

Matrix2000

Installation and Operation Manual



Conventional Fire Alarm Panels 4 - 24 Zones



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1. General description of panels

The line of conventional fire alarm panels *Matrix 2000* has been designed to provide full fire detection coverage to buildings or installations that require fire detection systems of 4 up to 24 zones.

The high quality of manufacture, the many but at the same time prototype technical characteristics and operations, that one can only find in very expensive fire alarm panels, make them unbeatable in the world market. Also they fully cover any need for conventional fire alarm installations. In combination with the most competitive prices, they are undeniably the best choice in terms of high quality product/ low price.

They are designed and manufactured so that they fulfill the requirements of directive **BS5839 Part 4** 1988. They are also certified with complete compatibility to directive **EN 54 Part 2 and 4**, 1998.

Operating, controlling and programming of the panels can be done in three different access levels, in accordance with directive **BS5839 part 4** 1988. Access levels 1 and 2 are achieved via the keyboard of silicone (Silicon Rubber) and the lock in the facade of the panels, and access level 3 via microswitches from the interior of the panels (cf. page 6 paragraph 6.1).

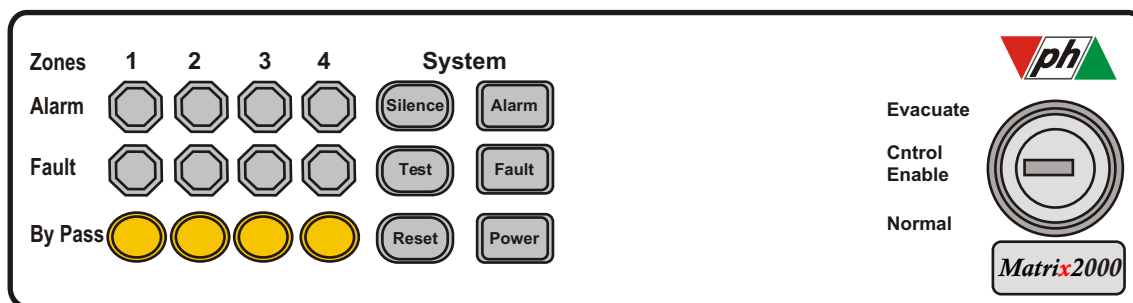
The analytic indications and the simple handling of the panels of *Matrix 2000* series ensure the easy handling and control of the system by the operator.

Attention: The fire alarm panels contain static sensitive high quality electronic control equipment. Care should be taken when connecting field wiring.

Do not make any connections with mains or battery power applied. The cabinet should be connected to a suitable earth point at all times.

2. Indications handlings of keyboard

Operating, monitoring and programming of the panels is done in three different access levels, always in accordance with European standards EN 54-2 & EN 54-4 : 1998. Access to levels 1 and 2, is achieved with the silicon rubber keypad and the electric keyswitch in the face of the panels. Access to level 3, is accomplished with the help of microswitches sets inside the panels (page 6, par. 6.1).



2.1 Indication "Power"

In normal system operation and when voltage of 27,5V is applied from the main or backup(batteries) power supply, the indication "Power", is turned on constantly.

Also it provides the installing engineer the information that the software of the panel is "running" without problems.

Concisely the indication "Power" turns off when we have either dysfunction of the software or disconnected power supply to the mainboard (burned mainboard fuse).

Furthermore the indication starts to blink when we have:

- (a) removal or voltage loss of batteries only
- (b) total break of main power supply only

In all the above cases, indication "General fault" also turns on while the buzzer sounds continuously.

2.2 "System Fault" indication (general fault)

The indication of general problem, "System Fault", turns on in the case that something happens to the connections of the zones, the outputs of the sirens or the outputs of the extra Relays of zones (PCB of auxiliary relays).

More specifically, in the case that open or short-circuit occurs in the connection cables of the siren in the main board, General Fault indication will turn on, while at the same instant we will have continuous sound notice from the in the panel incorporated Buzzer.

The General Fault indication will turn on and at the same moment we will have sound notice from the panel's incorporated Buzzer, in every case that some problem occurs in the zones or in the outputs of Relays of the zones, as it is analytically described in the next paragraph.

In all the above cases it is possible for the user to stop the Buzzer by pressing the key **Silence**, with the keyswitch in position **Control Enable**. All the indications turn off after restoring the problem.

2.3 "Zones Fault" indications

The "Zones Fault" indications are blinking, in a different way, (schematic 1) in every case that a problem occurs to the connections of the zones or the outputs of the extra Relays of zones (in the case where the relays expansion board is used).

More analytically:

(a). In the case that short-circuit or opening of a zone exists, "System Fault" indication will turn on as well as the corresponding "Zones Fault" indication will blink, (form 1a) while at the same moment we will also have sound notice from the panel's incorporated Buzzer.

Possible causes of of a zone problem are:

- (a1) disconnection or interruption of wiring of the zone
- (a2) short-circuit in the wiring of the zone
- (a3) removal of sensor from its base
- (a4) removal of terminal resistance

(a5) testing procedure for the particular problem

(b). In the case where the Relays expansion board is used and we have short-circuit or opening of the wiring in the corresponding outputs or removal of the output monitoring resistance, then “**System Fault**” indication will turn on and the “**Zones Fault**” indication of the corresponding zone will blink (in a different way from that when we have Fault of zone , form 1b). At the same moment we will also have sound notice from the panel's incorporated Buzzer.

(c). Finally, in the case that we have both of the above situations, the LED indication starts blinking according to form 1c, while at the same time we have sounder warning from the panel's incorporated Buzzer.

(d). If the panel is used for fire extinguishing application and we connect two call points as described in paragraph 6.4 , and accidentally we activate the CANCELLATION call point by pressing it, we have the following indications on the keyboard of the panel to state this event:

System Fault indication is constantly ON

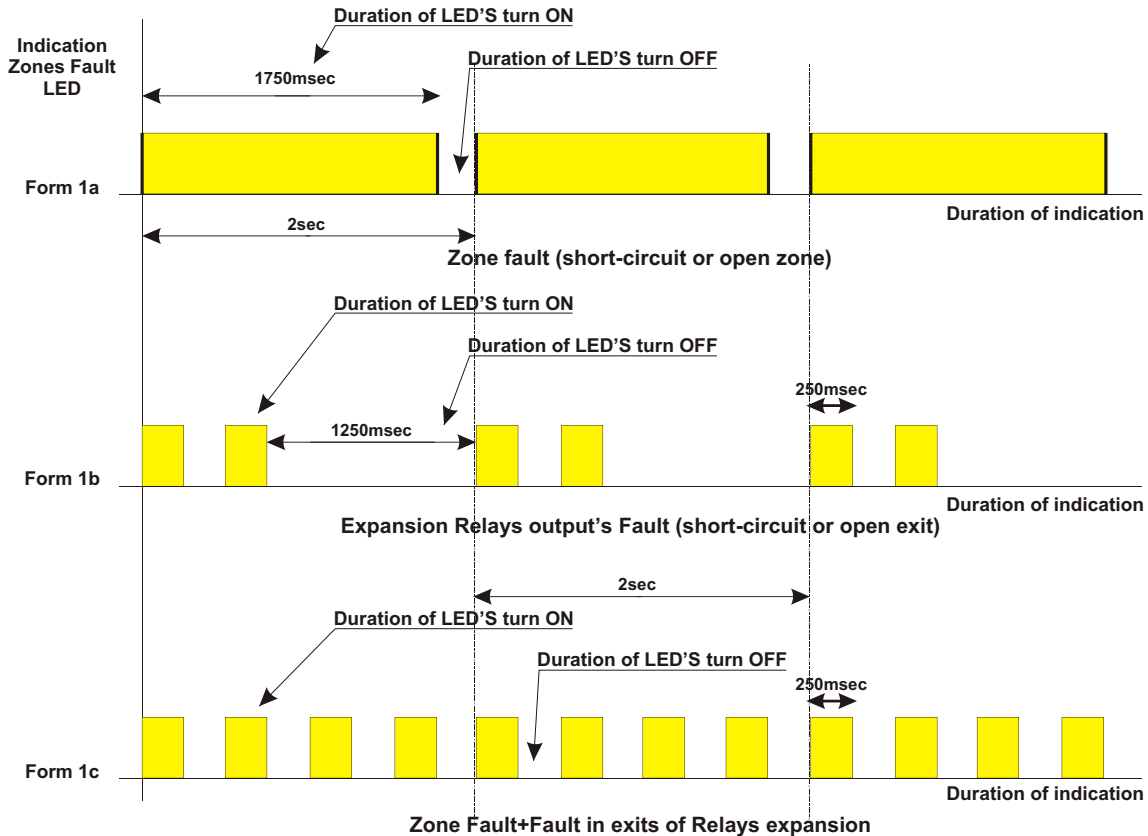
Zones Fault indication is blinking as shown in schematic 1b (corresponding zone only)

