Alarm Control Panel

INTEGRA 128-WRL

Firmware Version 1.07

INSTALLER MANUAL

Satel

GDAŃSK

CE 1471

integra-wrl_i_en 08/09

⚠ WARNINGS

For safety reasons, the security alarm system should only be installed by qualified personnel.

Before you begin the installation, read carefully this manual so as to avoid the risk of electric shock. Any electric connections may only be made in deenergized state, with power supply disconnected.

The security alarm system may comprise hazardous equipment, therefore it is important that its components be stored so as to prevent unauthorized access.

Never make any unauthorized construction modifications or repairs. This requirement applies, in particular, to replacement of assemblies and components.

CAUTION!

It is not allowed to connect a fully discharged battery (with voltage across unloaded terminals less than 11 V) to the alarm panel. If the battery is fully discharged or it has never been in use, precharge it by means of a suitable charger, to avoid the risk of equipment damage.

The batteries applied for the security systems contain lead. Never throw away the batteries when used up, but dispose them of as required by the existing regulations (European Directives 91/157/EEC and 93/86/EEC).

<table>
<tr><td colspan="2">DECLARATION OF CONFORMITY CE 1471 ⓘ</td></tr>
<tr><td>Products:
INTEGRA 128-WRL control panel</td><td>Manufacturer: SATEL spółka z o.o.
ul. Schuberta 79
80-172 Gdańsk, POLSKA
tel. (+48 58) 320-94-00
fax. (+48 58) 320-94-01</td></tr>
<tr><td colspan="2">Product description: INTEGRA 128-WRL control panel, provided with ABAX wireless communication system and GSM/GPRS communicator, designed for use in burglary and panic alarm systems.</td></tr>
<tr><td colspan="2">These products are in conformity with the following EU Directives:
R&TTE 1999/5/EC</td></tr>
<tr><td colspan="2">The product meets the requirements of harmonized standards:
Art. 3.2 (effective spectrum usage):
ETSI EN 300 220-1: v.2.1.1; ETSI EN 300 220-2: v.2.1.2; ETSI EN 301 511 V9.0.2;
3GPP TS 151.010-1 V5.10.0
Art. 3.1b (electromagnetic compatibility):
ETSI EN 301 489-1: v.1.6.1.; EN 301 489-3: v.1.4.1; EN 301 489-7: V1.3.1
Art. 3.1a (safety of operation):
EN60950-1:2001</td></tr>
<tr><td colspan="2">Notified body taking part in conformity evaluation:
Identification No: 1471</td></tr>
<tr><td>Gdańsk, Polska 2008-11-10</td><td>Head of Test Laboratory:
Michał Konarski</td></tr>
<tr><td colspan="2">The list of countries where the INTEGRA 128-WRL has been approved for use – please see the website www.satel.pl</td></tr>
</table>

The SATEL's goal is to continually upgrade the quality of our products, which may result in alterations of their technical specifications and firmware. The current information on the introduced modifications is available on our website.

Please visit us at:
http://www.satel.eu

New functions of the INTEGRA 128-WRL control panels in version 1.07

Zones	Option to use resistors of different values in 2EOL configuration.
LCD keypad	Keypad restart does not cause exit from the service mode.
Wireless devices	Support for new wireless devices: – AMD-102 – wireless magnetic contact with input for roller shutter detector, – ARD-100 – wireless reorientation detector.
Expansion modules	Support for ABAX ACU-100 wireless system controller with firmware version 1.08 and 2.01.

CONTENTS

1. GENERAL DESCRIPTION

- Dedicated modern microprocessor-based construction for protection of medium-to-big-size facilities, with built-in GSM/GPRS industrial telephone and support for hardwired and wireless devices.
- Two-way encrypted communication with ABAX system wireless devices on 868.0 MHz - 868.6 MHz frequency band. The acknowledgement feature provided for all sent transmissions, to ensure that the information gets through and to check devices for their presence in the system. Parameter configuration and testing of the wireless devices performed by radio, without removal of their cover.
- Firmware of the alarm control panel is stored in FLASH type non-volatile memory, so it can be easily updated with no need for dismounting of the panel. It only requires connection of the panel to the computer via RS-232 port and starting of the procedure of firmware replacement.
- Saving the control panel settings to FLASH memory. These data will be retained even if the RAM memory backup battery is disconnected.
- Execution of non-standard control functions, owing to the possibility of programming complex logical operations on the outputs.
- System expansion by means of expansion modules. They not only increase the number of available zones and outputs (both hardwired and wireless), but enhance the system with new functional capabilities.

2. SYSTEM SPECIFICATIONS

- Capability to create up to 8 objects (subsystems).
- Optional subdivision of the system into 32 partitions (partition = group of zones).
- Partition status (armed/disarmed) can be controlled by user, timer or system zone. Partition status can also be made dependent on the status of other partitions.
- Up to 128 programmable zones (hardwired and wireless) with support for NO, NC, EOL and 2EOL configurations. One of several dozens of reaction types can be assigned for each zone.
- Optional control of the zone status by using output, with no need for making physical connection, which enables virtual zones and outputs to be used in the system.
- Up to 128 programmable outputs. One of over a hundred functions can be chosen for execution.
- Up to 8 keypads or other devices can be connected to the keypad bus (CA-64 PTSA, ETHM-1, INT-RS).
- Up to 32 expansion modules can be connected to the expander bus.
- 240 codes (passwords) for system users including a dozen of code types with the possibility to define the system access authority level. Additionally, 8 administrator codes and a service code are available.
- 64 system timers defined by the service, to enable armed mode control based on time parameters. Additionally, partition timers (1 per each partition), programmed by authorized users.
- Editable names of users and most of the security system components (partitions, zones, outputs, modules, timers, etc.) to facilitate managements of the system.
- Variety of means for control panel programming:
  – LCD keypad,
  – computer with DLOADX program installed (locally through RS-232 port or remotely via telephone links, and optionally – with ETHM-1 module connected – also through Ethernet network, using TCP/IP protocol),

  - web browser (optionally, with ETHM-1 module connected),
  - mobile phone with MobileKPD application installed (optionally, with ETHM-1 module connected),
  - palmtop (PDA or MDA) with suitable application installed (optionally, with ETHM-1 module connected).
- Variety of means for security system control:
  - LCD keypad,
  - key fob (optionally, with INT-RX module installed),
  - computer with DLOADX or GUARDX program installed,
  - SMS message,
  - web browser (optionally, with ETHM-1 module connected),
  - mobile phone with MobileKPD application installed (optionally, with ETHM-1 module connected),
  - palmtop (PDA or MDA) with suitable application installed (optionally, with ETHM-1 module connected).
- Possibility to control individual partitions by means of partition keypads and proximity card readers or DALLAS chips.
- Execution of the access control function by means of partition keypads, code locks and readers of proximity cards / DALLAS chips. Door status control by modules does not reduce the number of control panel supervision zones.
- Automatic diagnostics of the system essential components.
- Reporting events to two monitoring stations (four telephone numbers) by means of:
  - GSM voice channel,
  - GPRS,
  - SMS messages,
  - Ethernet network and TCP/IP protocol (optionally, with ETHM-1 module connected).
- Sending events to monitoring station in several formats, including Contact ID and SIA.
- Sending messages about system events to 16 telephone numbers in the form of:
  - voice messages played back by speech synthesizer (up to 16),
  - SMS text messages (up to 64),
  - PAGER text messages (up to 64).
- Call answering function, which enables checking the partition status by means of telephone keys (DTMF) or SMS messages.
- Event log, covering not only the monitored events, but also user access, functions used, etc.
- Advanced function of real-time event printout with optional selection of events. Event descriptions meet the Contact ID standard. Also, the names of zones, modules and users are printed as they are defined in the system.

2.1 MAINBOARD

- 8 individually programmable hardwired zones with additional support for vibration detectors and roller shutter motion detectors.
- Programmable resistor values for hardwired zones in EOL and 2EOL configuration.
- 8 individually programmable hardwired outputs:
  - 2 high-current outputs, current-carrying capacity 2 A, with polymer fuses,
  - 6 low-current outputs, current-carrying capacity 50 mA, designed for relay control.
- 3 high-current outputs, current-carrying capacity 0.5 A, with polymer fuses, having power supply output functionality.

