to balance the line. Of course, if a line balance control is not used, this resistor can be omitted. Once all the resistors are installed, press the 1 key to store the all the balance resistor values in the CU.

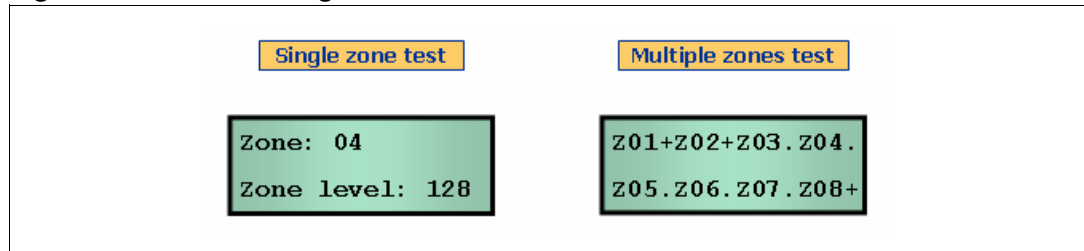
Once the Zones Autobalance feature is enabled, any variation of the resistance triggers an alarm condition and is processed by the CU.

Zones Test

Two different tests are available in the Zones Test sub-menu:

- single zone test that displays the signal level of the selected zone (depending on the value of the installed resistors)
- a multiple zone test that displays the status (balanced/unbalanced) of groups of 8 zones (see [Figure 28](#)). Press **▶▶** to scroll to the next group of 8 zones (if installed on the system). A dot (.) indicates a balanced zone, while a plus sign (+) indicates an unbalanced zone.

Figure 28. Zones testing



Outputs Test

Similar to the Zones Test, it is possible to test each output. Select Outputs Test to display the status of groups of 8 outputs (installed on the system). Press **▶▶** to scroll to the next group of 8 outputs. Press **◀▶** to select an output. Press **ENT** to change the status of the selected output.

Modules Acquisition

The Modules Acquisition feature is used when one or more modules are removed from the system, or when the installer wants to update the bus configuration. When this feature is selected, the CU erases all the modules stored into the internal memory, and starts scanning the bus. Each module that responds to the CU is stored into the CU modules table.

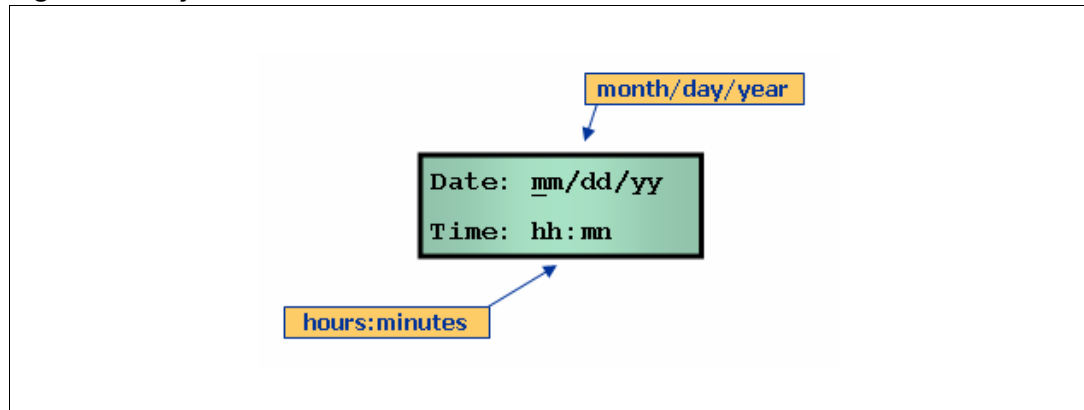
5.6.7 Timer events

This option is not yet implemented.

5.6.8 Date and time

This sub-menu ([Figure 29](#)) is used to modify the system date and time. When this sub-menu is selected, both the date and the time have to be modified (reset). Press **ENT** to modify the date and time values. The cursor starts to blink on the first digit of the month. Enter the correct value and then press **ENT** in order to modify the day, year, hours and minutes.