Zones Bypass indication-button is blinking every 1 sec (corresponding zone only)

The indications cease to exist as soon as we reset the call point to NORMAL position.

In all above cases it is possible for the user to stop the Buzzer, by pressing the **Silence** key, with the keyswitch in position Control Enable. The “**System Fault**” indication remains **ON** in order to show that a problem exists in the installation. The Buzzer sounds in regular time intervals, in order to remind the user the existence of the problem.

All the Fault indications turn off after restoring the problem.



Schematic 1

2.4 “System Alarm” indication

In the case that a connected detector in the system detects some sign of fire (smoke, high temperature etc), the panel goes in alarm mode and the indication “**System Alarm**” turns on. At the same moment we have continuous alarm from the sirens of the system. “**System Alarm**” indication also turns on when the operator user of the system for very serious reasons asks the evacuation of the protected area, turning the key of the keyswitch in **Evacuate** position. In both above cases we also have activation of **Zones Alarm** indications, which blink in the way presented in schematic 2.

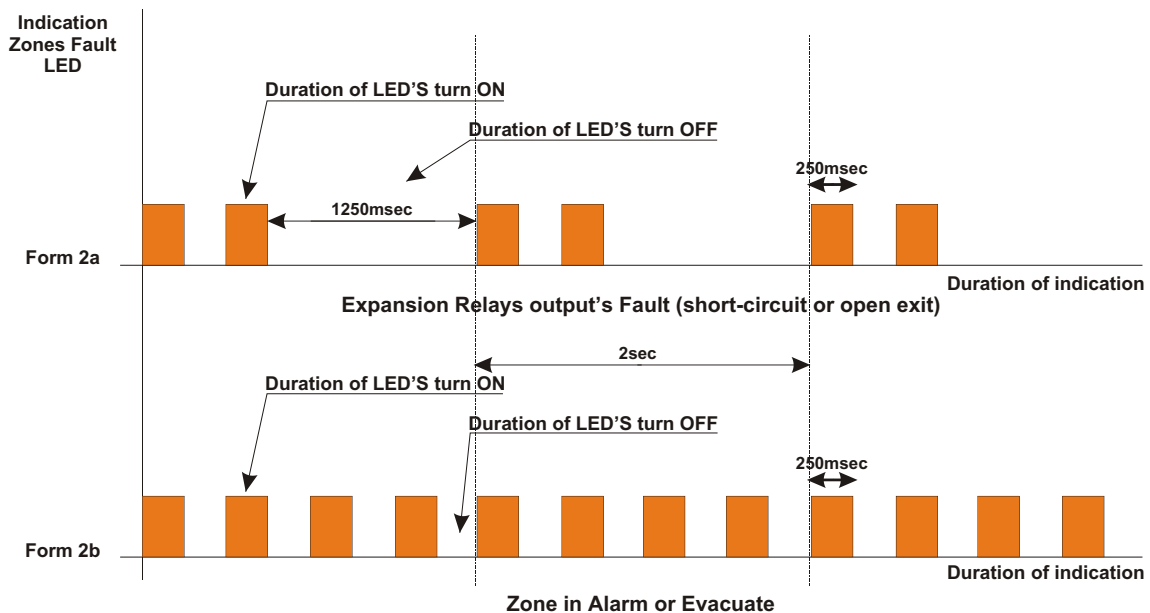
2.5 “Zones Alarm” indications

The “**Zones Alarm**” indications blink as shown in schematic 2b each time a detector from the corresponding zone is activated.

If a manual call point is activated to trigger the alarm, the indication blinks as shown in schematic 2a to show that the alarm came from a manual call point and not a detector.

If the cause of the activation of the zone is restored, the system continues in alarm mode with the indication of the activated zone blinking.

Also the sirens sound. In this case , pressing the “**Silence**” key makes the sirens stop and the Zones Alarm indication/s remain turned on continuously. They can be turned off by pressing the **Reset** button. All the buttons are active only when the keyswitch is in position **Control Enable**.



Schematic 2

3. Central Electric Keyswitch

Via the central Electric Keyswitch we have the ability of accessing the 1st and 2nd Access Level of the system.

The central electric Keyswitch has three positions:

1st position. (Access Level 1) **Normal**: the system is in normal mode operation ready to accept commands of alarm from the zones or recognize any problem that occurs in the installation.

2nd position (Access Level 2) **Control Enable**: all buttons on the silicon rubber keyboard on the face of the panel are active and we can control the panel.

3rd position: (Access Level 2) **Evacuate**: By turning the key in this position and after a small delay of 2 seconds all the zones of the system go into alarm evacuating mode resulting in the activation of all sirens of the protected area (interrupted mode). Bypassed zones and even number zones of the zone pairs chosen as Cross zoning (par. 6.4 & 6.5) for extinguishing are omitted, in order to avoid useless triggering of the extinguishing systems. The system returns to standby mode by turning the key to **Control Enable** position and pressing the reset button.

Removing the key from the keyswitch is allowed only in **Normal** position.

4. Controls Via Keyboard

4.1 "System Silence" key

In order to stop the sounding of the Buzzer in any case (alarm or fault) and the sirens in case of alarm, the operator user simply has to press the key "Silence". The "Silence" key, as all the keys of the keyboard, is active only when the key of the Central Electric Keyswitch is in position **Control Enable**.

4.2 "System Test" key

By pressing of the "System Test" key all the luminous indications in the keyboard turn on, confirming that none of the LEDs is burned. At the same moment and for the time that the "System Test" key is pressed the Buzzer sounds. The "System Test" key, as all the keys of keyboard, is active only when the key of the Central Electric Keyswitch is in position **Control Enable**.

4.3 "System Reset" key

The key "System Reset" is used for resetting the zones of the system in Stand By mode after an alarm. The "System Reset" key, as all the keys of keyboard, is active only when the key of the Central Electric Keyswitch is in position **Control Enable**.

4.4 "Zones By Pass" keys

The "Zones By Pass" keys are used to isolate a zone in the case that works take place in the building that can cause false alarm or when the connected appliances present some problem or give false alarms. With the keyswitch in position **Control Enable**, we press the corresponding "Zones By Pass" key which turns on, indicating that the area has been isolated. Resetting in normal mode occurs when pressing the key once again. If one of the keys "Zones By Pass" is turned on (yellow colour) the corresponding zone is isolated and it does not function. In this case, the "Fault" indication is constantly ON and the buzzer sounds every 30 seconds to remind the user of the existing problem.