- Direct support of up to 48 wireless devices of the ABAX system (up to 48 wireless zones / outputs).
- Communication bus designed for connecting LCD keypads and some additional modules (keypad bus).
- Communication bus designed for connecting additional modules to expand functional capabilities of the mainboard (expander bus).
- Interface for connection of CA-64 SM (or SM-2) voice synthesizer.
- Industrial type, three-range GSM phone, designed for operation in 900/1800/1900 MHz networks, offering the functions of monitoring, messaging, call answering and control, as well as remote programming (GSM or GPRS).
- Internal GSM modem (transmission rate 300 bps or CSD, i.e. 9.6 kb/s).
- RS-232 port for operating the security system from a computer (DLOADX installer program), for printer support and external modem control.
- Switching mode power supply, output current 2 A, with short-circuit protection, provided with battery status monitoring and low battery disconnection circuit.
- Visual indication of the status of outputs, battery charging circuit, GSM telephone and wireless devices communication module.
- Electric protection of all hardwired zones and outputs, as well as communication buses.

2.2 LCD KEYPADS

Keypads interfacing with the INTEGRA control panels are made with or without a built-in proximity card reader. They have the following features:

- Large, easy to read 2 x 16 character display with permanent or temporary backlighting activated on pressing a key or by any control panel zone.
- Keys with backlighting controlled in the same way as the display backlighting.
- 2 programmable zones with support for NO, NC, EOL and 2EOL configurations.
- Tamper switch for detection of housing opening/pull-off from the mounting surface.
- RS-232 port to enable operating the security system from a computer (using GUARDX administrator/user program).

2.3 OPTIONAL MODULES

Optional modules make the INTEGRA 128-WRL based security system flexible enough to be optimally adapted to the specific needs and requirements of the customer.

2.3.1 Modules to be connected to keypad bus

CA-64 PTSA. Mimic board. Enables visualization of the state of partitions/zones in the security system. The INTEGRA 128-WRL control panel supports the mimic boards made in version CA64T v 1.4 and having firmware in version v4.0 or later.

ETHM-1. Ethernet module. Makes it possible to operate the control panel through the Ethernet. INTEGRA 128-WRL control panel supports ETHM-1 modules in version 1.02 or later.

INT-RS. Data converter. Makes it possible to connect a computer with GUARDX program installed, similarly as to LCD keypad, monitor events by using a special external device, and operate the control panel by means of software other than that offered by SATEL.

2.3.2 Modules to be connected to expander bus

CA-64 E. Zone expander. Enables system expansion by 8 zones with support for NO, NC, EOL and 2EOL configurations. The expander with electronics in version 2.1 (or later) and firmware in version 2.0 (or later), where the DIP-switch 8 is set in ON position, will

be identified by the control panel as **CA-64 Ei**. Additionally, the CA-64 Ei expander zones offer support for vibration / roller shutter detectors.

CA-64 EPS. Zone expander with power supply. Enables system expansion by 8 zones. Equipped with a 1.2 A built-in switching mode power supply. The expander with electronics in version 2.0 (or later) and firmware in version 2.0 (or later), where the DIP-switch 8 is set in ON position, will be identified by the control panel as **CA-64 EPSi**. Additionally, the CA-64 EPSi expander zones offer support for vibration / roller shutter detectors.

CA-64 ADR. Addressable zone expander. Enables system expansion by 48 zones. Equipped with a 2.2 A built-in switching mode power supply. The INTEGRA 128-WRL control panel supports the addressable zone expanders with firmware version v1.5 or later.

CA-64 O-OC/CA-64 O-R/CA-64 O-ROC. Outputs expander. Enables system expansion by 8 outputs. Made in three versions with 8 OC type outputs, 8 relay outputs, and 4 relay outputs/4 OC outputs.

INT-ORS. DIN-rail outputs expander. Enables system expansion by 8 relay outputs. The relays can control electrical devices supplied with 230 V AC voltage.

Note: *If the sixth DIP-switch in the INT-ORS expander is set in the upper position, the device will be identified by the control panel as the CA-64 O output expander.*

CA-64 OPS-OC/CA-64 OPS-R/CA-64 OPS-ROC. Output expander with power supply. Enables expansion of the system by 8 outputs. Made in three versions: 8 OC type outputs, 8 relay outputs and 4 relay outputs/4 OC outputs. Equipped with a 2.2 A built-in switching mode power supply.

INT-IORS. DIN-rail zones/outputs expander. Enables expansion of the system by 8 zones and 8 relay outputs. The relays can control the electrical devices supplied with 230 V AC voltage.

Note: *If the sixth DIP-switch in the INT-IORS expander is set in upper position, the device will be identified by the control panel as the CA-64 PP zone/output expander.*

CA-64 PP. Zone/Output Expander with Power Supply. Enables expansion of the system by 8 zones and 8 outputs (4 relay and 4 OC type). Equipped with a 2.2 A built-in switching mode power supply.

INT-S-GR / INT-S-BL / INT-SK-GR. Partition Keypad. Controls the armed mode in one partition; can perform the access control functions and operate the electromagnetic door lock.

INT-SCR-BL. Depending on its settings, the device can work as a **partition keypad** (identified as INT-S in the control panel), a **partition keypad with reader** (identified as INT-SCR in the control panel) or an **entry keypad** (identified as INT-ENT in the control panel). If it operates as a partition keypad or a partition keypad with reader, the device can control armed mode in one partition, execute access control functions, and control operation of the electromagnetic door lock. The main task of the entry keypad is activation of the delay for zones with reaction type 3 INTERIOR DELAYED. After expiry of the time programmed in the keypad, unless the system has been disarmed, the interior delayed zones will operate again as the instant ones.

INT-SZ-GR/INT-SZ-BL/INT-SZK-GR. Code lock. Enables execution of the access control functions and operation of the electromagnetic door lock.

CA-64 SR. Expander for proximity card readers. Supports the SATEL made proximity card readers, enabling execution of the access control functions and operation of the electromagnetic door lock. Enables control of the partition status by means of proximity cards.

CA-64 DR. Expander for "DALLAS" chip readers. Supports the DALLAS chip readers, enabling execution of the access control functions and operation of the electromagnetic door lock. Enables control of the partition status by means of DALLAS chips.

