

Technical Specifications

for Digital PBXes

**Slican MAC-6400
Slican MAC-ZERO**
PBX Structure

Revision 1.05



PRZEDSIĘBIORSTWO
FAIR PLAY 2006

SLICAN Sp. z o. o.

www.slican.com

e-mail: office@slican.pl

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“The manufacturer reserves the right to introduce changes to the product without previous notice.”

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1 Introduction

Digital PBX Slican MAC-6400 have been designed with the purpose of providing solutions for communication systems of large companies, where the maximum number of subscribers does not exceed 640. Basing ourselves on the rich experience gained designing and manufacturing previous PBXes, we have broadened our offer with a new system which can be delivered in the following base designs:

- **Slican MAC-6400.EU-1SH,32AB.y** – 32 analogue subscriber ports (two cards) installed on one shelf with the possibility to extend to 10 cards on one shelf and to 4 shelves with 10 slots each,
- **Slican MAC-6400.EU-0SH,32AB.y** – known also as MAC-ZERO: 32 analogue subscriber ports (two cards) installed on one shelf with the possibility to extend to 10 cards,
- **Slican MAC-6400.EU-0SH,32VOIP** - with MAC.M-32VOIP card installed by default on one shelf, in this model there are no physical subscriber ports and the number of possible virtual subscribers depends on purchased license code but cannot exceed 1000.

where:

y = RJ or KB.

The PBXs can be delivered in free-standing 19" manufacturer housings (with the height of the inner space intended for installing PBX shelves equal to 12 or 22U - parameter x in the base design marking) or mounted in customer's 19" cubicles (x = E in the design marking). Additionally, while making orders for basic solutions, please specify the method of connecting the 32 analogue inner lines that are offered in each MAC base PBX (parameter y). The RJ marking means that individual subscribers will be connected by means of RJ-45 plugs, whereas KB indicates connecting a group of subscribers by means of the RJ-21 plug.

2 Basic parameters and characteristics of the Slican MAC-6400 PBX

2.1 Functional features

- modularity of PBXs,
- remote management of the PBX through a modem, an LAN network or the Internet, by means of PC,
- LCR – intelligent call routing, cost reduction, reliability, networking,
- monitoring in real time, from inside ConfigMAN application,
- dedicated digital system sets – CTS-202 family and CTS-102 family and CTS-202.IP
- feasibility to configure system sets from inside PBX management application,
- managing costs of calls and tariffication using inner mechanisms of the PBX and with the use of the supplementary BillingMAN application,
- 99 voice announcements (DISA/Infolinie or a DND message),
- services for subscriber confirmed by voice messages,
- cooperation with computer applications

2.2 Technical data

- analogue ports of inner phones with impulse dialling and DTMF,
- complete functionality for telephone sets with DTMF,
- CLIP signalling, both inner and outgoing/incoming calls signalling,
- configurable ISDN ports on the BRA 2B+D contact (int/outer),
- power supply from the ~230V, 50Hz alternating current network,
- power consumption max. 750W (for complete PBX equipment – 4 shelves),
- protection of cards against voltage surges from the telecommunication network,
-
- ports of urban translations as analogue with the ASS signalling,
- Connections:
 - ISDN 2B+D – DSS1 protocol (EURO – ISDN),
 - ISDN 30B+D – DSS1 protocol (EURO – ISDN),
 - Analogue urban lines as conformable with the ASS signalling,
 - GSM – Dual Band: GSM 900, GSM 1800,
 - VoIP – through LAN, WAN interfaces – in conformity with SIP, IAX protocols,
 - U_{po} – contacts of CTS-202, CTS-202.Plus digital system sets,
- Interfaces:
 - LAN, WAN – Ethernet 10/100 Mbps,
 - RS-232,
 - USB 2.0,
- servicing ISDN digital telephones with DSS1,
- ambient temperature at the PBX operation site: +10°C to +25°C (recommended: +20°C),
- air humidity: 40÷70%,

2.3 Line lengths

<i>Type of line</i>	<i>Range</i>						
E1	1500m with AWG-22 ¹						
S/T (point-point)	1000m for cable 0.6mm ² , 120nF						
S/T (point – multipoint)	750m for cable 0,6mm ² , 120nF						
ASS	According to the WTO – Operator’s (TP S.A.) Technical Requirements - maximum loop resistance for 1800 Ω direct current with a terminal (only for cable approx. 1200 Ω)						
LAN/WAN	100m – with UTP category 5 strand (applies to the cabling length between devices; a VoIP subscriber can be localised anywhere)						
U_{po} (contact for CTS)	Cable length	CTS202	CTS202 + console	CTS202 + 2x console	CTS202 + supply unit	CTS202 + console + supply unit	CTS202 + 3 do 5 consoles + supply unit
	200m	√	√	√	√	√	√
	400m	√	⊗	X	√	√	√
	600m	⊗	X	X	√	√	√
	800m	⊗	X	X	√	√	√
	1000m	⊗	X	X	√	√	√
	√ - proper performance ⊗ - proper performance to the exclusion of the loud speaking mode X – possible improper performance (in the table, maximum ranges for cable 0.6mm ² are specified; the range may change with a change of the cable and possible noise, for the AWG-26 ¹ , the maximum range of operation for a telephone with a power supply unit amounts up to 1300m)						
AB (subscriber, analogue)	about 4000m for wire 0,5mm						

¹ AWG – American Wire Gauge

AWG-22 – twisted pair, wire diameter 0,64516mm, 55Ω/km

AWG-26 – twisted pair, wire diameter 0,40368mm, 143Ω/km

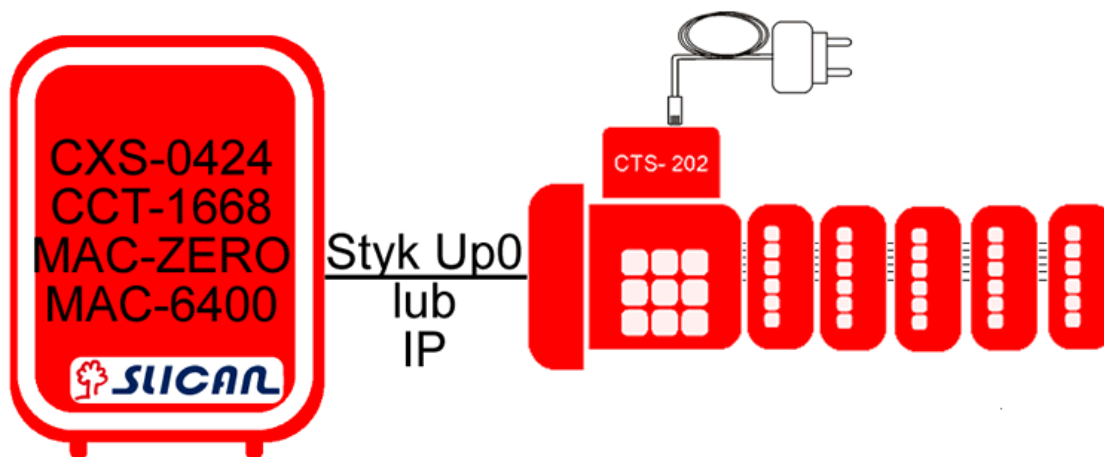
2.4 Connecting additional consoles to CTS-202 system sets

To PBX system phones Slican CTS-202 or Slican CTS-202.IP can be connected. Five Slican CTS-232 consoles can be connected to four of those sets. This allows extending the number of speed access keys in such a set to 162. The other system telephone sets can be equipped with a maximum of two Slican CTS-232 consoles, which allows to extend the number of speed access keys to 72. For system phones CTS-102 or CTS-102.IP it is not possible to extend number of speed access keys using console CTS-232.

When a larger number of consoles (three to five) are connected to the system set, the optional mains supply unit must always be used. This will ensure reliable system operation. The consoles can be supplied through a CTS-202 system set with an optional mains supply unit or directly, from the optional mains supply unit.

Below You can find some examples of connecting system phones to PBX.

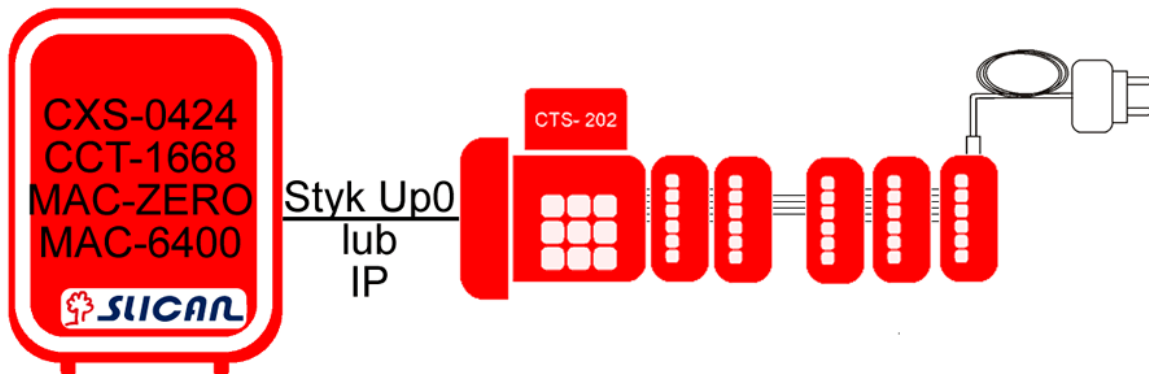
2.4.1 Example 1 – consoles powered from main supply connected to CTS-202.