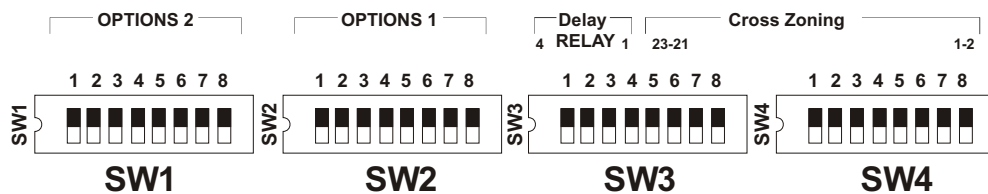
5. Internal indications

In each fuse holder on the main board and / or the power supply board a red LED indication for burned fuse exists. For example, if any of the internal fuses of the system is burned, the indication Power on the keyboard of the panel will either turn off or start to blink; that means that the engineer should check internally the panel. Opening the metal casing he immediately locates the burned fuse under which the red LED is turned on. The LED turns off with the replacement of the fuse.

6. Internal Settings

Settings that can be done from the inside of the panel in access level 3, only apply to basic programming of the panel. This procedure must be performed only by the **installation engineer** and with great care.

On the mainboard of the panel four (4) dip switches' modules SW1 SW4 exist. Every module consists of 8 microswitches from no.1 to no.8 as shown on schematic no.3. (dip switches).



Schematic 3

The different functions of the microswitches are shown in the table below.

**NOTE : The ON position of the microswitches equals to Enable status.
The OFF position of the microswitches equals to Disable status**
(with bold, the default setting is indicated)

6.1 Microswitches module SW1 (option 2).

- 1. Output 1 and 2, fire alarm triggered *
 - 2. Output 3 and 4, fire extinguishing triggered **
 - 3. Real Time clock setting
 - 4. Future Use
- } Additional control outputs. Use of these outputs can only be achieved by adding a MES-4 relay expansion board.

- 5.
- 6. Selection of maximum number of zones }
- 7.
- 8. Enable **Disable** of weekly reminder for system test ***

ZONES	4	8	12	16	20	24
DIP SW						
5	ON	OFF	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF	OFF	ON
7	OFF	OFF	OFF	ON	ON	ON

* Outputs 1 & 2 refer to Relays 1 & 2 of relay's expansion board MES-4. They are activated instantly with every fire alarm event. They are used for turning off of ventilation, air conditioning, elevator and closing of fireproof doors.

** Outputs 3 & 4 refer to Relays 3 & 4 of relay's expansion board MES-4. They are activated instantly in the case of building Evacuation or fire extinguishing function Cross Zoning. They are used for turning off of ventilation, air conditioning, elevator and closing of fireproof doors.

*** By turning this microswitch on, the panel once a week (starting from the time of enabling this feature) reminds the owner of the system to perform a preventive test of the good functionality of the system. This reminder consists of 10 x 1 sec sound pulses with 1sec intervals (total time is 20 sec). This pattern is repeated every 4 hours during the specific day. The reminder stops by pressing the **Test** button on the keypad.

6.2 Microswitches module SW2 (option 1)

- 1. } Setting of Evacuation time, Extinguishing delay
- 2. } time or Intellizone delay time.
- 3. Enable Disable Intellizone feature*
- 4. Connect disconnect main Relay board
- 5. Connect disconnect first expansion Relay board
- 6. Connect disconnect second expansion Relay board
- 7. Walk Test function Enable-Disable**
- 8. Automatic evacuation function from a zone output order Enable-Disable***

DELAY TIME	30sec	60sec	90sec	120sec
DIP SW				
1	OFF	ON	OFF	ON
2	OFF	OFF	ON	ON

* Intellizone feature gives the Matrix the ability to eliminate the cases of false alarms. The whole feature is based in the simple principle of confirming an alarm by a second alarm signal coming from the same or a neighbouring zone in a predefined time after the original signal. E.g. if **one** or **two** detectors from the 2nd zone give an alarm, the Matrix ignores that alarm signal and instantly resets that zone without sounding any siren. If in a short period of time, chosen by the installation engineer, via dip switches 1 & 2 of SW2 time from 30, 60, 90 or 120 sec- smoke (or other cause of alarm) still exists in these two detectors the system is instantly switched to alarm mode. If in the mean time, and in the preselected period of time, a second alarm signal comes from a detector of the 1st or 3rd zone, then the Matrix will go into Alarm mode instantly. In case that originally an alarm signal is given from more than two different detectors in the same zone (indicative that a reason for fire alarm is surely present) the Matrix switches immediately to alarm mode without waiting for the Intellizone time delay to pass. Finally, if the operator-user of the system realizes that a cause of a fire alarm exists in the premises, he can switch the Matrix in alarm mode by pressing a manual call point in the premises, bypassing in that way the Intellizone feature. The manual call point must have an equivalent resistance of 180Ω. **Zones that are defined-programmed for Cross Zoning operation cannot support the Intellizone feature.**

** The Walk Test function allows the installing engineer to perform a final overall test of the system without the presence of another person. Every time he test triggers a detector the sounder sounds for 2 sec and the detector and the panel zone automated are reset. During the Walk Test procedure the **Bypass** indications in the keypad are on, reminding in that way the installer that the panel is in the Walk Test state.

*** When the **automatic evacuation function** from a zone output order has been chosen, sounders sound with an algorithm pattern and selectable time delays, starting with the zone siren that has given the alarm signal. This happens in order to avoid confusion and panic in the staircase when the site is being evacuated. For example, if in a 7 floor building an alarm occurs in the 3rd floor the sounder of the 3rd floor will sound first. Then, and after the selected delay time, the 4th floor sounder will sound. Then the 2nd floor, the 5th floor, the 1st floor, the 6th floor and finally the 7th floor sounder will sound in turns. The main sounder in the fire security officer will sound from the beginning of the alarm. The delay time can be set from microswitches 1 and 2 of SW2, according to the above table. In order for the above to happen, the system must be equipped with relay expansion board with number of relays equal to the number of zones. E.g. if we have an 8 zone panel (mod. *Matrix 2008*) then a **MER-8** relay expansion board must be used. In the above mentioned case even numbered zones from the Cross Zoning programmed pairs of zones, are **NOT** activated automatically, in order to avoid useless starting of the fire extinguishing procedure.

6.3 Microswitches module SW3.

1. }
2. }
3. }
4. }
5. Cross Zoning zones 23-24
6. Cross Zoning zones 21-22
7. Cross Zoning zones 19-20
8. Cross Zoning zones 17-18



MSW1	MSW2	MSW3	MSW4	DELAY TIME
OFF	OFF	OFF	OFF	0
ON	OFF	OFF	OFF	½ min
OFF	ON	OFF	OFF	1 min
ON	ON	OFF	OFF	1 ½ min
OFF	OFF	ON	OFF	2 min
ON	OFF	ON	OFF	2 ½ min
OFF	ON	ON	OFF	3 min
ON	ON	ON	OFF	3 ½ min
OFF	OFF	OFF	ON	4 min
ON	OFF	OFF	ON	4 ½ min
OFF	ON	OFF	ON	5 min
ON	ON	OFF	ON	6 min
OFF	OFF	ON	ON	7 min

6.4 Microswitches module SW4.

1. Cross Zoning zones 15-16
2. Cross Zoning zones 13-14
3. Cross Zoning zones 11-12
4. Cross Zoning zones 9-10
5. Cross Zoning zones 78
6. Cross Zoning zones 5-6
7. Cross Zoning zones 3-4
8. Cross Zoning zones 12

Delay time for activating the local sirens is set via microswitches 1,2,3 and 4 of module SW3 from 30 sec up to 5 mins with 30 sec steps and from 5 mins up to 7 mins with 1 min steps. The selection mode of delay time appears in the above table.

CAUTION : In order for any change of settings via the micro dip switches to be effective the Reset button of the main board **MUST** be pressed(schematic 6).

Cross Zoning function is used when the installation consists of extinguishing zones. In that case, the use of a Relay expansion board with as many relays as the number of zones is necessary , e.g. for the 8 zone panel *Matrix 2008*, an 8 relay expansion board **MER-8** must be used. To each zone we connect a relay, which in normal conditions would be activated every time the zone gave alarm signal. In that way, in every pair of zones two Relays correspond.