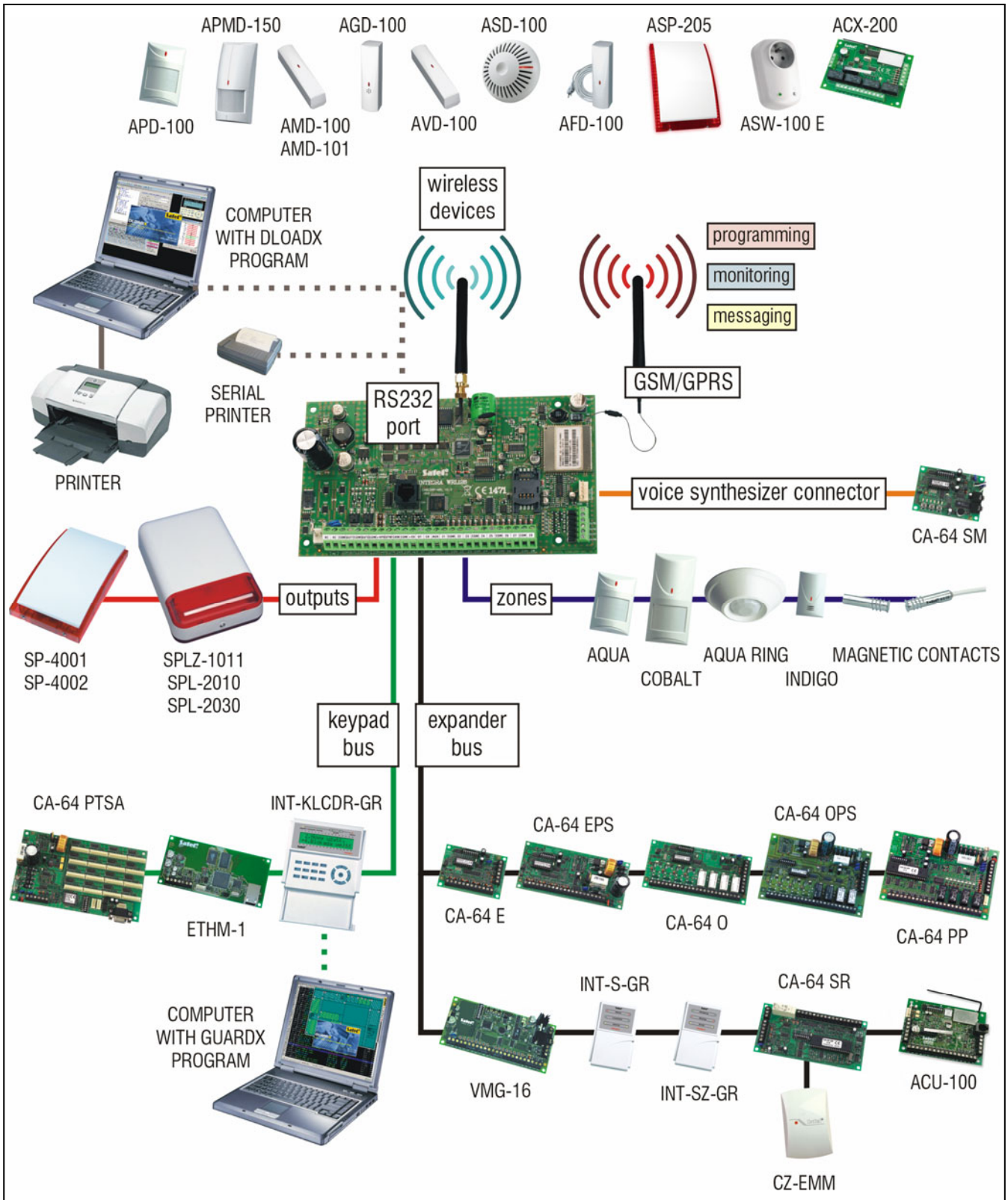


Fig. 1. Example of devices interfacing with the INTEGRA alarm control panel.

CA-64 SM. Voice synthesizer expander. Capable of storing 16 voice messages, 15 second duration each. The messages are used for alarm notification via telephone.

VMG-16. Voice message generator. Plays back prerecorded messages when specified events occur in the system. Capable of storing 16 voice messages.

ACU-100. Controller of ABAX wireless system. Enables expansion of the system by additional wireless devices.

INT-RX. 433 MHz key fob control expander. Enables remote key fobs to be assigned to the users in order to operate the system.

2.4 WIRELESS DEVICES

AMD-100. Wireless magnetic detector. An additional input enables NC type hardwired detector to be connected.

AMD-101. Two-channel wireless magnetic detector. An additional input enables NC type hardwired detector to be connected.

AMD-102. Wireless magnetic contact with input for roller shutter detector. An additional input enables NC type hardwired detector or roller shutter detector to be connected.

APD-100. Wireless passive infrared detector.

APMD-150. Wireless dual motion detector. Includes a microwave detector (MW) and a double pyroelement (PIR).

AVD-100. Wireless vibration detector and magnetic contact.

AGD-100. Wireless glass break detector.

ASD-100. Wireless smoke and heat detector.

AFD-100. Wireless water flood detector.

ARD-100. Wireless reorientation detector.

ASP-105. Wireless control outdoor siren. Visual and audible alarm triggered independently by radio.

ASP-205. Wireless indoor siren. Offers a possibility of programming 2 different signaling modes for 2 alarm types (e.g. burglary and fire) or independent triggering of visual and audible alarm signals.

APT-100. Bidirectional keyfob.

ACX-200. Hardwired zone/output expander. Enables wireless communication with hardwired devices connected to 4 zones and 4 outputs of the expander.

ACX-201. Hardwired zone/output expander with power supply. Enables wireless communication with hardwired devices connected to 4 zones and 4 outputs of the expander. Fitted with a built-in 1.2 A switching power supply.

ASW100 E and ASW-100 F. 230 V AC wireless controllers. Enable remote switch-on/ switch-off of devices connected do 230 V AC sockets.

ARF-100. Radio signal level tester. Enables checking the level of radio signal sent and received by wireless devices wireless, and thus facilitates selection of a suitable installation place.

3. SYSTEM INSTALLATION

All electric connections may only be made with power supply disconnected.

The following tools will be useful during installation:

- blade screwdriver 2.5 mm,
- Phillips screwdriver,
- precision pliers,
- flat nose pliers,
- drill with a set of drill bits.

3.1 INSTALLATION PLAN

Installation must be preceded by preparation of a plan of the security alarm system. It is advisable that you draw up a sketch of the premises, showing all the devices to be included in the system, i.e. the control panel, keypads, detectors, sirens, expansion modules, etc. The control panel and other security system components should be installed within the boundaries of the protected area.

3.2 ESTIMATION OF SYSTEM CURRENT CONSUMPTION

At the stage of planning the security system, you should sum up the currents consumed by all devices included in the system (control panel mainboard, keypads, additional modules, detectors, sirens, etc.). The calculation should also take into account the battery charging current. If the sum of currents exceeds the control panel capacity, i.e. 2 A, expanders with power supply or an extra power supply unit must be used in the system.

The sum of currents consumed by the devices connected to the power supply unit (expander with power supply) must not exceed the power supply output current.

When planning connection of devices to particular power outputs (control panel, expander with power supply, etc.), remember that the sum of currents consumed by these devices must not exceed the maximum current-carrying capacity of those outputs.

3.3 CABLING

It is recommended that straight unscreened cable be used for making electric connections between devices included in the system (using the twisted pair type of cable, e.g. UTP, STP, FTP is not advisable).

Cross-section of the power supply wires should be selected so that the supply voltage drop between the power supply and the supplied device should not exceed 1 V as against the output voltage.

In order to guarantee correct functioning of the system components it is important to ensure that resistance and capacitance of the signal wires are as low as possible. When the distance between the devices is more substantial, several wires connected in parallel may have to be used for each signal, in order to reduce conductor resistance. This, however, may lead to an increase of conductor capacitance. Too high resistance or capacitance of the cables connecting the control panel to keypads or expansion modules can prevent the devices from working correctly (e.g. the control panel will be unable to identify devices, absence of devices will be reported, etc.). When selecting the length of cables, follow recommendations set out in sections on connection of particular types of devices.

The signal wires of keypad bus (DTM, CKM, COM) must be run in one cable (they must not be run in separate cables). Also the signal wires of expander bus (DT, CK, COM) must be run in one cable.

When you make the cabling, remember that there must be sufficient distance between the low-current wires and the 230 V AC power supply wires. Avoid running the signal cables in parallel of the 230 V AC supply cables in close vicinity of them.

The cables should not run in immediate vicinity of antennas, because it could adversely affect radio communication.

3.4 INSTALLATION OF CONTROL PANEL MAINBOARD

The control panel mainboard contains electronic components sensitive to electric charges.

Before connecting the mainboard to power supply source (battery, alternating voltage from transformer), you must have finished all the installation work with

regard to hardwired devices (connection of keypads, expansion modules, detectors, sirens, etc.).

The control panel should be installed indoors, in spaces with normal humidity of air. The control panel must be protected against unauthorized access.

Installation place of the control panel should be selected so that all the wireless devices which are to be controlled by it, are indeed within its operating range. It is recommended that the panel be installed at a high location. This will enable a better radio communication range to be achieved, while avoiding the risk of the control panel being accidentally covered by people moving around the site.

A permanent (not disconnectable) 230 V AC power supply circuit with protective grounding must be available at the control panel installation place.

Explanations for Figure 2:

1 - **battery connection cables** (red +, black -).