- System phone connected to PBX with standard phone cable.
- System phones and consoles powered by optional power supply.
- Phone and next consoles are connected using standard connecting cable delivered with console (6-wires).

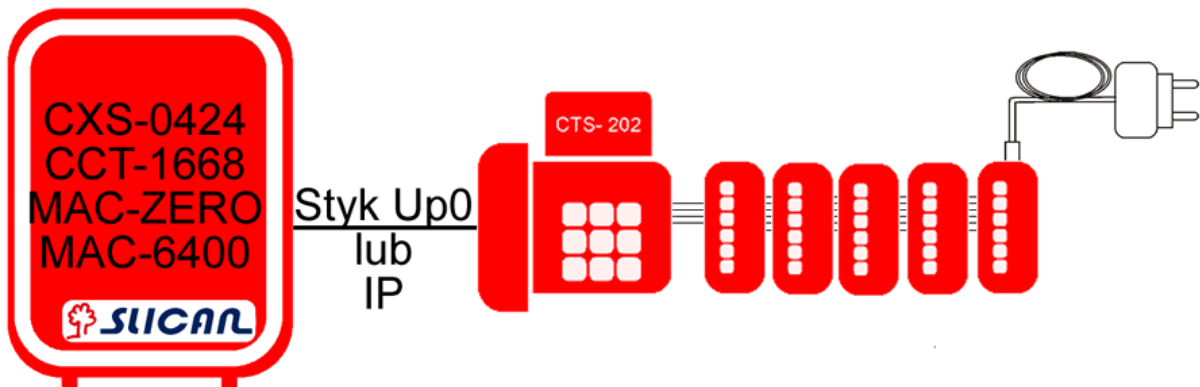
Attention: If power supply 230V~ lost, it is not possible to use consoles. Using phone can be not comfortable due to significant power consumption.

2.4.2 Example 2 – to consoles powered from CTS-202, remain from power supply connected to CTS-232



- CTS-202 connected with two first consoles using 6-wires cable, (assures power supply of phone and two consoles from PBX).
- Three consoles are connected using 4-wires cable (without power supply).
- Connections between these three consoles is made using standard 6-wires cable.
- These three consoles are powered from additional power supply device, which is connected to output socket (OUT).

2.4.3 Example 3 - All consoles powered from power supply device



- System phone is connected to consoles using 4-wire cable, phone is powered from PBX, consoles are not powered from phone.
- Connection between consoles is made using 6-wire cable.
- Consoles are powered from additional power supply device connected to console output terminal (OUT).

Attention: While lack of power supply, system phone can be still used. In every situation, after restoring power supply additional consoles automatically establish connection with phone.

2.5 Accordance of system phone and console power supply

No	System phone	Power supply 36V/160mA	Power supply 12V/1,25A RJ11
1	CTS-102.HT	+	-
2	CTS-102.CL	+	-
3	CTS-102.IP	+	+
4	CTS-202.CL	+	-
5	CTS-202.BT	+	-
6	CTS-202.IP	+	-
7	Console >2	+	+

3 Architecture of the Slican MAC-6400 PBX

3.1 General information

Slican MAC-6400 PBXes are operated in a hierarchical system. The system may be composed of maximum four elements called shelves, with one of them working as a superior device (Master) in relation to the other shelves (Slave). Such a situation is a consequence of equipping the shelf in one of two types of controllers:

- PBX master controller – MPU (**M**aster **P**rocessor **U**nit) – there may be only one in the system (on one of the shelves),
- PBX slave controller – SPU (**S**lave **P**rocessor **U**nit) – there may be up to three in the system (one on a shelf).

Every shelf has 10 slots which may be filled with PBX equipment cards. When the system is operated in a configuration with one shelf, the shelf must be equipped with the MPU master controller.

The inter shelf communication is carried out through the Ethernet (with switches incorporated in shelf controllers). Each slave shelf is connected logically to the master shelf through 128 PCM channels. Each of the slave shelves has its own 400Hz, DTMF and FSK modules. The modules are managed in the central logic, on the master shelf (equipped with the MPU). Commutation takes place locally in a shelf, whereas the commutation management is effected by the master shelf. If anyone of the conference components is situated on a slave shelf, such a component is commuted to the master shelf.

Equipment cards may be freely fixed in every shelf. Only one VoIP card may be installed in the system.

3.1.1 Terminals numbering

The number of a physical terminal of the PBX has the following format:

X-Y-Z,

where:

X – PBX shelf no.: 1..4,

Y – slot no.: 1..10,

Z – port no. on the equipment chart: 1..16.

Shelf no.	Slot no.	1	2	3	4	5	6	7	8	9	10
1 (master shelf)		1-1-Z	1-2-Z	1-3-Z	1-4-Z	1-5-Z	1-6-Z	1-7-Z	1-8-Z	1-9-Z	1-10-Z
2 (1. slave shelf)		2-1-Z	2-2-Z	2-3-Z	2-4-Z	2-5-Z	2-6-Z	2-7-Z	2-8-Z	2-9-Z	2-10-Z
3 (2. slave shelf)		3-1-Z	3-2-Z	3-3-Z	3-4-Z	3-5-Z	3-6-Z	3-7-Z	3-8-Z	3-9-Z	3-10-Z
4 (3. slave shelf)		4-1-Z	4-2-Z	4-3-Z	4-4-Z	4-5-Z	4-6-Z	4-7-Z	4-8-Z	4-9-Z	4-10-Z

Table 3.1: Numbering of terminals in MAC-6400 PBXs

4 Components of the Slican MAC-6400 PBX

4.1 MAC-ZERO model

It is special, compact model of PBX. It has height equal to – **4U** and is designed to mounting in 19 inch racks.



Fig. 4.1.: MAC-ZERO – front view

There are some differences between this version and standard version of MAC-6400:

1. There is no possibility of adding next shelves.
2. Power supply device is installed on the back side of casing – it is mounted as standard by manufacturer.
3. Maximal capacity is equal to 10 slots (160 ports) – without extending possibility.

MAC-ZERO PBX can be installed in standard 19 inch rack of any manufacturer (minimal depth is equal to 40cm) or in one of specialized Slican housing.

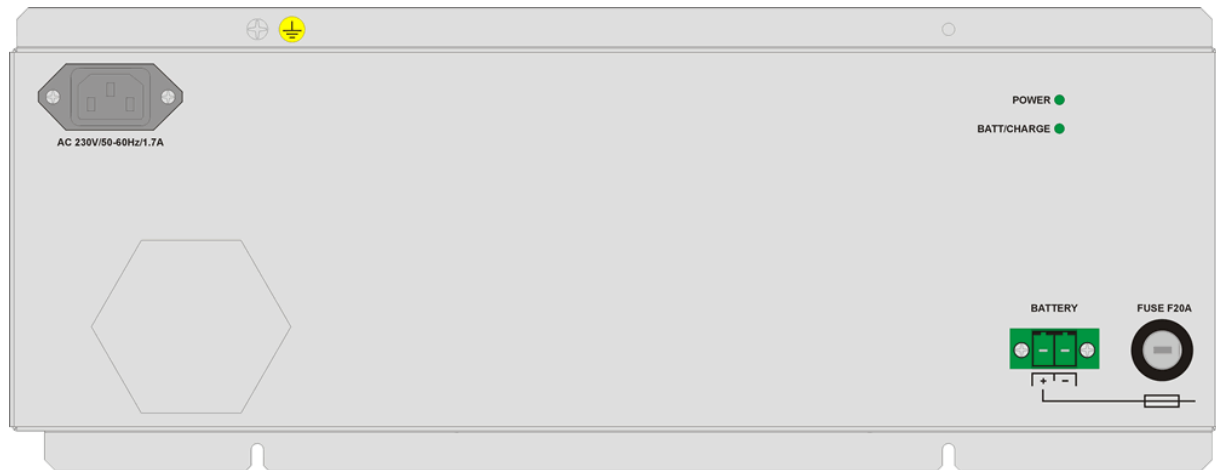


Fig.4.2.: MAC-ZERO – back side view

4.2 MAC-6400 model

4.2.1 Main supply unit

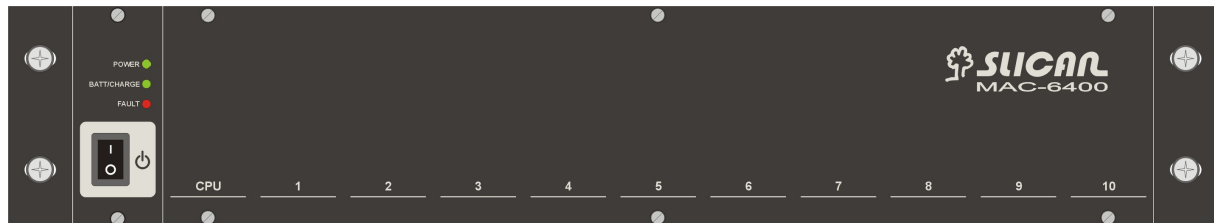


Fig. 4.3.: Main supply unit– front view

There are diodes installed in the front of the main supply shelf and the meaning of the diode signals is as follows:

POWER – green diode

- the diode is on all the time: supply from the 230V, 50Hz alternating current network,
- quickly flashes (the diode on for 0.1 s. and off for 2 s.): supply voltage is present with the PBX switched off,
- the diode is off: no mains supply.