Figure 29. System date and time

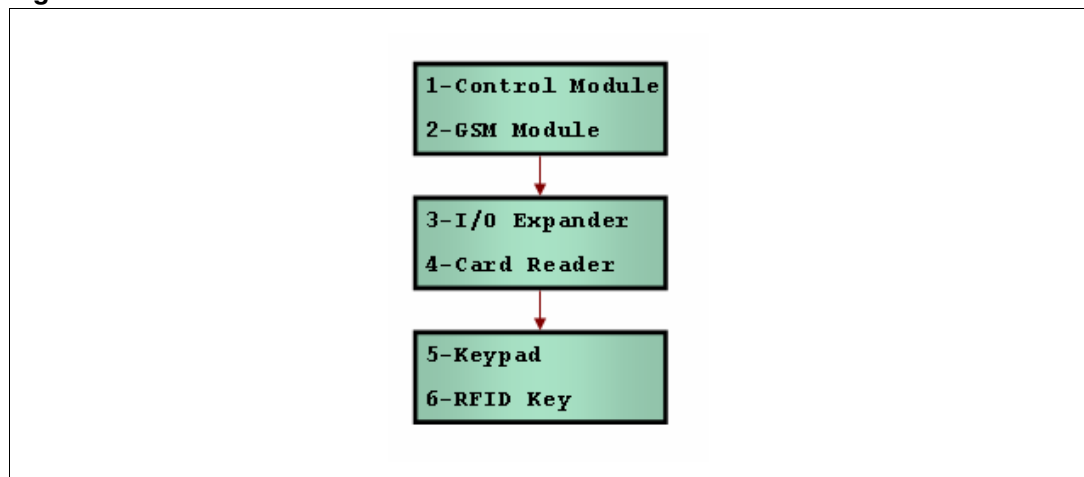


5.6.9 Bus modules

The Bus Modules menu ([Figure 30](#)) sets up the modules installed on the system. Once installed, a module address must be stored in the CU address table using the procedure described in [Modules Acquisition on page 32](#).

Note: This procedure can only be executed once all the modules are wired on the bus line.

Figure 30. Bus modules menu

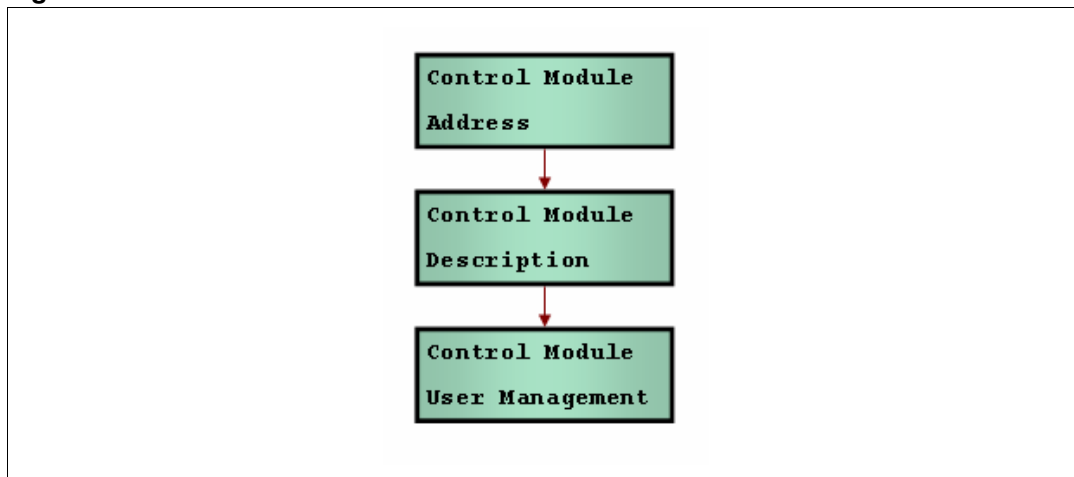


Control Module

As shown in [Figure 31](#), there are three options associated to the CM:

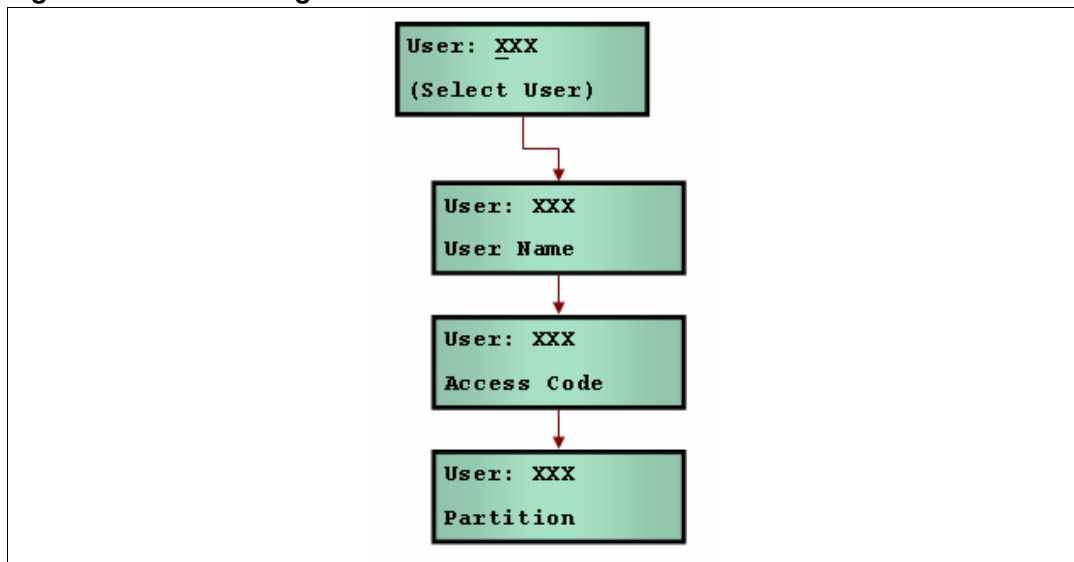
- Address: This is the CM address set by the procedure described in [Section 5.7: CM Setup](#). In this sub-menu, the Address menu is read-only.
- Description: This is the CM description (16 characters long). Press ENT to modify the description.
- User management: Each CM is also a CU ON/OFF device used to activate or deactivate the unit using a password from a given user.

Figure 31. Control module menus



Each CM is able to manage up to 8 users, numbered from 0 to 7. Press ENT to display the user number selection prompt. After inserting the required user number, three options are available as shown in *Figure 32*.

Figure 32. User management menu

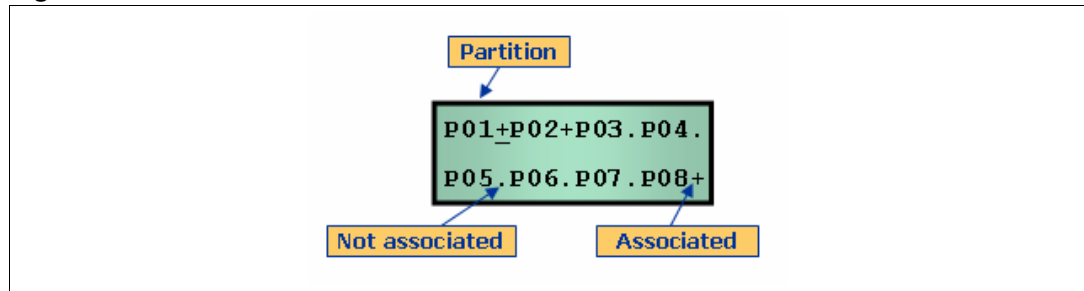


1. User name: a 16 character field associated to each user. This name is the one recorded in the log event.
2. Access code: the code associated to the selected user. This code is used to switch ON/OFF the CU.

Note: As this code is automatically recognized by the CU, it must be unique, meaning different from all other user codes and from the service and owner codes.

3. Partition: each code has to be associated to one or more partition. Only these partitions (and consequently only all the zones associated to these partitions) will be processed when the CM detects an alarm condition. Press ENT to select the partitions to associate (*Figure 33*). Use the ← → keys to select the desired partition, press ENT to associate/dissociate the partition (the symbol will change from a dot (.) to a plus sign (+) and vice versa) and the ►► key for selecting the next group of partitions.

Figure 33. Partition association menu



GSM Module

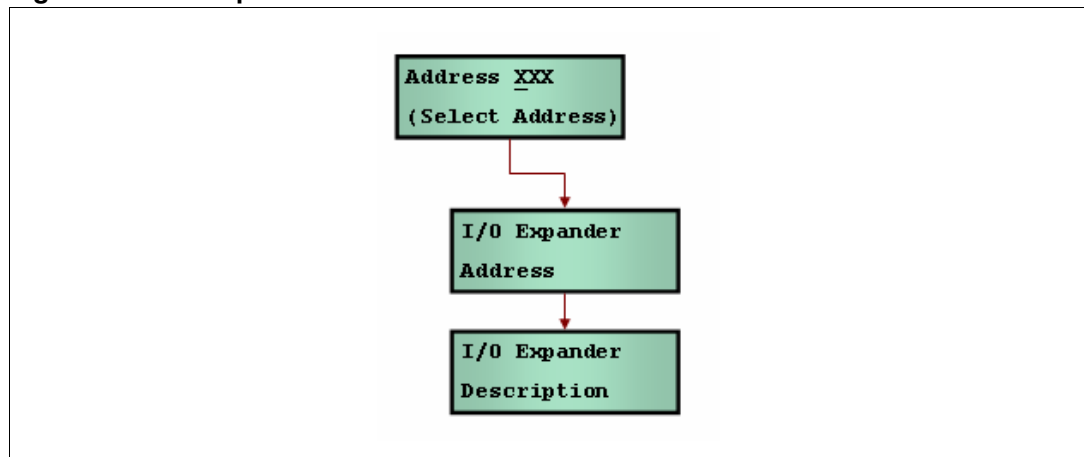
This feature is not implemented in this version.