2 - **LED indicator of OUT1 high-current output status.**

3 - **LED indicator of OUT2 high-current output status.**

4 - **pins for setting battery charging current:**
- pins shorted (jumper on) – 400 mA
- pins open (no jumper) – 800 mA

5 - **CHARGE LED.** Indicates battery charging.

6 - **port RS-232.** It allows local programming and management of the system by means of DLOADX or GUARDX program (the cable for making connection RJ type socket on the control panel mainboard and the DB9 socket on the computer is supplied by SATEL). Enables remote programming by means of DLOADX program through Ethernet (TCP/IP) network, if the ETHM-1 module is connected. Makes interfacing possible with an external analog or ISDN modem.

7 - **STTS LED.** Indicates operation status of the supervision circuit of wireless devices.

8 - **MEMORY pins. Never remove jumper from these pins.** Removal of the jumper results in disconnection of the battery backup for the clock and RAM memory and, consequently, in loss of the clock settings and all data stored in the RAM memory.

9 - **RESET pins.** In case of emergency, they make it possible to start the STARTER program, local computer programming function or service mode (see: PROGRAMMING manual).

10 - **SIM card socket.** It is not recommended to insert the SIM card into its socket before the card PIN code has been programmed in the control panel.

11 - **socket to connect antenna for communication with wireless devices.**

12 - **GSM STATUS LED.** Indicates GSM network status:
- LED off – telephone not working,
- LED blinking at short intervals – telephone has failed to find network,
- LED blinking at long intervals – telephone has found network,
- LED blinking at very short intervals – GPRS communication.

13 - **OUT3...OUT8 LEDs.** Indicate status of OUT3...OUT8 low-current outputs.

14 - **GSM telephone.**

15 - **socket for voice synthesizer.**

16 - **socket for GSM/GPRS communication antenna.**

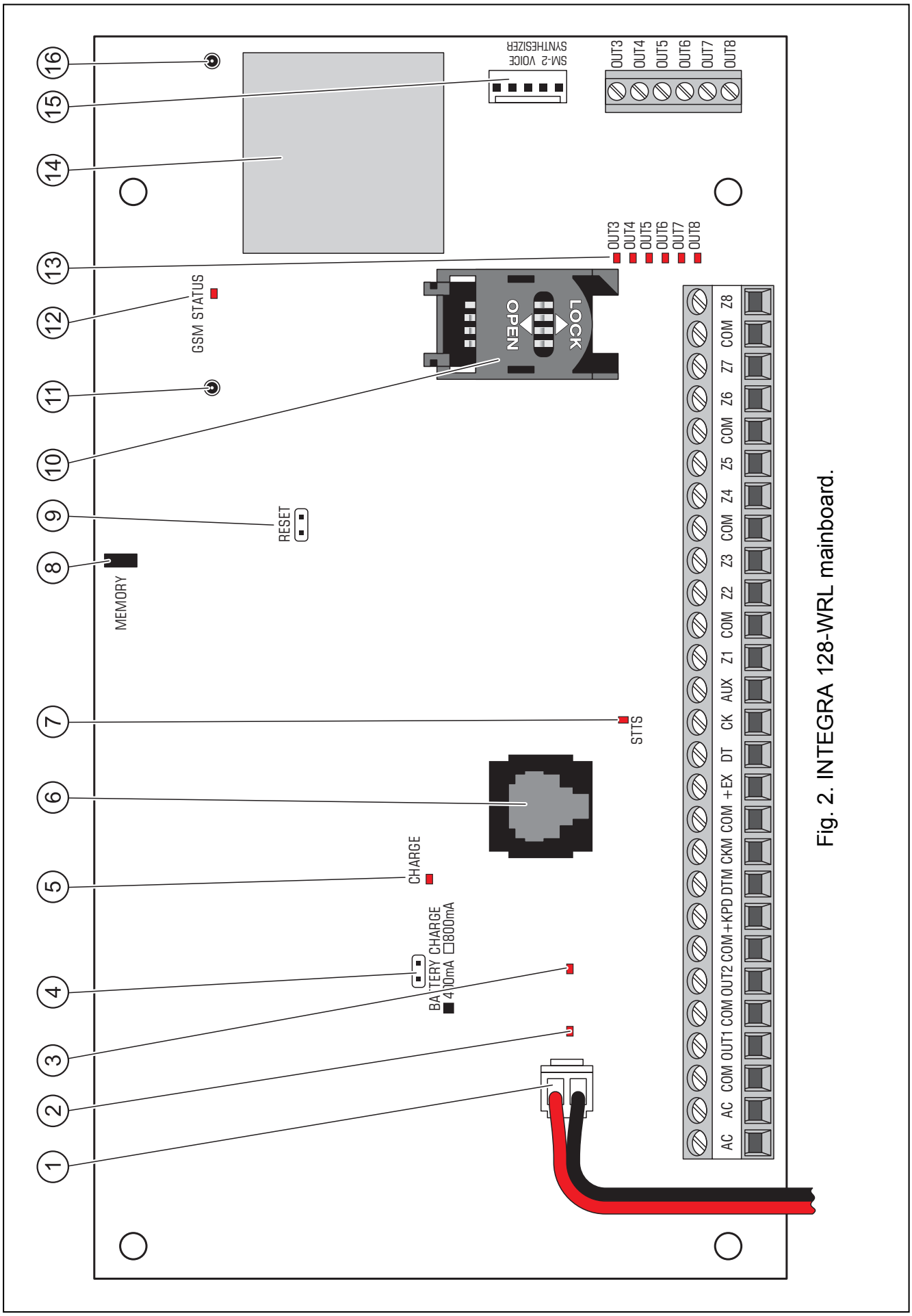


Fig. 2. INTEGRA 128-WRL mainboard.

Terminals:

AC - power supply inputs (18 V AC)
COM - common ground
OUT1...OUT2 - programmable high-current outputs (if not used, they should be loaded with 2.2 kΩ resistors)
+KPD - dedicated power supply output for devices connected to keypad bus (13.6...13.8 V DC)
DTM - keypad bus data
CKM - keypad bus clock
+EX - dedicated power supply output for devices connected to expander bus (13.6...13.8 V DC)
DT - expander bus data
CK - expander bus clock
AUX - power supply output (13.6...13.8 V DC)
Z1...Z8 - zones
OUT3...OUT8 - programmable low-current outputs, OC type

3.5 CONNECTING KEYPADS AND OTHER DEVICES TO KEYPAD BUS

Up to 8 different keypads or other devices to be connected to keypad bus can be installed in the system. They are connected in parallel. The data are addressable and all devices function independently.

The keypad bus terminals on control panel mainboard have designations COM, +KPD, DTM and CKM. The +KPD output enables powering of the keypad bus devices (the output has a polymer fuse).

The distance between the keypad or other device to be connected to keypad bus and the control panel may be up to **300 m**. Table 1 shows the number of wires required for correct connection of devices to the keypad bus, if using a 0.5 mm^2 cross-section straight-through cable.

	+KPD	**COM**	**CKM**	**DTM**
Distance	**Number of wires**			
up to 100 m	1	1	1	1
100-200 m	2	2	1	1
200-300 m	4	4	2	2

Table 1.