BATT/CHARGE – green diode

- the diode is on: the PBX is supplied by the batteries (when there is no supply, the POWER diode is off), batteries charged (when the PBX is supplied from the mains, the POWER diode is on all the time),
- the diode flashes: charging batteries,
- the diode is off: no batteries, batteries damaged or improperly connected.

FAULT – red diode

- the diode is on: main supply unit is damaged (incorrect voltage on the unit outlet)

There are descriptions on the front panel of the supply unit which are to facilitate the specification of the control module location (CPU description) and the slot number (numbers ranging from 1 to 10) where the equipment module we are interested in is installed, on respective shelves. The slot number is used for numbering the physical terminals of the PBX where translations or subscriber equipment are connected (see Chapter ["Terminals numbering"](#)). Height of power supply device is equal to 2U.

4.2.2 PBX shelf housing

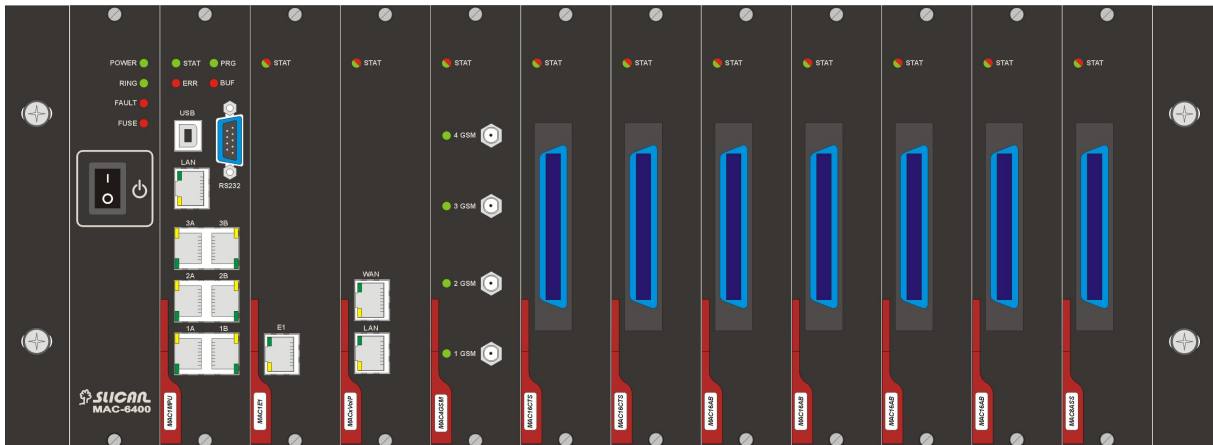


Fig. 4.4.: Front view of PBX shelf housing with full slot occupation

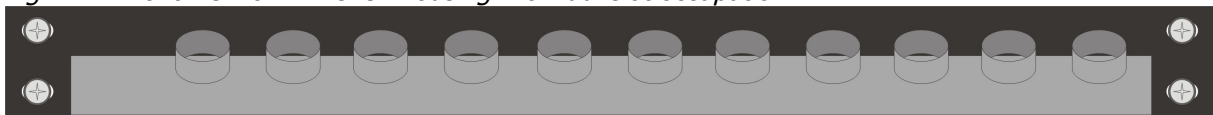


Fig. 4.5.: Cable fixing shelf – MAC.PMK

The shelf presented above is fitted with Velcro tapes used for mounting cables. They can be adjusted according to the diameters of cable bunches lead out from individual modules.

4.2.3 PBX shelf base board

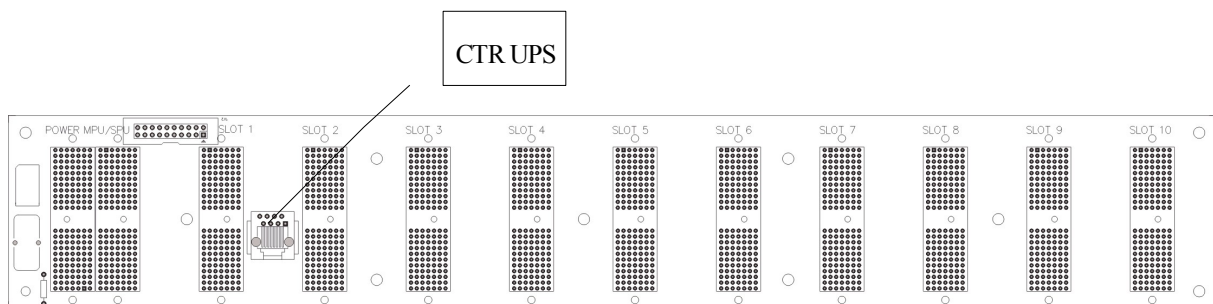


Fig. 4.6.: View of base board MAC10BAZ for Slican MAC-6400, PCB number MAC10BAZv2

The base board is mounted on the inner back wall of the PBX shelf housing. It enables the fixing of equipment cards in the system and ensures connection between them. There are 12 card connections on the board. The two first on the left-hand side (see above drawing), marked as:

- **POWER,**
- **MPU/SPU**

are dedicated to the cards of, respectively:

- the shelf supply,
- the master or slave controller.

The other connections, marked as **SLOT 1** to **SLOT 10**, can be filled with other equipment cards.

Technical specification

On the master shelf base board, there is also a connection for the main supply unit, as related to sending signals concerning supply. The connection is presented on the above drawing as UPS Ctrl (it is marked with such a label on the PBX shelf rear panel, as viewed from the rear of the PBX housing).

4.3 Housing 12U

Housing 12 U enables to install one or two shelves of MAC-6400, eventually shelf of MAC-ZERO:

- Marking: Slican MAC-6400.12U-XSH – where X=1..2 means number of shelves.

Location of elements, starting from top:

1. main supply shelf – 2U.
2. First (master) PBX shelf - 4U,
3. Cable fixing shelf - 1U.
4. Second (slave) PBX shelf – 4U
5. Cable fixing shelf - 1U.

Cables move out from port cards are lead via cable fixing shelf to the back of housing and carry out via holes in housing pedestal.

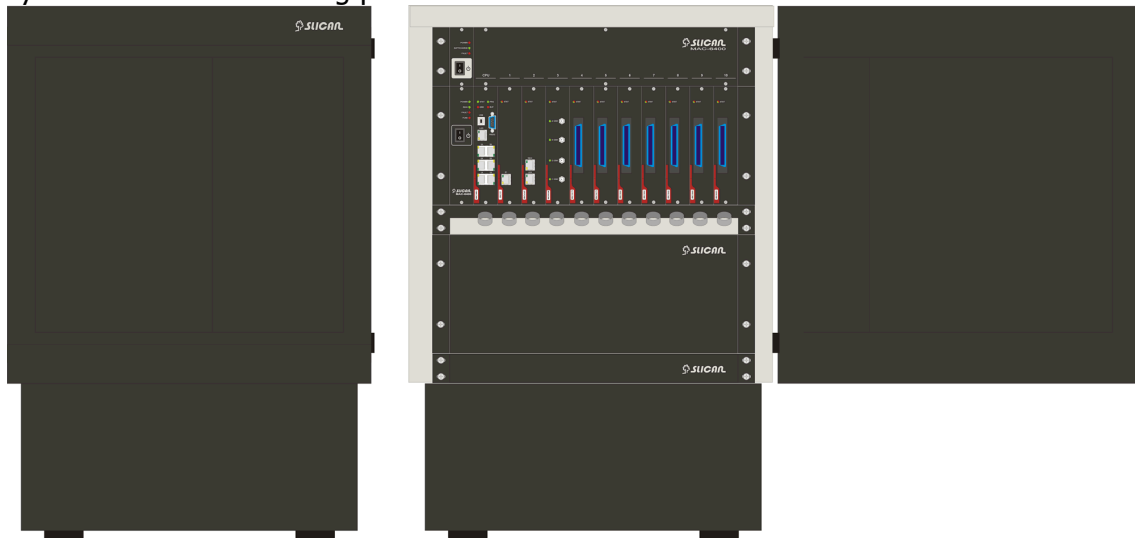


Fig. 4.7.: MAC-6400 view in 12U housing (up to 320 ports)

Housing is equipped with additional main switch, which is located on the left side, in its bottom part. This switch is connected in series with main power supply switch and can be used to emergency switch off the PBX, if housing door are lock out. Due to serial connection of switches, it should be noticed, that both switches must be on (position „1“) to connect power supply to PBX shelves.