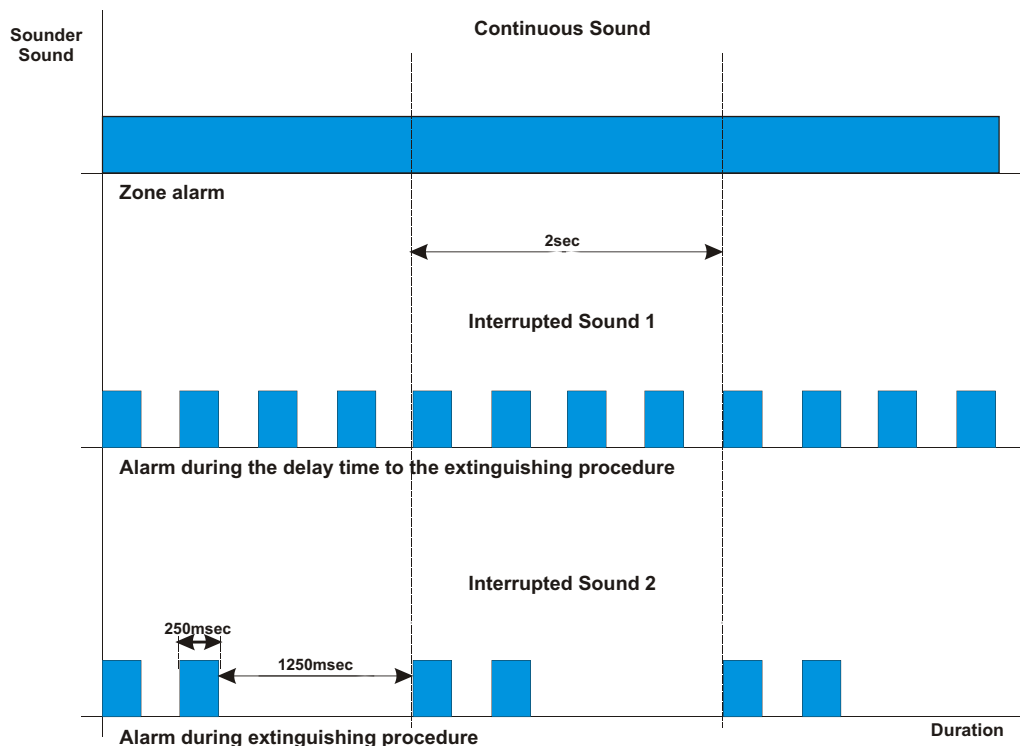
When Cross Zoning operation is enabled, if one zone from any pair of zones gives an alarm signal, (first or second) the first Relay on which the sounder is connected will **always** be triggered first. The sounder will sound in a continuous mode (Continuous Sound) indication of the alarm. If the second zone of the Cross Zoning pair of zones gives an alarm, the sounder will change its sound to an interrupting mode (Interrupted Sound 1), indication that announcement for the beginning of the extinguishing procedure in the certain area has sounded. The extinguishing command is given from the panel after the selected delay time. Delay time, which can vary from 30sec up to 90 sec, is used to give the fire alarm officer the option of canceling the extinguishing procedure. After the time delay has passed, the panel gives the extinguishing command and the sounder again changes its sound to Interrupting Sound 2, indication that the fire extinguishing procedure has started. In schematic no. 4, the three different modes the sounder sounds appear.

The operator-user of the system is able to start-cancel the extinguishing procedure at any time, in any area , via the dedicated call points installed outside of the extinguishing protected area. These call points are connected: to **odd** numbered zones of the Cross Zoning pairs, **Cancellation** call point of fire extinguishing procedure and in **even** numbered zones of the Cross Zoning pairs, **Start** call points of fire extinguishing procedure. The equivalent resistance of both call points is **180Ω**.

In paragraph 2.3 we described the indications of the panel when the **Cancellation** call point has been left pressed.

In the case that during that time, we realise that there is cause to start the extinguishing procedure, we can do so by simply pressing the **Start** call point ; in this way we override the already active **Cancellation** call point and the extinguishing procedure initiates.

In the same case, **Cancellation** call point pressed, if a detection signal comes from one of the detectors connected to any of the zones forming the Cross Zoning pair, the panel ignores the fire extinguishing command and gives **ONLY Zone Alarm** indication ALWAYS to the even numbered zone of the Cross Zoning pair.



Schematic 4

6.5 General panel Reset switch

The Reset switch can only be used by the installing engineer. It must be used only to restart the microcontroller program or to make any changes made via the micro dip switches effective.

7. Real Time clock and event logging

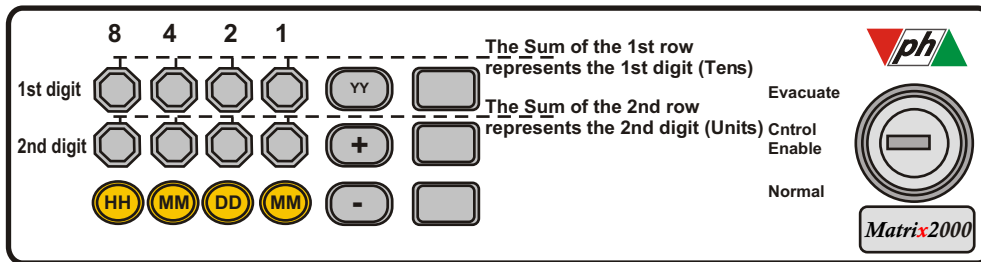
Matrix2000 panels, further to the many and unique features that we have already described in the previous paragraphs, also have the ability to record events in real time, in the panel's internal memory. These events can then be uploaded to a PC connected to a Matrix2000 panel by using a special module MCL-232 (this module equips the panel with one RS-232 and one RS-485 output). The PC that is going to be connected to the panel must have installed the specially developed ViewMatrix software (supplied without charge from our company). The *ViewMatrix* software is described in detail in paragraph 11, page 14.

In order to accomplish the above mentioned feature, the panels are equipped with a Real Time Clock.

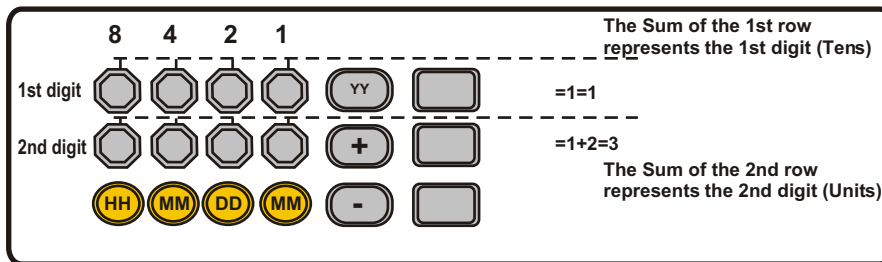
The silicon rubber keyboard and more specifically the buttons and indications, specially marked for this feature, shown in the schematic below, help us both understand the Real Time Clock setting procedure as well as use it (as installation engineers) as a prototype for this setting. If we look carefully at the schematic, we can see that Zones Alarm indicating LEDs act for showing us in hexadecimal code of the first digit (tens) of the field being set each time with value: 1 for the 4th zone Alarm LED, 2 for the 3rd zone Alarm LED, 4 for the 2nd zone Alarm LED and finally 8 for the 1st zone Alarm LED.

In the same way, the Zones Fault indicating LEDs act, in hexadecimal code, as values for the second digit (units) of the setting field with value: 1 for the 4th zone Fault LED, 2 for the 3rd zone Fault LED, 4 for the 2nd zone Fault LED and finally 8 for the 1st zone Fault LED.

Value 0 is in both cases equal to all four LEDs ON.