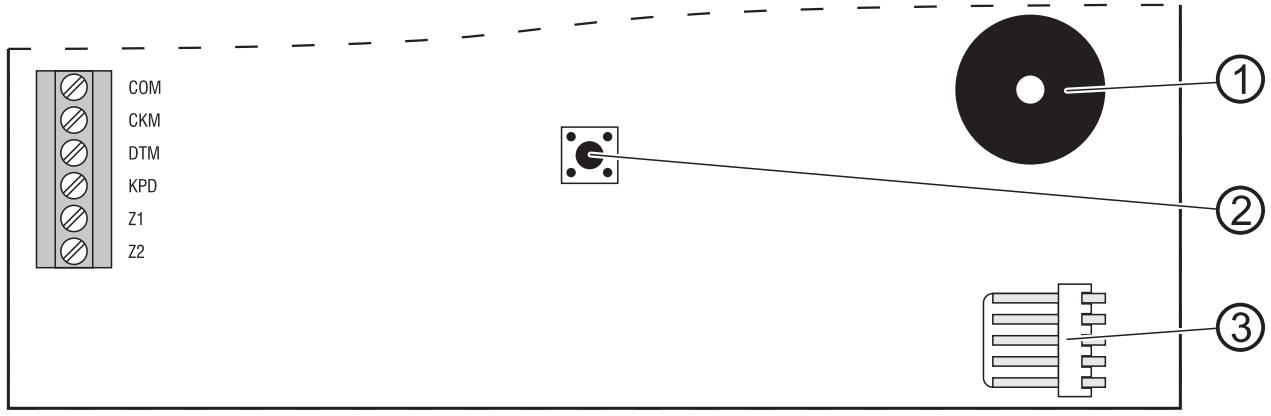


Fig. 3. Partial view of keypad board - INT-KLCD-GR/INT-KLCD-BL/INT-KLCDR-GR/ INT-KLCDR-BL.

Notes:

- *The signal wires (CKM, DTM and COM) must be run in one cable!*
- *The supply voltage measured across the LCD keypad terminal block with backlight on should not be less than 11 V DC.*
- *Devices installed far from the control panel may be powered locally from an independent power source.*

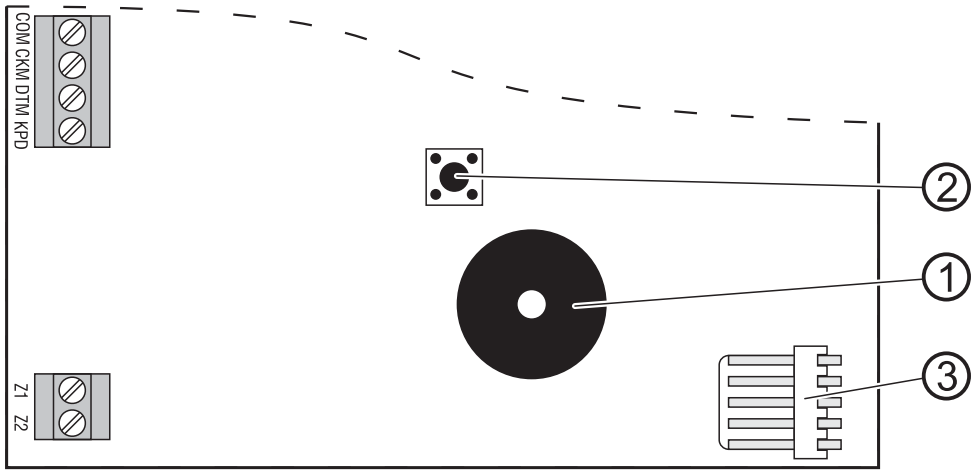


Fig. 4. Partial view of keypad board - INT-KLCDS-GR/INT-KLCDS-BL.

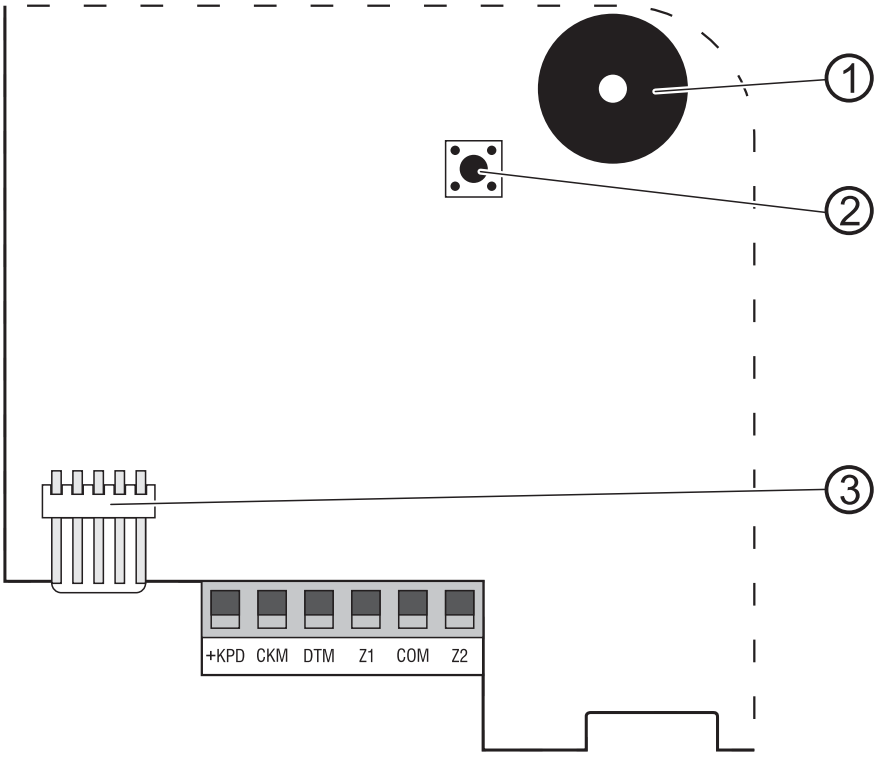


Fig. 5. Partial view of keypad board - INT-KLCDK-GR.

Explanations for Figures 3, 4 and 5:

1 - **buzzer.**

2 - **tamper contact.**

3 - **RS-232 port.**

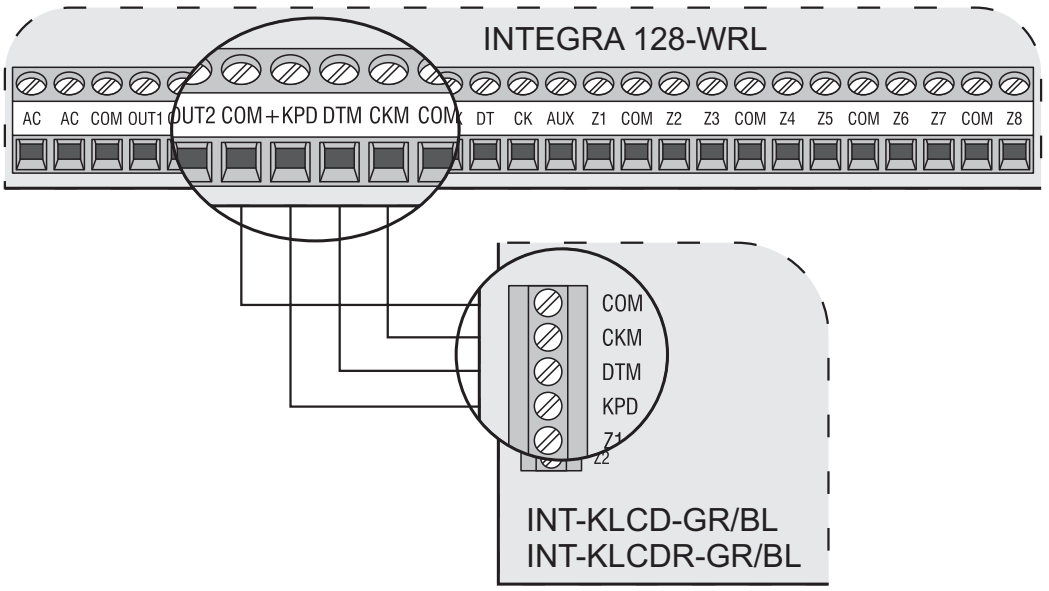


Fig. 6. Connection of LCD keypad.

3.5.1 Addressing devices connected to keypad bus

Each keypad/device to be connected to keypad bus must have its own individual address from the 0 to 7 range (addresses must not repeat). It is recommended that consecutive addresses be assigned starting from 0.

In LCD keypads, the address is set by software means and saved to the EEPROM non-volatile memory. By default, address 0 is set in all keypads. This address can be changed in two ways:

- by means of service function,
- without entering the service mode.

The address in other devices is set by means of DIP-switches.