In housing pedestal there is battery chamber.

4.4 Housing 22U

Housing 22 U enables to install 1 to 4 shelves of MAC-6400, eventually shelf of MAC-ZERO:

- Marking: Slican MAC-6400.22U-XSH – where X=1..4 means number of shelves.

Location of elements, starting from top:

1. main supply shelf – 2U.
2. First (master) PBX shelf - 4U,
3. Cable fixing shelf - 1U.
4. Second (slave) PBX shelf – 4U
5. Cable fixing shelf - 1U.
6. Second and third shelf identically as master shelf.

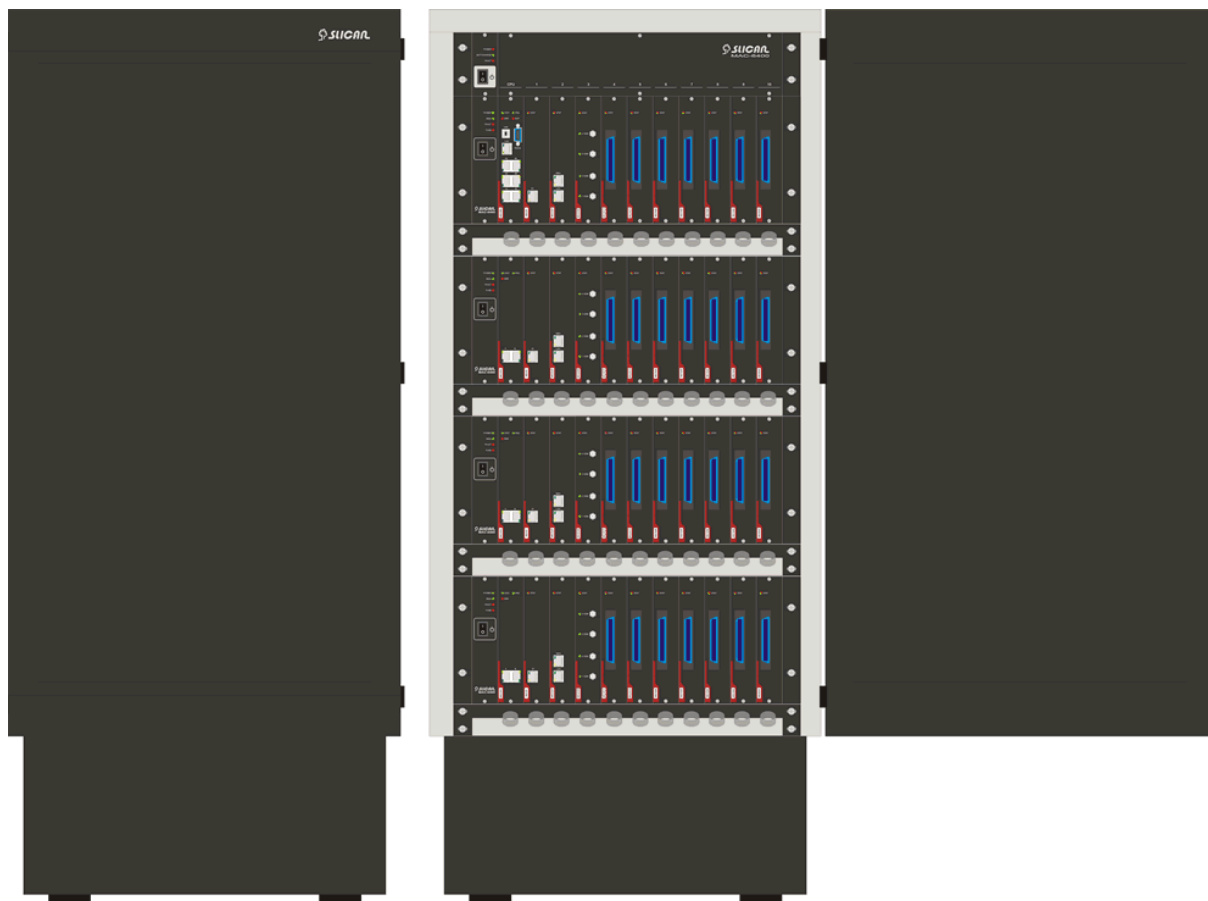


Fig. 4.8.: MAC-6400 view in 22U housing (up to 640 ports)

Housing is equipped with additional main switch, which is located on the left side, in its bottom part. This switch is connected in series with main power supply switch and can be used to emergency switch off the PBX, if housing door are lock out. Due to serial connection of switches, it should be noticed, that both switches must be on (position „1“) to connect power supply to PBX shelves.

In housing pedestal there is battery chamber.

4.5 Set of housing fans with forced air flow

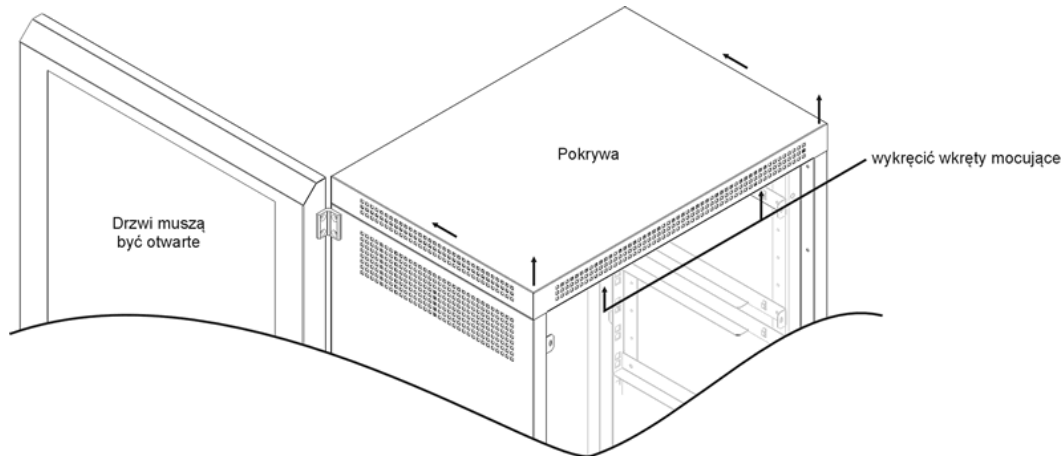
In housing models, which are suited to mounting cover, you can choose cover with gravity or forced air flow.

It is recommended to use **Fan set MAC.LID-8FAN** with forced air flow for system designed with following assumption:

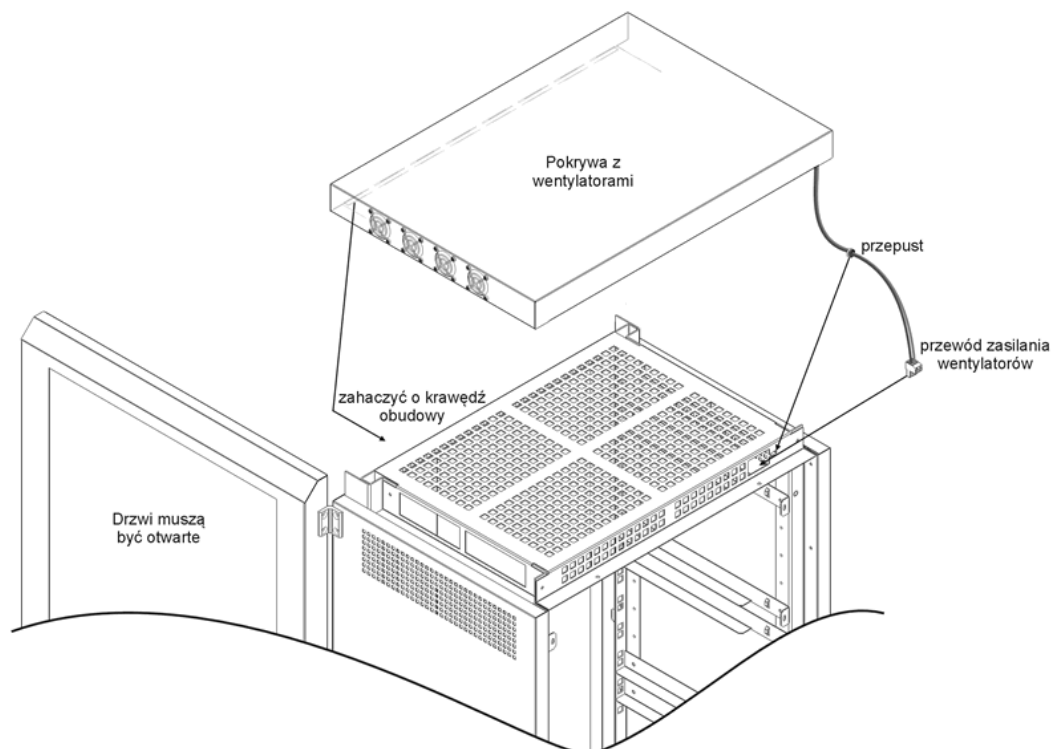
- capacity of system exceeded 300 ports

- environment temperature is in range 25-30°C.
- **Fan set MAC.LID-8FAN** is equipped in thermostat, it means, that fan operating is subject of temperature inside housing.