An example is described below :

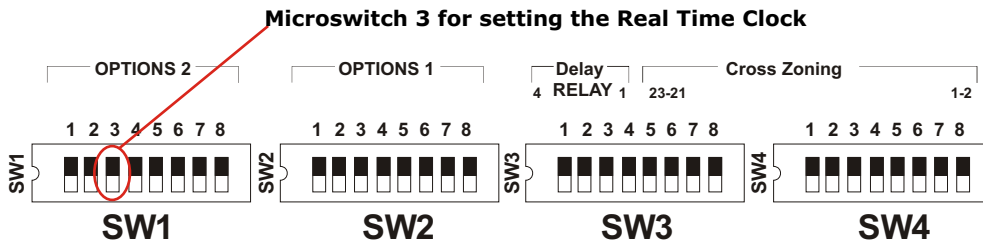


In this case the number set is 13.

Furthermore Bypass, Silence, Test and Reset buttons have a new functionality. The Bypass button of the 1st zone is used to set the Hours, the Bypass button of the 2nd zone is used to set the Minutes, the Bypass button of the 3rd zone is used to set the Days of the Real Time Clock, the Bypass button of the 4th zone is used to set the Months and the Silence button is used to set the Years of the Real Time Clock. Using the Test and Reset buttons we can increase or decrease the values of each field by one each time we press them.

Setting this clock can be done in the following steps :

The installation engineer, after turning the key of the electric keyswitch into Control Enable position, sets the 3rd microswitch of module SW1 to ON position and presses the RESET button of the mainboard so that this change is accepted effectively by the panel.



By pressing the RESET button, the panel goes instantly to setting mode for the Real Time Clock.

1st zone's Bypass button is ON, indicating that HOURS are being set. We can see that the Zone Alarm LEDs are blinking and that Zone Fault LEDs are constantly ON. The LED row that blinks is the one that can be set, using the (+), Test and (-), Reset buttons.

In this case we can set the first digit (tens) of the HOURS. If we want to set the second digit (units) of HOURS, we must press the 1st zone Bypass button again ; then the Zone Alarm LEDs remain constantly ON and the Zone Fault LEDs start blinking.

7.1 Setting the HOURS

- We press 1st zone's Bypass button so that the Zone Alarm LEDs start blinking (HOURS tens)
- Using the (+) and (-) buttons we set the desired value for the HOURS tens
- We press 1st zone's Bypass button again so that the Fault Alarm LEDs start blinking (HOURS units) (each time we press the Bypass button setting changes from tens to units and vice versa)
- Using the (+) and (-) buttons we set the desired value for the HOURS units

7.2 Setting the MINUTES

- We press 2nd zone's Bypass button so that the Zone Alarm LEDs start blinking (MINUTES tens)
- We repeat steps b, c and d of par. 7.1

7.3 Setting the DAYS

- We press 3rd zone's Bypass button so that the Zone Alarm LEDs start blinking (DAYS tens)
- We repeat steps b, c and d of par. 7.1

7.4 Setting the MONTHS

- We press 4th zone's Bypass button so that the Zone Alarm LEDs start blinking (MONTHS tens)
- We repeat steps b, c and d of par. 7.1

7.5 Setting the YEARS

- We press the SILENCE button so that the Zone Alarm LEDs start blinking (YEARS tens)
- We repeat steps b, c and d of par. 7.1

If we upload the event log, it will look like this :

Zone No.	Description	Type of event	Time of event	Date of event
Zone 1	(Garage)	Event: Isolated	Time: 13:52	Date: 22/07/03
Zone 1	(Garage)	Event: Restored	Time: 13:56	Date: 22/07/03
System		Event: Power Failure	Time: 09:02	Date: 25/08/03
System		Event: Low Battery	Time: 22:16	Date: 27/08/03
System		Event: Main Power Restored	Time: 23:15	Date: 27/08/03
System		Event: Battery Restored	Time: 04:22	Date: 28/08/03

Notice : In an 8 zone panel, where we have an 8 zone keyboard, Real Time Clock can be set using keys for zones 5,6,7 and 8.

8. Power Supply

The power Supply for Matrix2000 panels is switching, Back Converter with stabilized output of 27.6 V, 2 A.

It is entirely protected from short circuit or batter overload, basic requirement for fire alarm panels according to European standard EN 54-4.

The Switching Power Supply is connected to the mainboard through a 4 terminal connector. Two terminals for +/- 24 V DC voltage and two terminals , PBT , for checking the battery status. The power supply accepts input voltage of 28 V AC from a transformer installed in the panel from the installing engineer.

When the mains power supply is restored the POWER LED indication on the panel starts to blink and the Buzzer sounds (indication that no batteries are connected to the panel). Then, when we connect the two 12V 7AH batteries in serial to the panel, the POWER LED indication turns on in a continuous mode and the buzzer stops sounding after a maximum period of 30 seconds, necessary for the panel to check the battery status. If we don't wish to wait for this time period of 30 secs we can press the Reset button on the keyboard, and the panel instantly "recognizes" the batteries.

ATTENTION : Connecting the panel to the power supply or the batteries must be done **AFTER** the connection of all the wiring - appliances, in order to avoid any problems.

8.1 Translucent current of *Matrix2000* panels

In the below table current consumption of series panels *Matrix2000* is listed.

PANEL MODEL	ZONES	POWER SUPPLY	CURRENT IN STANDBY MODE	CURRENT IN ALARM MODE	MAX No OF DETECTORS
<i>Matrix 2004</i>	4	27,6 V DC 2A	55mA	125mA	80
<i>Matrix 2008</i>	8	27,6 V DC 2A	70mA	140mA	160
<i>Matrix 2012</i>	12	27,6 V DC 2A	95mA	205mA	240
<i>Matrix 2016</i>	16	27,6 V DC 2A	110mA	230mA	320
<i>Matrix 2020</i>	20	27,6 V DC 2A	135mA	285mA	400
<i>Matrix 2024</i>	24	27,6 V DC 2A	150mA	320mA	480

All above consumptions do not include consumption from detectors and any additional modules

8.2 Recommended batteries

The batteries recommended for all panels of the *Matrix2000* series are 2 X 12V ,7Ah Sealed lead acid batteries. The autonomy of the panels obtained with these batteries depends on the panel type, the number and type of the connected peripheral appliances and the number and type of the connected detectors. Especially, the 4 and 8 zones small box panels accept batteries 12V, 2AH.

8.3 Panel fuses

On the *Matrix2000* series panels three different fuses are used. The first in the power supply and the other two in the mainboard. The power supply fuse is 3,5 A fast melt. The other two fuses in the mainboard are 1,5 A fast melt. All three fuses are equipped with luminous status indication (a red LED in the base of each fuse box). If a fuse is removed or destroyed, the LED turns on indicating the destroyed fuse.

9. Wiring Connections of Inputs / Outputs

9.1 Alarm output

The Alarm output provides 24V voltage in the case of an alarm to the hard wired siren through Relay contacts. It is fused with 1,5A fuse. It is also monitored for the case of open line short circuit for the connecting wire of the siren. For this reason the connection of a terminal 4K7 Ω resistor is required (schematic 6).

9.2 Fault output

Free Relay contacts through which we can activate any appliance or indicator. Maximum Relay contact current 5 A.

9.3 Fire detection zones wiring connections

The fire detection zones have 21V DC in standby mode with the positive power supply terminal common and are equalized via a terminal resistor 4 \hat{E} 7. The circuit recognizes five different resistor levels which correspond to five different states of the system.