When started with default (factory) settings, the alarm control panel will support all keypads connected to the bus, irrespective of what addresses are set in them. Thus it is possible to set correct individual addresses in the keypads and perform identification of all devices connected to the bus. Execution of the service function KEYPAD IDENTIFICATION (SERVICE MODE →STRUCTURE →HARDWARE →IDENTIFICATION →KEYPAD IDENT.) is necessary for correct support of the keypads and other devices connected to the bus. The system control is only possible after execution of the identification function. The function checks the addresses at which keypads or other devices are connected and registers them in the system. Disconnection of a keypad/device registered in the system will trigger tamper alarm. Any commands from an unregistered LCD keypad are rejected by the control panel.

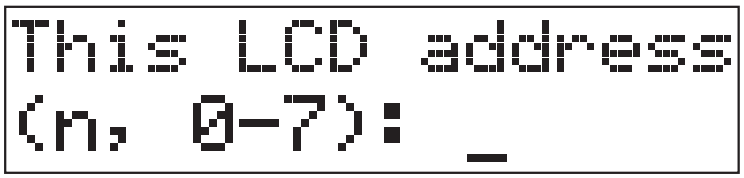
Notes:

- *Each change of the LCD keypad (or other device connected to the keypad bus) address requires execution of the keypad identification function.*
- *Setting the same address in several keypads will trigger tamper alarm, display the message "This keypad is changed", and disable operation of such keypads. To restore the operation of keypads, change their repeated addresses into unique ones.*

3.5.1.1 Programming keypad address by means of service function

1. By means of any supported keypad, enter the control panel service mode ([SERVICE CODE][*] →SERVICE MODE).

2. Start the function KEYPAD ADDRESSES (→STRUCTURE →HARDWARE →IDENTIFICATION →KEYPAD ADDRESSES).
3. The message shown in Figure 7 will appear on display of all keypads connected to the control panel.



n=0...7, current address of the keypad

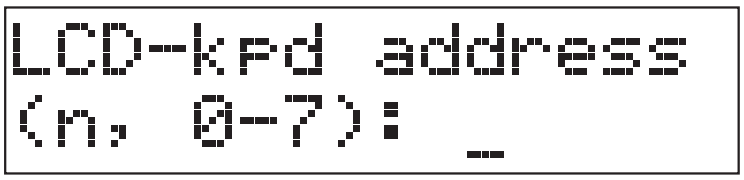
Fig. 7. Programming keypad address by means of service function.

4. Enter a proper address from the 0–7 range in the selected keypad(s). The address change will be confirmed by four short and one long beeps.
5. To terminate the address change function, press the [*] key. The function will be terminated automatically after 2 minutes from being started. Termination of the function will restart the keypad (return to the main service mode menu will follow in the keypad from which the function has been started).

3.5.1.2 Programming keypad address without entering service mode

This method of address programming is particularly useful when – due to repeating addresses – the keypad support has been disabled and entering the service mode is impossible.

1. Disconnect keypad power supply (KPD) and signal wires CKM and DTM.
2. Short the keypad terminals CKM and DTM.
3. Switch on keypad power supply.
4. The text shown in Fig. 8 will appear on the display.



n=0...7, current address of the keypad

Fig. 8. Programming keypad address without entering the service mode.

5. Enter a new address from the 0–7 range. The keypad will confirm execution of the function by four short and one long beeps. If it is necessary to change the entered address, press the [*] key (keypad restart will follow and the text shown in Fig. 8 will again be displayed).
6. Disconnect the keypad power supply.
7. Open the keypad terminals CKM and DTM.
8. Connect the keypad correctly to the control panel.

3.5.2 Numeration of keypad zones

The address set in the keypad defines which numbers in the system will be assigned to the keypad zones (see: Table 2). You can define for each LCD keypad whether or not its zones will be used in the system. If the zone numbers of LCD keypad and expander coincide, the keypad zones have priority (in such a case, the corresponding expander zones will not be supported).

Keypad address	Z1	Z2
	Zone number in security system	
0	113	114
1	115	116
2	117	118
3	119	120
4	121	122
5	123	124
6	125	126
7	127	128

Table 2.

3.5.3 Keypad RS-232 port

The keypad RS-232 port makes it possible to connect the computer with GUARDX program installed. The GUARDX program enables visualization of the protected facility on computer monitor, operation of the system from an independent on-screen LCD keypad, access to the event log, as well as creating and editing of the system users.

Connection to the computer is made permanent, with the use of an ordinary unscreened cable. When using the straight-through cable with 0.5 mm^2 wire cross-section (the use of twisted-pair wire is not recommended), the distance between the computer and the keypad can be up to **10 m**. The method of making connection is shown in Fig. 9.

Note: *Activate the "RS communication" option in parameters of keypads to which the user's computer is to be connected. Data exchange with the computer begins automatically on starting the GUARDX program.*

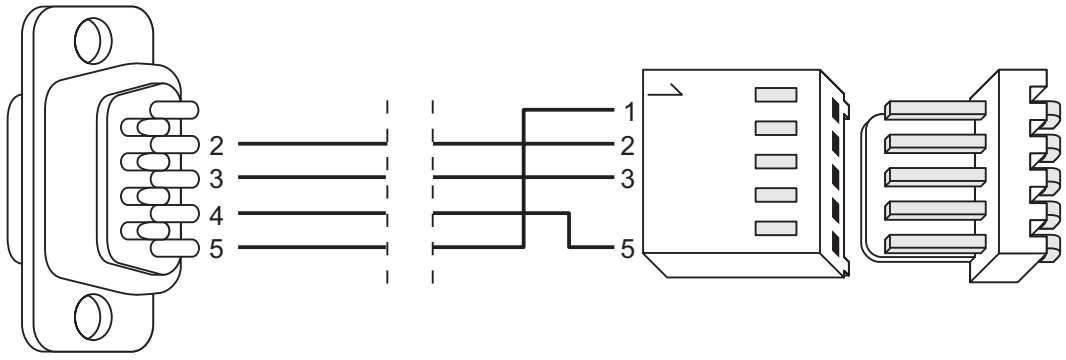


Fig. 9. Connecting computer to keypad RS-232 port. Shown on the right is the keypad interface. Shown on the left is the DB-9 female connector from soldering points side.

3.6 CONNECTING DEVICES TO EXPANDER BUS

Up to 32 modules to be connected to expander bus, can be installed in the system. The modules are connected in parallel.

The expander bus terminals on the control panel mainboard are designated COM, +EX, DT and CK. The +EX output enables power supply to the expander bus devices (the output has a polymer fuse).

The total length of the expander bus may not exceed **1000 m**. Table 3 shows the number of wires required for correct connection of devices to the expander bus, if using a 0.5 mm^2 cross-section straight-through cable.

distance between module and control panel	number of wires in signal cable		
	CK	DT	COM
up to 300 m	1	1	1
300 – 600 m	2	2	2
600 – 1000 m	2	2	4

Table 3.