Following figure present installation method of cover with forced air flow or replacement of standard cover with gravity cooling to cover with forced air flow.



Demontaż pokrywy obudowy:
 - zdemontować tylną osłonę obudowy,
 - wykręcić dwa wkręty mocujące pokrywę,
 - unieść tylną część pokrywy,
 - przesunąć pokrywę do przodu,
 - zdjąć pokrywę.



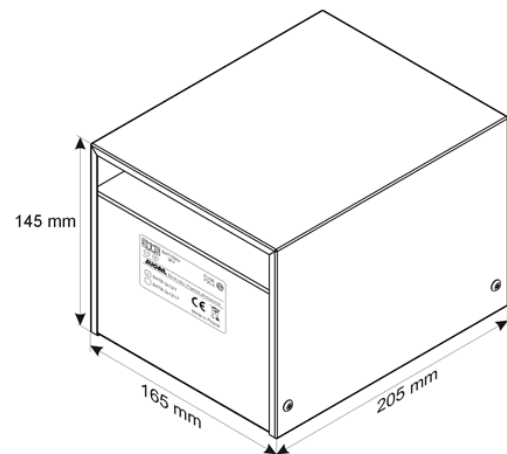
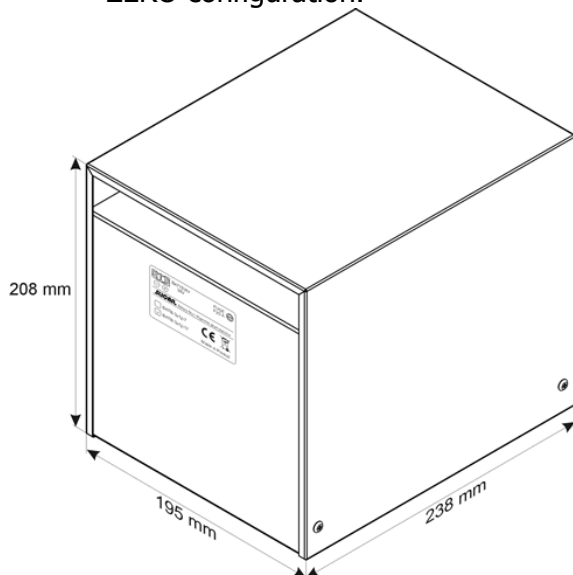
Montaż pokrywy z wentylatorami:
 - przełożyć przez wskazany otwór przewód zasilania wentylatorów,
 - przepust znajdujący się na przewodach zasilania umieścić we wskazanym miejscu w obudowie,
 - zahaczyć przednią część pokrywy za krawędź obudowy,
 - przykręcić dwa wkręty mocujące pokrywę,
 - podłączyć wtyk zasilania wentylatorów do gniazda FAN na tylnej ścianie półki zasilacza głównego,
 - zamontować tylną pokrywę obudowy.

Fig. 4.9.: Installation of fan set MAC.LID-8FAN

4.6 Battery housing

Housing for battery provided for MAC systems installed in standard 19" rack are available in two versions:

- **BATB-3x12/17** - housing (larger) for battery of 3 battery 17Ah – dedicated for configuration larger than 1 shelf.
- **BATB-3x12/7** – housing (smaller) for battery of 3 battery 7Ah – dedicated for MAC-ZERO configuration.



Operating time calculator can be accessed from [ServNet](#): MAC-6400 section

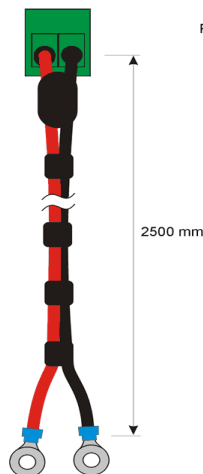
Example battery operating times as a function of battery capacity and PBX configuration:

Type	a/b	CTS	GSM	E1	EREC	VoIP	Battery	Time
MAC-ZERO	64	8	4	1	8	8	7	4h
MAC-6400	64	8	4	1	8	8	17	11h
MAC-6400	320	120	8	1	16	32	17	2h

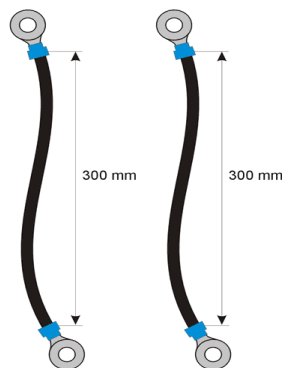
4.7 Installation of batteries with large capacity

For applications with very long emergency power supply time (ex. 24 hours) it is possible to use batteries with larger capacity. For this purpose cable MAC.AKU-M6 should be used.

Przewód do podłączenia akumulatorów do centrali



Przewody do połączenia akumulatorów ze sobą



Końcówki kablowe oczkowe $\varnothing 6/2,5$

Końcówki kablowe oczkowe $\varnothing 6/2,5$

4.8 PBX shelf equipment modules

4.8.1 List of modules

MAC-6400 PBX have a modular structure. A **module** in the PBX is an expansion card including a front panel. All modules are placed in the slots on the base board dedicated to them. The panels may occur in two different designs, as described separately for each module.

No.	Module name	Module designation	Card designation	Front panel designation
1	MASTER CONTROLLER	MAC.M-1MPU	MAC1MPU	-
2	MAC-ZERO CONTROLLER	MAC.M-0MPU	MAC0MPU	
3	SLAVE CONTROLLER	MAC.M-1SPU	MAC1SPU	-
4	E1 (ISDN-PRA 30B+D) MODULE	MAC.MRJ-1E1	MAC1E1	-
5	ISDN-BRA OUT/IN 8-PORTS MODULE	MAC.MRJ-8ST	MAC8ST	MAC.PCRJ-8ST
6	ISDN-BRA OUT/IN 4-PORTS MODULE	MAC.MRJ-4ST	MAC4ST	MAC.PCRJ-4ST
7	16 DIGITAL SYSTEM PHONE PORT MODULE	MAC.MRJ-16CTS MAC.MKB-16CTS	MAC16CTS	MAC.PCRJ-16CTS MAC.PCKB-16CTS
8	8 DIGITAL SYSTEM PHONE PORT MODULE	MAC.MRJ-8CTS MAC.MKB-8CTS	MAC8CTS	MAC.PCRJ-8CTS MAC.PCKB-16CTS
9	4 DIGITAL SYSTEM PHONE PORT MODULE	MAC.MRJ-4CTS MAC.MKB-4CTS	MAC4CTS	MAC.PCRJ-4CTS MAC.PCKB-4CTS
10	8 ANALOGUE TRUNKS MODULE	MAC.MRJ-8ASS	MAC8ASS	MAC.PCRJ-8ASS
11	4 ANALOGUE TRUNKS MODULE	MAC.MRJ-4ASS	MAC4ASS	MAC.PCRJ-4ASS
12	16 ANALOGUE PORT MODULE	MAC.MRJ-16AB MAC.MKB-16AB	MAC16AB	MAC.PCRJ-16AB MAC.PCKB-16AB
13	8 ANALOGUE PORT MODULE	MAC.MRJ-8AB MAC.MKB-8AB	MAC8AB	MAC.PCRJ-8AB MAC.PCKB-8AB
14	1 GSM TRUNKS MODULE	MAC.MA-1GSM	MAC1GSM	-
15	2 GSM TRUNKS MODULE	MAC.MA-2GSM	MAC2GSM	-
16	4 GSM TRUNKS MODULE	MAC.MA-4GSM	MAC4GSM	-
17	0 VoIP CHANNEL MODULE	MAC.M-0VoIP	MACxVoIP	-
18	32 VoIP CHANNEL MODULE	MAC.M-32VoIP	MACxVoIP	-
19	SHELF SUPPLIER MODULE	MAC.M-1ZAS	MAC1ZAS	-
20	8 CHANNEL RECORDING MODULE	MAC.M-8REC- HD.120GB	MAC8REC	-
21	16 CHANNEL RECORDING MODULE	MAC.M-16REC- HD.120GB	MAC16REC	-
22	DSP SUB-MODULE	SM.DSP SM.DSP-V	DSP DSP-V	-
23	PBX ELECTRONIC NUMBER SUB-MODULE	SM.SDN	SDN	-

WARNING!

*Cards used in MAC are labelled **HOT SWAP!** - it means they can be replaced when the power supply of the shelf where the cards are located is switched on*

Moreover, attention must be paid when replacing or installing a new card to sufficient tightening of the screws fastening the front panel to the PBX shelf casing to ensure an efficient protection against over-voltages that may occur in connected telecommunication lines.