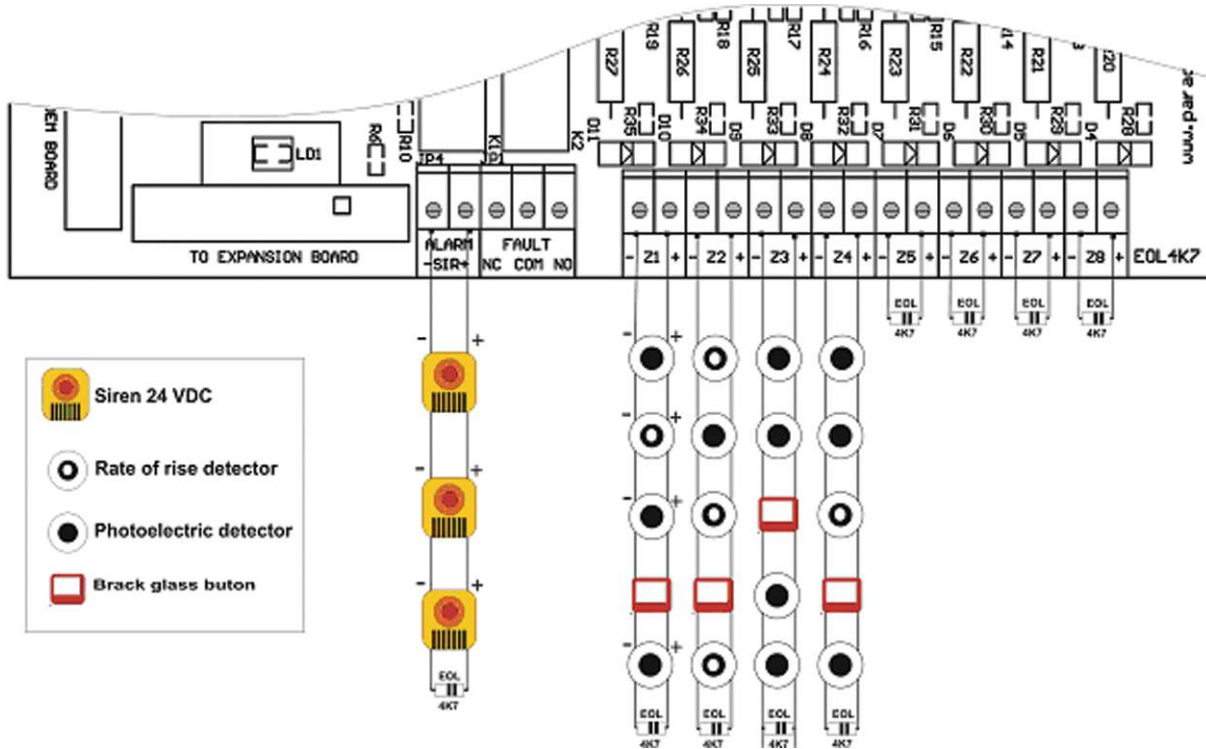
The five different states and resistor levels are :

0	up to	50 Ohms	Short-circuited Zone
51	up to	1K Ohms	Zone in alarm state
1 \hat{E}	up to	2K Ohms	Removal of detector from its base
2K	up to	9K4 Ohms	Zone in standby state
9K4	up to	∞	Open-circuited Zone

More specifically in the case of "Removal of detector from its base" the *Matrix 2000* series panels have been designed to fully comply to par.662 of standard BS 5839: part 1 , 1988. This standard requires that , in the case that manual glass break call points are connected to the same zone as the detectors, the call points will continue to operate normally after the detector/s is/are removed from its/their base. In that case the detector bases should be equipped with a Schottky diode and the line must be terminated with an **active** EOL device.

NOTICE : Each zone that is not used must be terminated with EOL resistor of 4K7.

Wiring connections of detectors and other appliances to the mainboard with EOL resistor 4K7 are analytically shown in schematic 6.



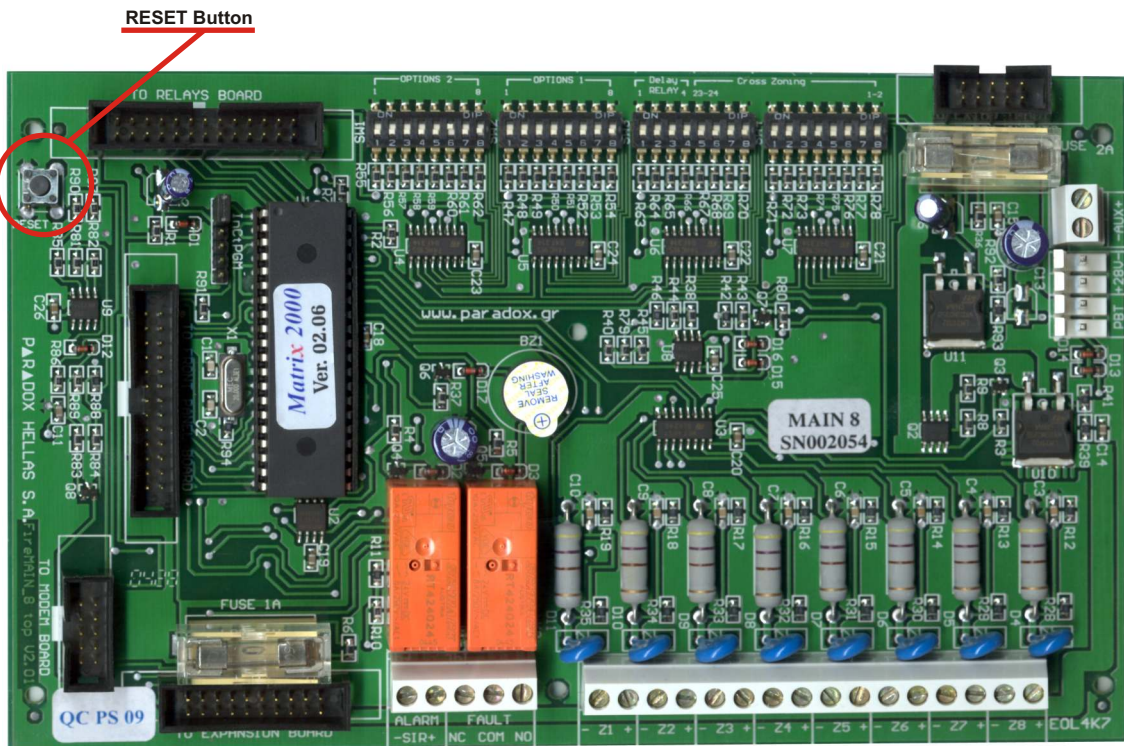
Schematic 6

9.4 Peripherals connections

On the mainboard other peripheral boards can be connected as relay board, zone expansion board, etc. The connection of these boards is accomplished via Flat Cable from the terminal connectors especially designed for this purpose. These terminal connectors are shown in the mainboard schematic no.6.

Peripheral connections' notes

- FRONT PANEL BOARD:** Terminal keyboard connector
- TO RELAYS BOARD:** Terminal relay board connector
- TO EXPANSION BOARD:** Terminal zone expansion board connector
- TO EXTRA INPUTS:** Terminal connector for connecting board of max 8 Inputs (MIN-8) for controlling building automations
- TO MODEM BOARD:** Terminal external modem connector for remote system support
- INC PGM:** Terminal programmer connector, for microprocessor's memory programming on board.



Schematic 7

10. PERIPHERALS - EXPANSIONS.

In order to fully take advantage of the functions that the two main models of fire alarm panels, 4 and 8 zones (Matrix 2004 και Matrix 2008), are providing us with, two basic models of Relays expansion boards and one zone expansion board have been designed and manufactured. By using them, in combination with the two mainboards of 4 and 8 zones, it is possible, as already described, to cover every need for a fire alarm panel of 4, 8, 12, 16, 20 or 24 zones, with or without output/zone, with or without fire extinguishing application.