Note: *Signal wires (DT, CK and COM) must be run in one cable!*

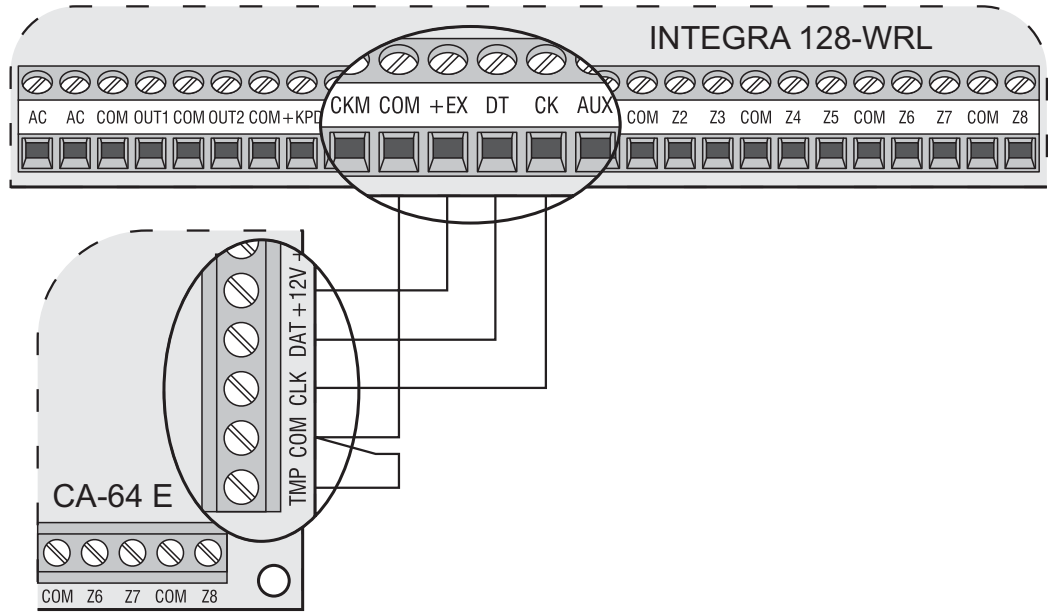


Fig. 10. Connection of modules without power supply unit, by the example of CA-64 E zone expander. The expander is mounted in the same housing as the control panel, hence the TMP terminal is shorted to the COM ground.

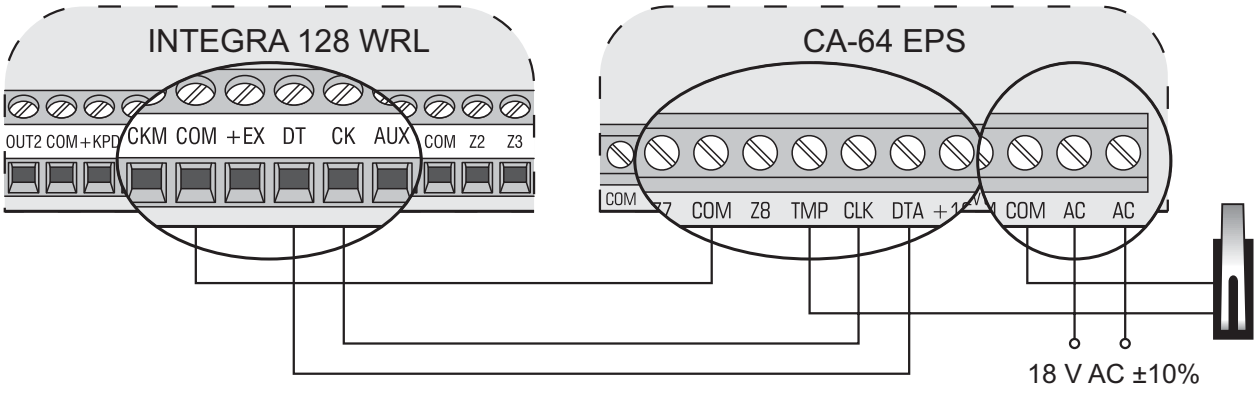


Fig. 11. Connection of expansion module with power supply unit, by the example of CA-64 EPS zone expander. Housing tamper contact is connected to TMP and COM terminals. AC terminals should be connected to transformer secondary winding terminals.

The modules without power supply unit may be powered directly from the control panel if the distance between control panel and module is not higher than 300 m. Where distances are small (up to 100 m), the modules without power supply unit may be connected one after the other to one supply cable (see: Fig. 12). If this is the case, devices connected to the

expanders must be independently supplied (by means of a separate cable from the control panel, expander with power supply, or a power supply unit). Where the distance between the control panel and the modules exceeds 300 m, the modules without power supply unit should not be supplied from the control panel. They should have an independent supply source (a power supply unit or an expander with power supply).

3.6.1 Addressing devices connected to expander bus

Each module to be connected to the expander bus must have its own individual address from the 0 to 31 range (the addresses must not repeat). It is recommended that consecutive addresses be assigned starting from 0. This will allow you to avoid problems during expansion of the system (e.g. changing numeration of zones or outputs due to connection of a new expander). The addresses should be set by means of DIP-switches situated on expander electronics board. The expander addresses are displayed on the keypad in hexadecimal format (from 00 to 1F).

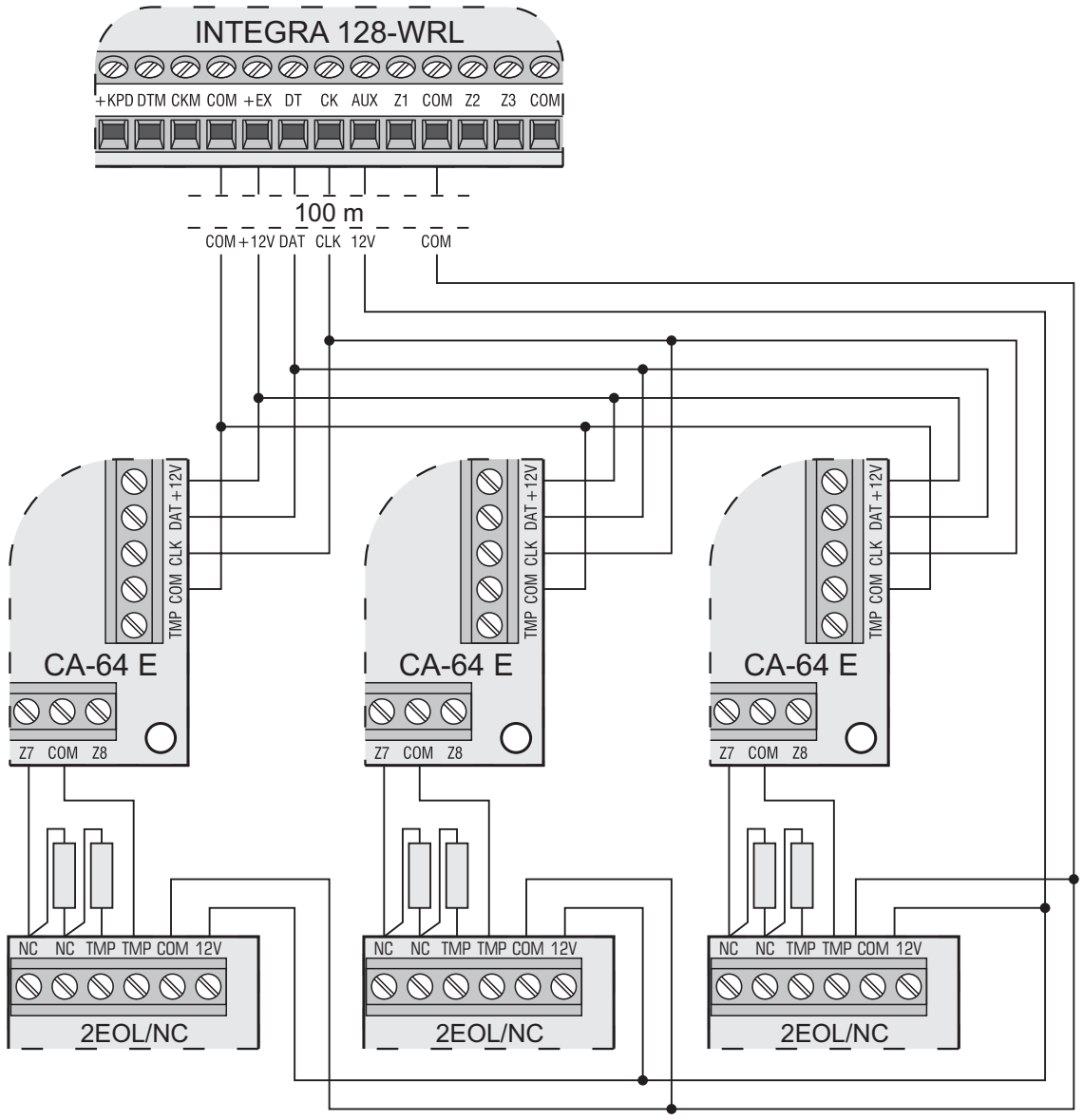


Fig. 12. Connection of modules without power supply to the control panel when the distance between panel and modules is small (by the example of CA-64 E zone expander). Several modules (connected in parallel) are connected to the control panel lead-in. Expanders only may be connected to the +EX power terminal. Detectors must be supplied by separate power leads.