4.8.2 Maximum numbers of cards in the MAC-6400 PBX

Card type	Limits concerning the SHELF		Limits concerning the whole PBX		Note
	Maximum number of cards	Maximum number of accessories	Maximum number of cards	Maximum number of accessories	
MACxAB	10	$10 \times 16 = 160$	$4 \times 10 = 40$	$4 \times 10 \times 16 = 640$ ²	no limits
MACxCTS	-	-	-	$7 \times 16 + 1 \times 8 + 1 \times 4 = 124$	limit on number of accessories per PBX
MACxST ³	-	-	-	$10 \times 8 = 80$	limit on number of accessories per PBX
MACxASS	-	-	10	$10 \times 8 = 80$	limit on number of accessories per PBX
MACxGSM	4	$4 \times 4 = 16$	$4 \times 4 = 16$	$4 \times 4 \times 4 = 64$	limit on number of cards per shelf
MAC1E1	-	-	8	$8 \times 1 = 8$	limit on number of accessories per PBX
MACxVoIP	-	-	1	VoIP trunks ≤ 100 VoIP subscribers ≤ 1000 CTS.IP phones ≤ 18	limit on number of cards per PBX
MACxREC	-	-	8	$8 \times 16 = 128$	limit on number of cards per PBX

2) including 20 doorphones and 20 audio devices; maximal number of subscribers and accounts is equal to 1000

3) card ports can be used as internal or external

4.8.3 Master controller module

Short description of the card:

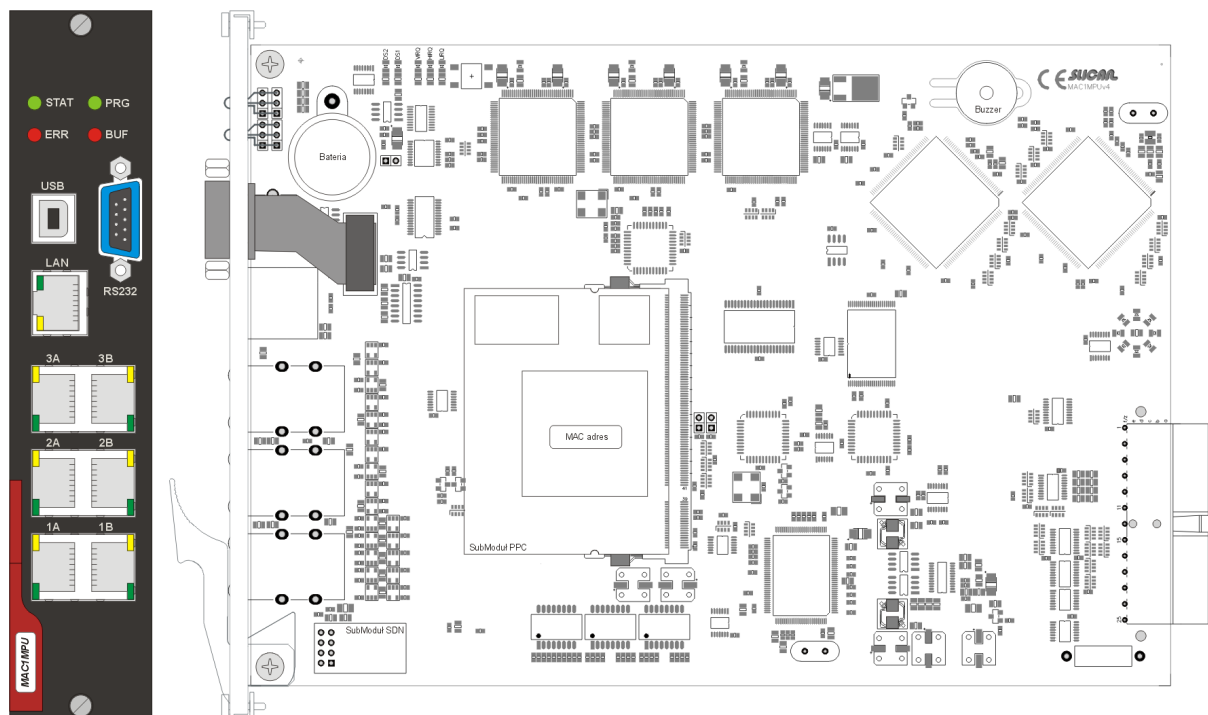
Module name: MAC.M-1MPU

Print name: MAC1MPUv4

Card designation: MAC1MPU

The master controller card is the main unit of the PBX. It is responsible for managing processes in the PBX and supervises the operation of slave controllers. Only one master controller can be installed in the Slican MAC-6400 PBX. Card enables transmission with rate 10/100 Mbs.

View of the master controller card and its front panel:



Installation of the card in the PBX:

The controller card is located in the base plate slot marked as **MPU/SPU**.

PowerPC module is installed on controller card. One of two models of PowerPC can be used:

- SM.PPC – PowerPC module with 32MB of memory,
- SM.PPC-64 – PowerPC module with 64MB memory, while using this module, it is necessarily to use firmware 5.11 or later.

Short description of diodes on the card:

STAT – green diode

- is off: the PBX is switched off or is in the course of the startup (unit and shelves initialisation),
- flashes green every 5 seconds: the PBX is activated; it can be communicated with for service purposes through the ConfigMAN software.

PRG – green diode

- flashes green slowly: the PBX is in the course of the startup (unit and shelves initialisation),
- shines constantly green: a subscriber is logged to the PBX according to the SDTP protocol (the PBXd programmed from the ConfigMAN software level),
- flashes quickly green: data are sent from/to the computer.

ERR – indicates an error detected in the PBX. Red diode:

- shines constantly red: a non-critical error (e.g. a fault of the E1 translation),
- flashes red: a critical error (e.g. a conflict of cards in the PBX).

The reason for a lit or flashing ERRor diode can be checked in ConfigMAN on selecting option *PBX alarms* from the **PBX** menu.

BUF – red diode

- shines constantly red: the event buffer in the PBX is 85% filled,
- flashes red: the event buffer in the PBX is 99% filled.

Description of sound signals (buzzer):

During the regular PBX operation

- A short single sound signal on switching on the PBX supply
- A short sound signal after detecting the shelf.

During deleting the NANDFLASH memory

- A signal is emitted all the time when the memory is deleted

RJ-45 terminal A and B are described in chapter: 5.3.1 Inter-shelf connections in front of the PBX

Localization of the MAC address for the LAN interface:

The MAC address is given on the label to be found on the PPC sub-module.

WARNING!

The incorrect replacement of the battery may result in the danger of an explosion. Replace only with a battery of the same type or its equivalent as recommended by the manufacturer. Used batteries must be disposed off according to the manufacturer's instructions.

Controller format:

Controller format (jumper X4 inserted) – near socket for PPC sub-module.

To clear database and content of SRAM memory jumper X4 should be inserted, next PBX should be powered.

After circa 30 seconds after switching on, PBX can be switched off and jumper detached. If firmware was earlier downloaded to PBX buzzer emits short beeps during whole time of formatting controller.

4.8.4 MAC-ZERO master controller module

Short description of the card:

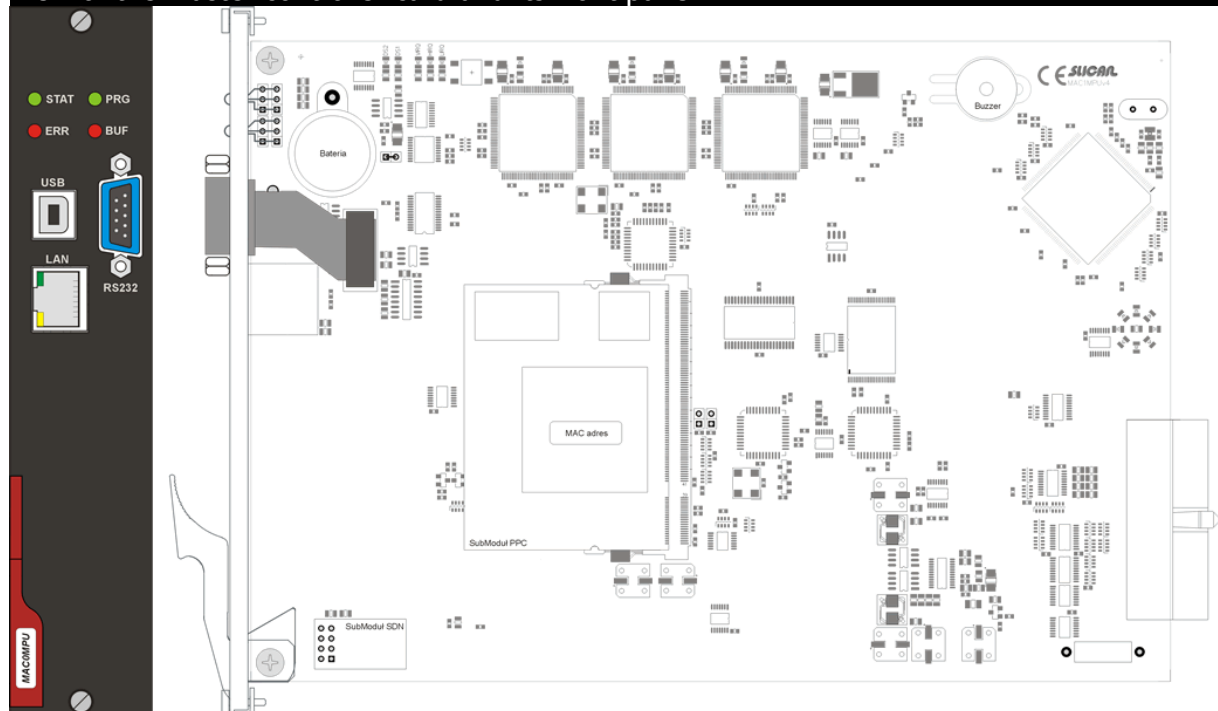
Module name: MAC.M-0MPU

Print name: MAC1MPUv4

Card designation: MAC0MPU

The master controller card is the main unit of the PBX. It is responsible for managing processes in the PBX and supervises the operation of slave controllers. Card enables transmission with rate 10/100 Mbs.