10.1 Zone Expansion board MEZ - 8

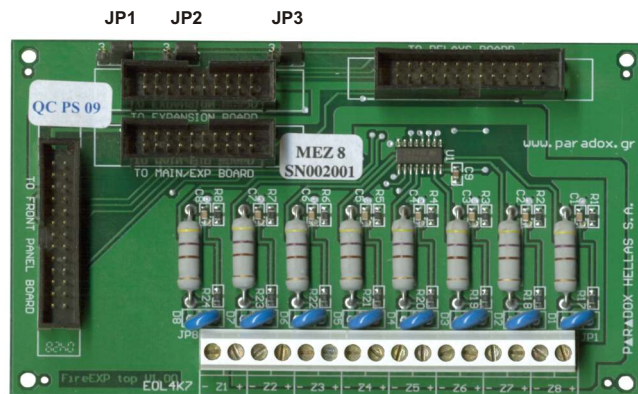
This zone expansion board adds to the two mainboards of 4 and 8 zones, 8 or 16 more zones (if two MEZ-8 boards are used). Operation and features of the added zones are exactly the same with those of the mainboard's zones.

The one thing that the installing engineer must pay close attention to when deciding to expand add more zones, is that he needs to characterize the expansion as first or second. This is accomplished via Jumpers JP1, JP2 και JP3. If the expansion is used as the first one then JP1, JP2, JP3 must be turned to position 2. If the expansion is used as the second one, JP1, JP2, JP3 must be placed to position 3. All zones are terminated with a 4K7 Ω resistor. Power consumption in standby mode 40mA and in alarm mode 85mA.

10.2 4 Relays expansion board MER 4

The 4 Relays expansion board was designed and manufactured to provide the Matrix 2004 fire alarm panel the ability of one output per zone, and furthermore the ability to use the panel as an extinguishing panel with Cross Zoning operation.

It can also be used by the fire panel itself, to control building peripherals like : air-conditioning, ventilation, elevator and fireproof doors.



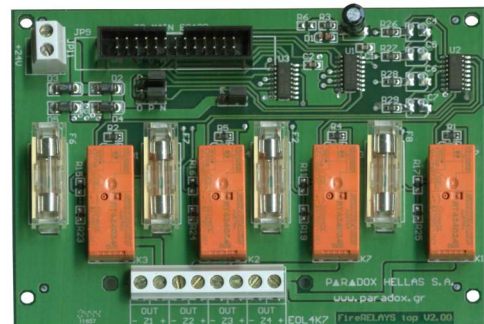
All zones are terminated with a 4K7 Ω resistor.

The onboard jumper is short-circuited in the case we connect additional voltage to the board in order to get more current from the Relays outputs. Power consumption in standby mode 10mA and in alarm mode 75mA.

10.3 8 Relays expansion board MER 8

The 8 Relays expansion board was designed and manufactured to provide the Matrix 2008 fire alarm panel the ability of one output per zone, and furthermore the ability to use the panel as an extinguishing panel with Cross Zoning operation.

It is also possible to use it for the same reasons and functions with one or more 8 zone expansion boards MEZ 8, everywhere one is used, without the necessity of the relay expansions to be equal to that of the zone expansions; e.g. it is possible for a 16 zone fire alarm panel to have only 8 outputs per zone.

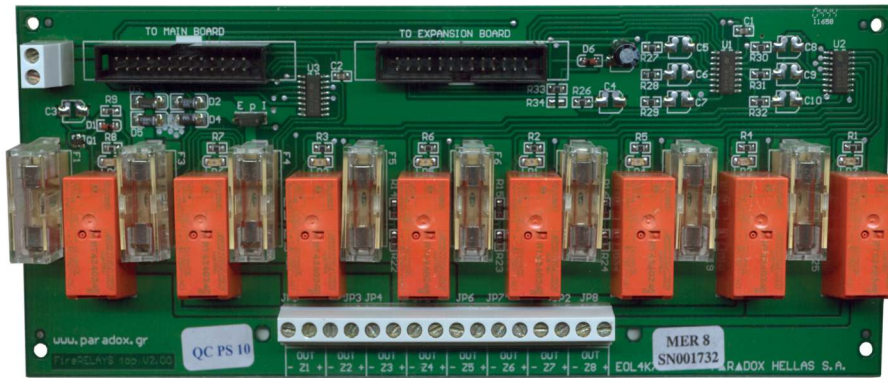


All zones are terminated with a 4K7 Ω resistor.

The onboard jumper is short-circuited in the case we connect additional voltage to the board in order to get more current from the Relays outputs. Power consumption in standby mode 20mA and in alarm mode 130mA.

10.4 Automation controlling Module MES - 4

MES 4 module consists of 4 relays that can be used to activate deactivate elevator, air-conditioning, ventilation, fireproof doors, public announcement system etc. The first two of the four relays are instantly triggered after the activation of a zone of the panel. They are usually used to deactivate the elevator and the ventilation. The other two relays are triggered 10 seconds before the activation of a fire extinguishing relay of a cross zoning pair. They are usually used to close the fireproof doors. It is obvious that enabling or disabling of these relays can be programmed with the aid of microswitches 1 and 2 of module SW1 (page 6, paragraph 6.1). Power consumption in standby mode 10mA and in alarm mode 75mA.



10.5 RS-232 & RS-485 port Module MCL 2

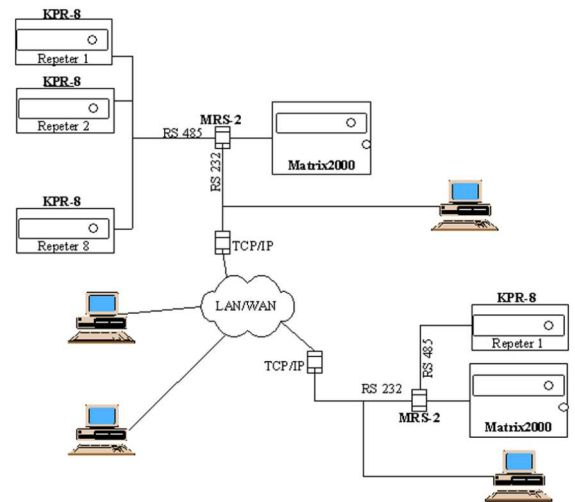
This module gives the Matrix2000 panels the ability to connect either to a local PC or to LAN/WAN through the RS232 port. In the case of LAN/WAN connection a TCP/IP module is also required.

Monitoring and control of the system from a PC can be performed with the aid of specially developed software ViewMatrix running under Windows. This software, described in detail in the following paragraph, simulates the keyboard and the settings of the panel in a user friendly graphic environment on the PC screen. All actions are performed with the use of a simple mouse.

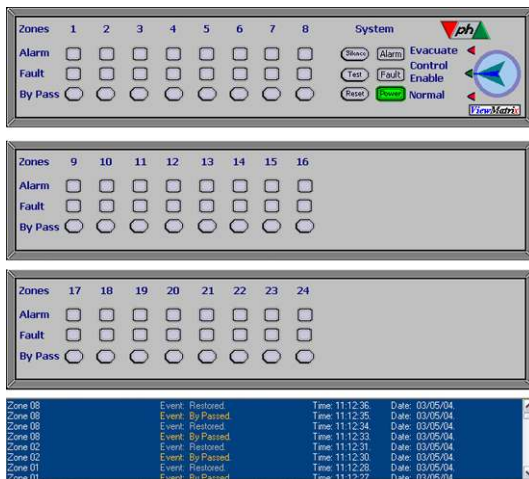
MCL 2 also provides Matrix2000 panels with the ability to accommodate through the RS-485 port up to 8 different fully functional repeater keyboards for each panel.

10.6 Repeater

On any Matrix2000 panel, up to 8 repeaters can be connected. They can fully represent the different indications and statuses of the panel, additionally to providing full control. The maximum distance that a repeater can be connected is 1200 meters.



11. ViewMatrix : Software for Online monitoring and control of Matrix2000 panels



The ViewMatrix software has been especially developed from our company's R&D department and it is probably the only one in the world market today, that gives the end user the option of direct and full information of the status of his **conventional** fire alarm system. The end user can simply perform any action with a simple click of a mouse button on the mimic diagram on the screen of his PC. The whole software is simple as a concept, though clever, user friendly and totally reliable.