I/O Expander

The Input/Output Expander module is used to add zones and outputs. Although this module is not fully managed in this version, certain options are available (Figure 34).

- Address: the I/O expander address set by the jumpers on the I/O expander module board. The Address menu is read-only.
- Description: the I/O Expander description (16 characters long). Press ENT to modify the description.

Figure 34. I/O Expander menu



Card Reader

This feature is not implemented in this version. The module address and description are the only menus available.

Keypad

This feature is not implemented in this version. The module address and description are the only menus available.

RFID Key

This feature is not implemented in this version. The module address and description are the only menus available.

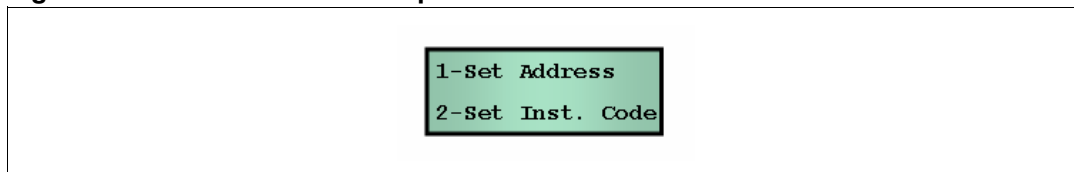
5.6.10 Central Unit

The Central Unit menu displays CU serial number. Press any key to return to the previous menu.

5.7 CM Setup

The CM setup menu ([Figure 35](#)) is used to set the current CM address and to modify the installation code.

Figure 35. Control module setup menu



Press 1 to display the current CM address. Press ENT to modify the address. This value must be entered when installing the system, in order to assign a valid CM address before storing the CU address (see [Modules Acquisition on page 32](#)) or when a new CM is added on the bus.

Press 2 to display or modify the installation code. This must be performed when installing the system and each time a new CM is installed on the BUS. Press ENT to modify the installation code. This code must match the one programmed on the CU (00000000 by default), otherwise the setup procedure is impossible (see [Section 5.6.4: Installation code](#)).

6 Electrical characteristics

Table 4. Electrical characteristics

Connection	Vout			Iout ⁽¹⁾		
	Min.	Typ.	Max.	Min.	Typ.	Max.
SIR AA1	13.4	13.8			500mA	1A
SIR INT	13.4	13.8			500mA	1A
AUX 1	13.4	13.8			500mA	1A
AUX 2	13.4	13.8			500mA	1A
STS	13.4	13.8			50mA	200mA
ALM	13.4				50mA	200mA
NC-C-NA (RELAY) ⁽²⁾						

1. Depends on power supply version.

2. Clean contacts (from the relay): 0.4A @ 125VAC and 2A @ 30VDC for resistive load and 0.2A @ 125VAC and 1A @ 30VDC for inductive load.

Appendix A Miscellaneous

A.1 Keyboard character association

Table 5. List of available characters

Key	Character Sequence
0	A B C 0 a b c
1	D E F 1 d e f
2	G H I 2 g h i
3	J K L 3 j k l
4	M N O 4 m n o
5	P Q R 5 p q r
6	S T U 6 s t u
7	V W X 7 v w x
8	Y Z 8 y z .
9	[SPACE] 9 * - + / ' .

A.2 Module address ranges

Table 6. List of possible module addresses

Address Range	Bus Module
0	Reserved
1 to 8	Control module
9 to 16	Keypad
17 to 24	RFID reader
25 to 32	Card reader
33 to 40	I/O expander

A.3 Output assignments

Table 7. Output assignments

Output No.	Board Layout Label
0	SIR AA1
1	SIR INT
2	AUX 1
3	AUX 2
4	STS
5	ALM
6	NC-C-NA (RELAY)
7	Not used in this version

Revision history

Table 8. Document revision history

Date	Revision	Changes
19-Sept-2006	1	Initial release.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2006 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com