View of the master controller card and its front panel:



Installation of the card in the PBX:

The controller card is located in the base plate slot marked as **MPU/SPU**.

Short description of diodes on the card:

STAT – green diode

- is off: the PBX is switched off or is in the course of the startup (unit and shelves initialisation),
- flashes green every 5 seconds: the PBX is activated; it can be communicated with for service purposes through the ConfigMAN software.

PRG – green diode

- flashes green slowly: the PBX is in the course of the startup (unit and shelves initialisation),
- shines constantly green: a subscriber is logged to the PBX according to the SDTP protocol (the PBXd programmed from the ConfigMAN software level),
- flashes quickly green: data are sent from/to the computer.

ERR – indicates an error detected in the PBX. Red diode:

- shines constantly red: a non-critical error (e.g. a fault of the E1 translation),
- flashes red: a critical error (e.g. a conflict of cards in the PBX).

The reason for a lit or flashing ERR diode can be checked in ConfigMAN on selecting option *PBX alarms* from the **PBX** menu.

BUF – red diode

- shines constantly red: the event buffer in the PBX is 85% filled,
- flashes red: the event buffer in the PBX is 99% filled.

Description of sound signals (buzzer):

During the regular PBX operation

- A short single sound signal on switching on the PBX supply
- A short sound signal after detecting the shelf.

During deleting the NANDFLASH memory

- A signal is emitted all the time when the memory is deleted

Localization of the MAC address for the LAN interface:

The MAC address is given on the label to be found on the PPC sub-module.

WARNING!

The incorrect replacement of the battery may result in the danger of an explosion. Replace only with a battery of the same type or its equivalent as recommended by the manufacturer. Used batteries must be disposed off according to the manufacturer's instructions.

Controller format:

Controller format (jumper X4 inserted) – near socket for PPC sub-module.

To clear database and content of SRAM memory jumper X4 should be inserted, next PBX should be powered.

After circa 30 seconds after switching on, PBX can be switched off and jumper detached. If firmware was earlier downloaded to PBX buzzer emits short beeps during whole time of formatting controller.

4.8.5 Slave controller module

Short description of the card:

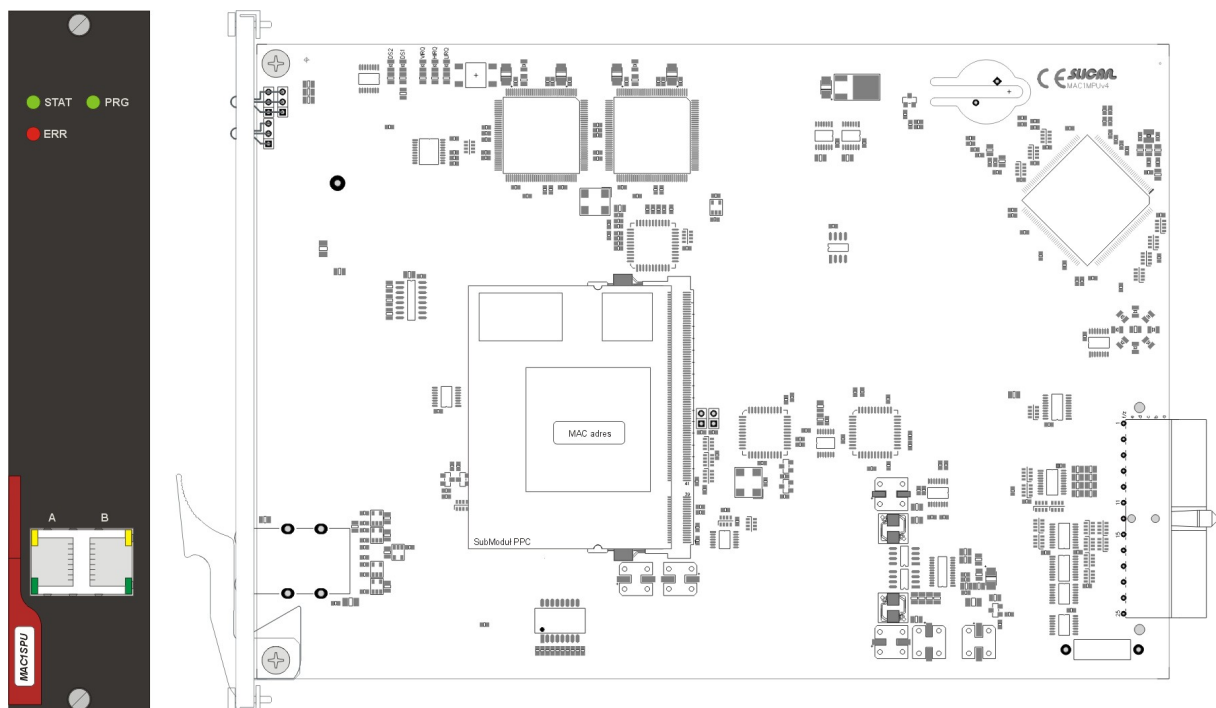
Module name: MAC.M-1SPU

Print name: MAC1MPUV3

Card designation: MAC1SPU

The slave controller card is an PBX unit operating under the control of the master controller. It is responsible for managing processes in the shelf where it is installed. Up to three slave controllers can be installed in the Slican MAC-6400 PBX. Card enables transmission with rate 10/100 Mbs.

View of the slave controller card and its front panel:



Installation of the card in the PBX:

The slave controller card is placed in the base plate slot marked as **MPU/SPU**.

Short description of diodes on the card:

STAT – green diode

- is off: the shelf is switched off or is in the course of the start up (unit initialisation),
- flashes green every 5 seconds: the shelf is activated.

PRG – green diode

- flashes green slowly: the shelf is in the course of the startup (unit initialisation),

ERR – red diode – future use.

4.8.6 E1 (ISDN-PRA) route module

Short description of the card:

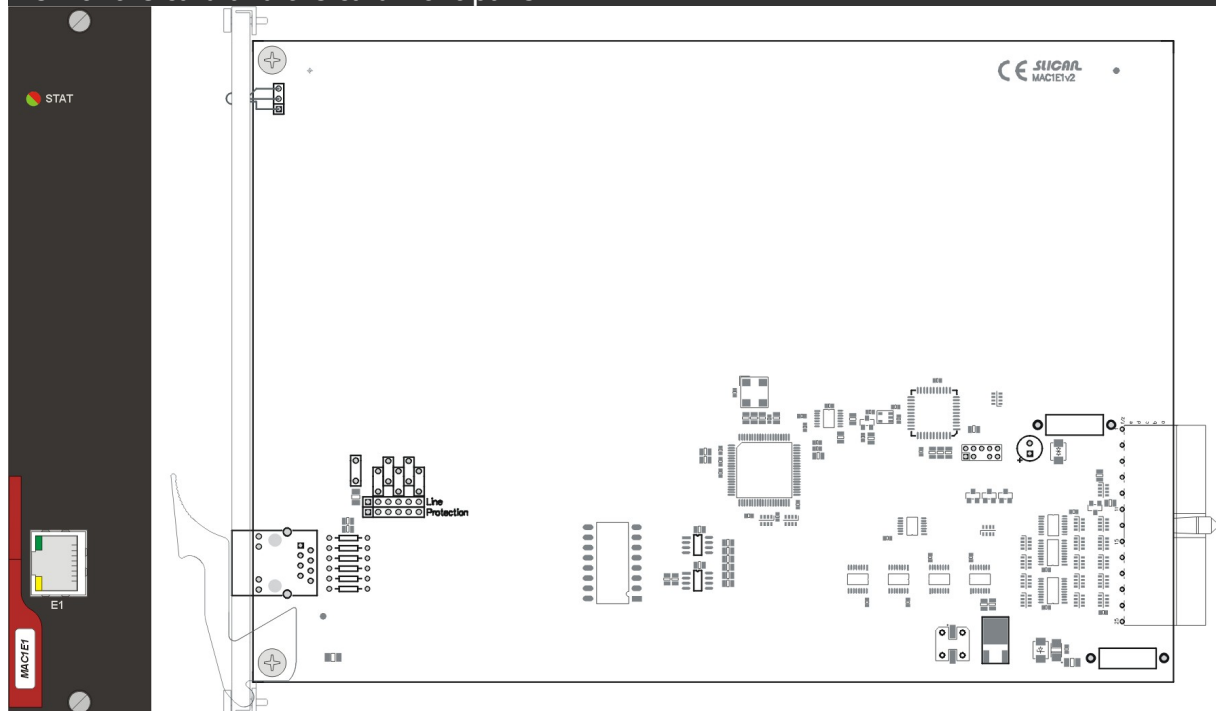
Module name: *MAC.MRJ-1E1*

The E1 route card ensures communication with the PSTN networks through the ISDN PRA (30B+D) connection.