The control panel only supports the modules which are registered in the system by means of the EXPANDER IDENTIFICATION service function (SERVICE MODE →STRUCTURE →HARDWARE →IDENTIFICATION →EXPANDER IDENT.). The function saves to the module memory a special (16-bit) number, which is used for checking the module availability in the system. The number is stored in EEPROM non-volatile memory and can only be changed after restarting the expander identification function. Hence, it is impossible to substitute another module for the identified one (even if a correct address is set in it). Substitution of another module for the identified one will trigger alarm (module tamper – verification error). Each change of module or module address requires restarting the expander identification function.

Notes:

- *The control panel will not support the module unless the identification function is completed with the "Found xx exp. (yy new)" message.*
- *A wrong module connection can make correct identification of the modules impossible, which is signaled by the message: "Error! Two expanders have the same addr!".*
- *Too high resistance of the cables connecting the module to the control panel (large distance, too small number of wires for a single signal) may result in the module being not recognized by the identification function.*

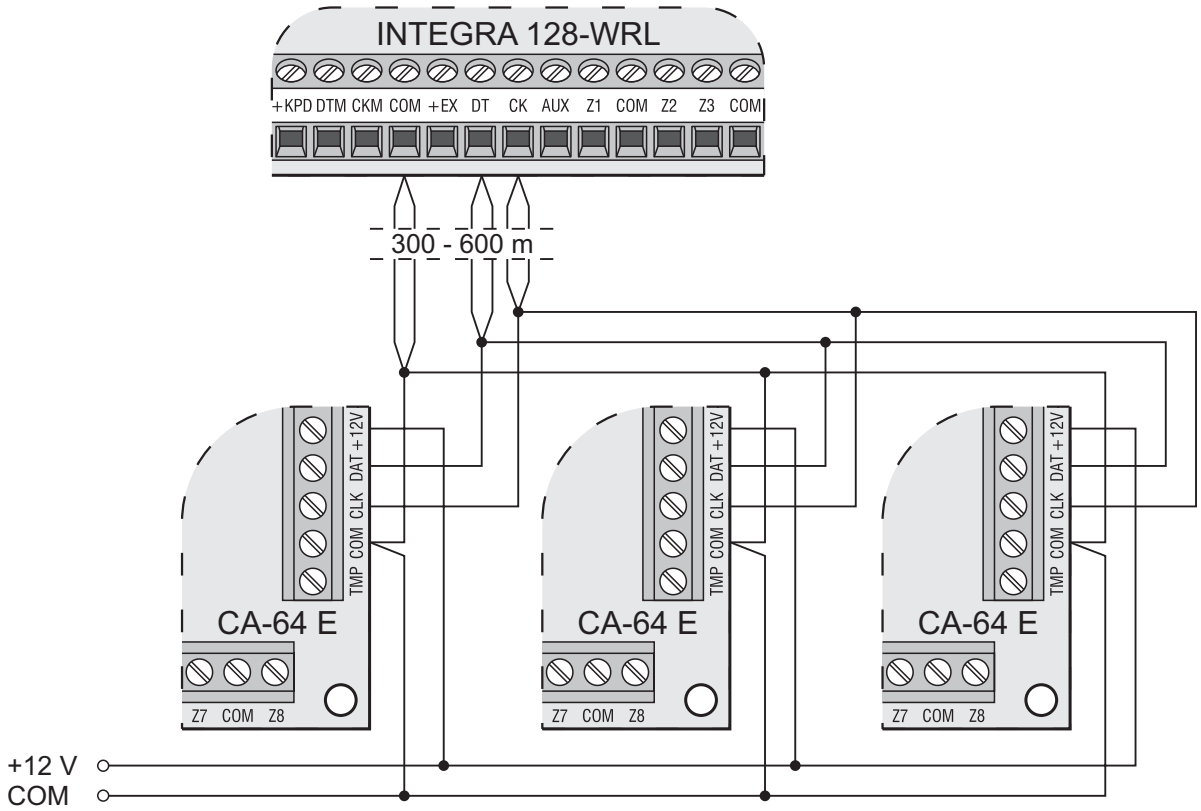


Fig. 13. Connection of modules without power supply (by the example of CA-64 E zone expander) to the control panel – the distance between panel and modules is 300 to 600 m. The modules are powered from a control panel independent source (power supply/expander with power supply). 2 wires in cable are used for each signal (CK, DT, COM).

3.7 CONNECTING HARDWIRED DETECTORS

The control panel can interface with any hardwired detectors. Each control panel zone and zones of LCD keypads and zone modules may operate in the following configurations:

- NC (normally closed),
- NO (normally open),

- EOL (end of line resistor),
- 2EOL/NC (double end of line resistor, NC type detector),
- 2EOL/NO (double end of line resistor, NO type detector).

The value of resistors used in EOL and 2EOL configurations is programmable within the range from 500 Ω to 15 kΩ for zones:

- on the control panel mainboard – the value of R1 and R2 resistors is programmed individually for the 2EOL configuration (see Fig. 17). The resistor value for EOL configuration is a sum of values programmed as R1 and R2.
- in the zone expanders identified by the control panel as CA-64 Ei and CA-64 EPSi. Depending on the expander program version, configure the following:
  - **version 4.00** – the value of R1 and R2 resistors for 2EOL configuration (see Fig. 17). The resistor value for EOL configuration is a sum of values programmed as R1 and R2.
  - **version 2.00 or 2.01** – the resistor value for EOL configuration. For the 2EOL configuration, a single resistor value equals to half the defined quantity.

In order to make the circuit in the zones of LCD keypads and other expanders (CA-64 ADR, INT-IORS, CA-64 PP) in EOL configuration, use 2.2 kΩ resistor, and in 2EOL configuration - 1.1 kΩ resistors.

The zones on the mainboard and in zone expanders identified by the control panel as CA-64 Ei and CA-64 EPSi can additionally work in the following configurations:

- roller (dedicated for connecting roller shutter motion detector),
- vibration (normally closed, dedicated for connecting vibration detector – an NC type of detector, e.g. magnetic contact, may be connected in series with the vibration detector).

All zones in the system can be made dependent on the output status. Activating the output amounts to violation of the zone (the output and the zone does not need to be physically connected). The zone does not need to exist physically, because virtual zones may be used as well. In case of the physically existing zones, programmed as the "follow output" ones, the physical violations and tampers of the zone are disregarded.

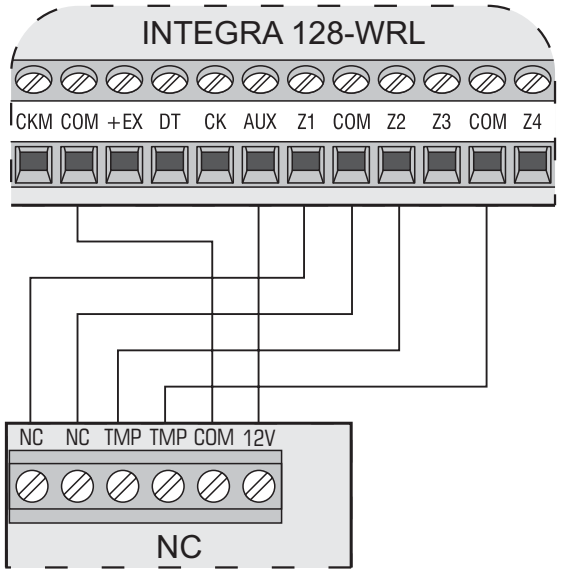


Fig. 14. Exemplary connection of NC type detector to control panel (NO type detector should be connected in the same way).

The AUX power supply output or any of the high-current outputs (OUT1 or OUT2), programmed as POWER SUPPLY OUTPUT, can be used for powering detectors. In case of extended systems and large distances to the control panel, the detectors may be powered from expanders fitted with power supply units, or from additional power supply units.