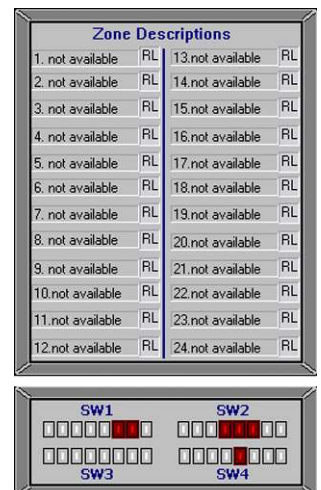
As you can see in the next page's full screenshot, the ViewMatrix's main page is divided into 5 different fields.

a. In the first field we have the installed panel's keyboard ; it can be any of 4 up to 24 zones panel. All **points** of the field are active. The LEDs' icons are flashing exactly in the same way and at the same time as the panel's LEDs are, according to the status of the system. If, e.g. we have an alarm from the 4th zone of the panel the LED for Zone Alarm of the keyboard of the panel will flash. At the same time, the corresponding icon on the ViewMatrix main page will start flashing in the same way. Bypass, Silence, Test and Reset graphical buttons have exactly the same functionality as to those on the panel's keyboard. That means, that if the user wants to bypass a zone all he has to do is "turn" the keyswitch to position Control Enable by putting his mouse over the corresponding point. The ViewMatrix will ask the user for a password to avoid accidental actions and by fully complying to requirements of the European standards. The default value for the password is 1234 (**PARADOX HELLAS S.A. strongly recommends changing the default password as soon as possible to avoid unintended use of this software's features**). If the correct password is provided, the keyswitch changes status and grants the authorized user access to level 2. Then, the user can simply activate any button he wants to on the graphical keyboard just as he would on the actual silicon rubber keyboard.

b. The second field is where the installer can input all details of the installation, such as the name of the owner and his company, address, contact details for the security manager etc. All fields can be updated with new text or descriptions.

c. The third field gives the installer the option of describing each zone in the system independently. Each of these descriptions is an active field since :

-Every time that a zone of the panel is activated, the corresponding position in this field will flash



-When the description of the zone is flashing the user can ,by double-clicking on it, have another window with the floor plan of the specific zone with all detectors, manual call points and sirens connected to this zone appearing in his screen

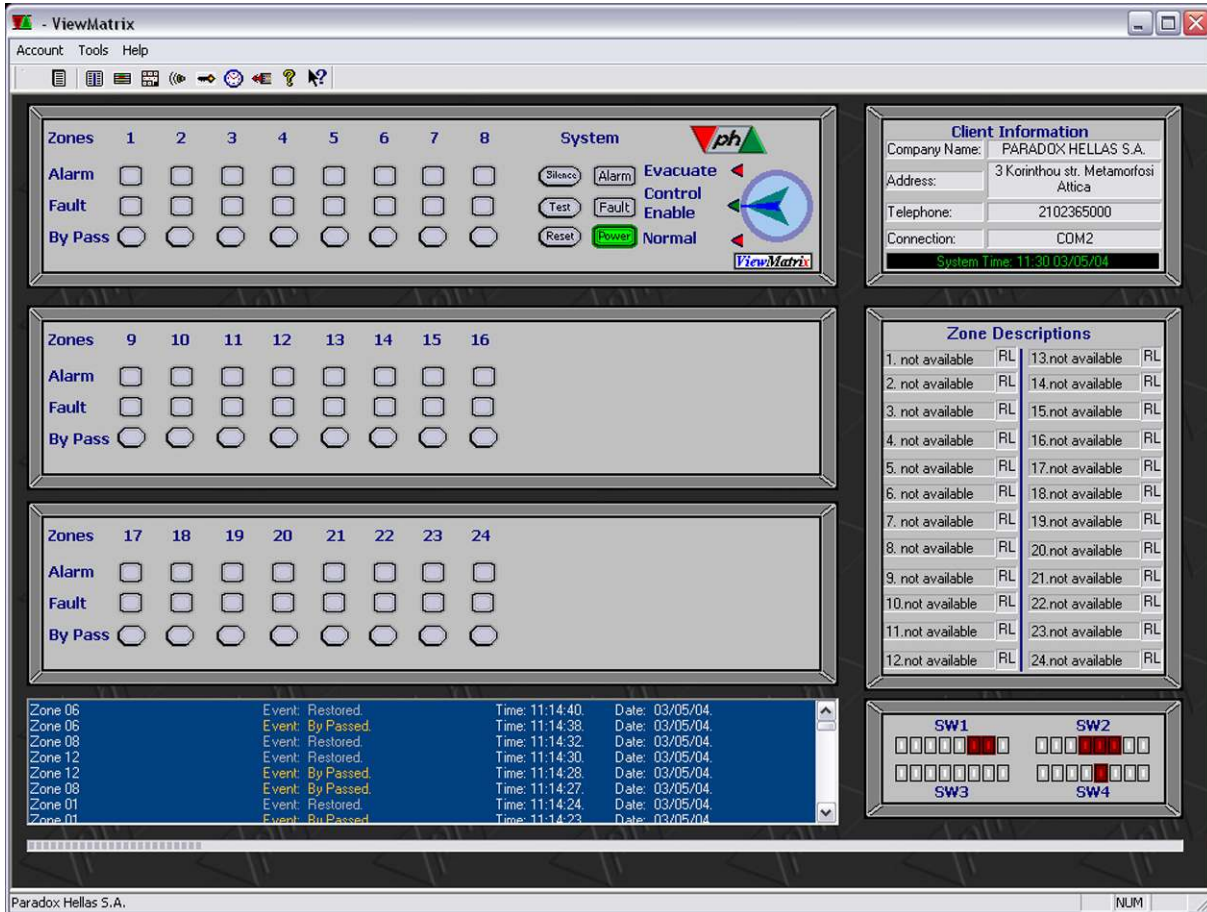
The ViewMatrix gives us the ability to import up to 24 different floor plans from any drawing software (SmartDraw, AutoCAD, Corel etc.)

d. The fourth field is where the overall setup of the system is graphically represented. That means which of the dipswitches are enabled and which are not, thus giving the user the power to know with a simple glance which features of the panel are enabled and which not. Any change in the setup of the system through the microswitches is represented in this field almost instantly. This field is also active ; the user by double-clicking on it, will bring a new window with all the setup analytically described.



NOTICE : The user can **NOT** change the setup of the system through the ViewMatrix, as if by changing the dipswitches inside the panel.

e. The fifth field is located just under the first one (keyboard) and is where all events are logged in time sequence fully described.



All these events are recorded in the HDD of the monitoring PC. If, for any reason, there's no PC connected to the panel, then the Matrix2000 stores in its internal memory up to 1024 events. These events can be retrieved by uploading them to a PC with the ViewMatrix software. This PC will check for any NEW events that are not recorded in its HDD; if he finds any he uploads them and stores them into the HDD.

The ViewMatrix also gives the user the option of updating the Real Time Clock at any time by comparing the panels' with the PC's time and proceeding with any if necessary correction after approval of the user.

12.Recommended Cables

Recommended cables for installation with length of zones up to 400 meters are 2x1.5mm. For installations complying with EN standards, cables with resilience to flame / temperatures up to 830oC for 15 minutes (EN50200 standard , PH30 category , at least).

***PARADOX HELLAS S.A. recommends that a test from the user should be performed periodically, in order to detect any malfunctions of the system. This test should be made by triggering the detectors.**

For any additional information , clarification or suggestion that concerns this manual or the Matrix 2000 series fire alarm panels , please contact our sales dept. at tel. No. +30 2102855000 or email us at sales@paradox.gr.



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