Print name: *MAC1E1v2*

Card designation: *MAC1E1*

View of the card and the card front panel:



Installation of the card in the PBX:

All cards of the E1 route are installed in lots marked as **SLOT 1** to **SLOT 10**.

Short description of the diode on the panel:

STAT – two-colour diode

- off: the card has not been recognised by the controller,
- flashes red: the card has been recognised but not initiated by the equipment (e.g. a faulty card, the card is being initialised),
- shines constantly red: the card has been recognised and initiated by the equipment, but is not referred to in the PBX database,
- shines constantly green: the card has been initialised and functions properly,
- shines constantly green, sometimes flashes red: activation/deactivation of the L1 layer.

4.8.7 ISDN-BRA digital accessories module

Short description of the card:

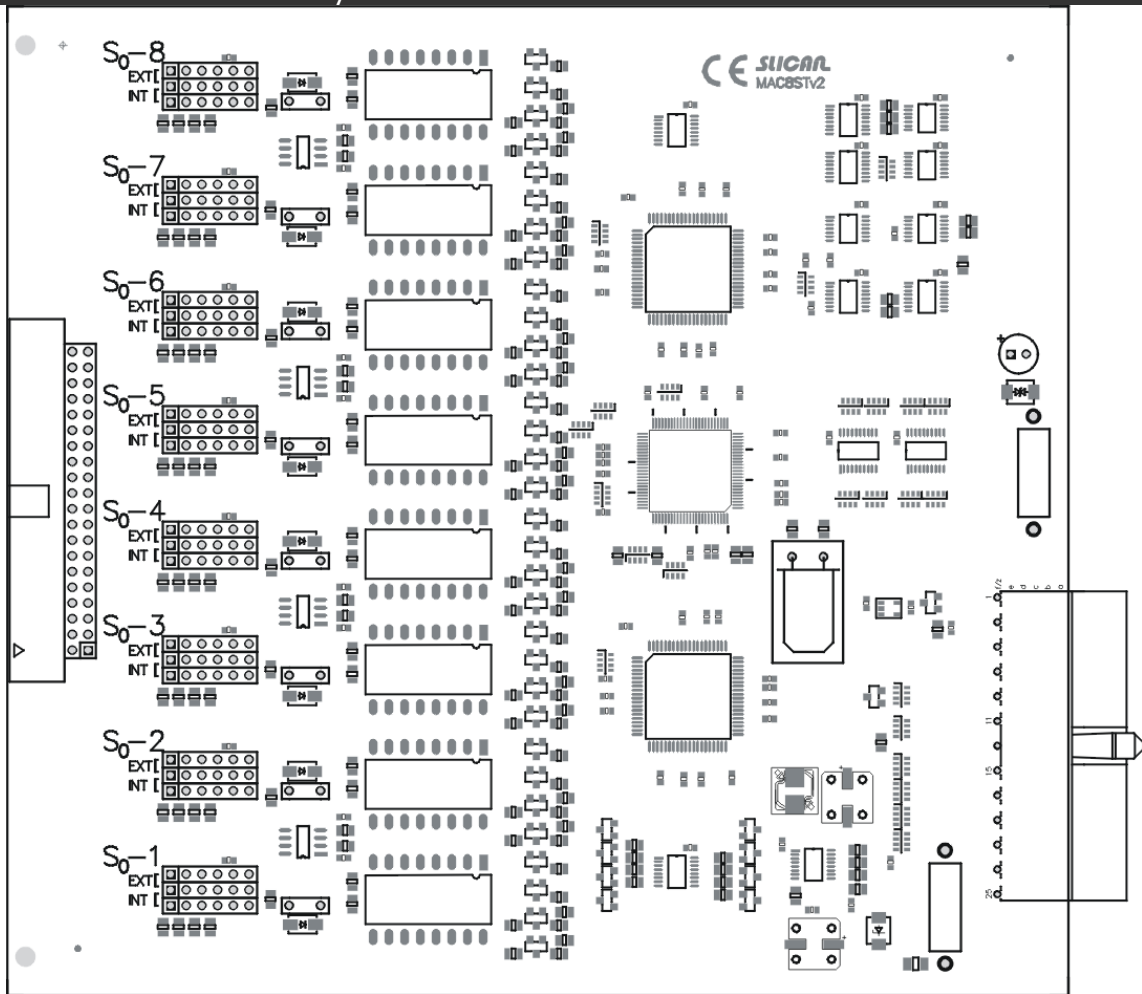
Module name: *MAC.MRJ-8ST*
MAC.MRJ-4ST

The digital accessories cards include ISDN 2B+D accessories. Each connection can be configured as a translation (urban line) or a subscriber inner contact.

Print name: *MAC8STv2*

Card designations: *MAC8ST*
MAC4ST

View of the ISDN accessory card:



Installation of the card in the PBX:

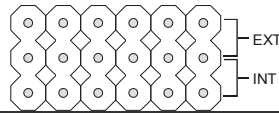
All cards with ISDN digital accessories are installed in slots marked as **SLOT 1** to **SLOT 10**.
 Types of accessory cards:

MAC8ST	8 ports S ₀ INT/EXT (ISDN)
MAC4ST	4 ports S ₀ INT/EXT (ISDN)

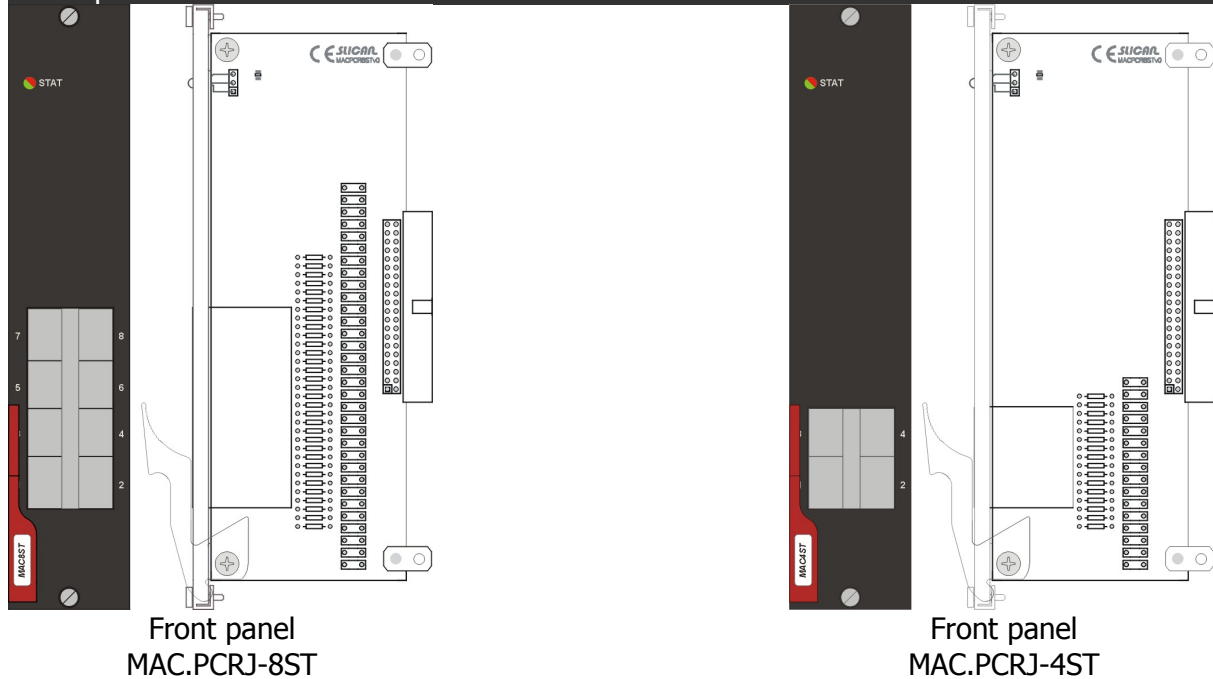
Elements of ISDN contacts configuration:

Digital accessory ports, marked on the card board as S_0 , can be configured as external ports (translations), and internal (subscriber) ones. The mode of the port operation is defined by setting of the armatures on the board. Armature positions:

EXT – external port ,
INT – internal port.



Front panels:



Short description of diodes on the panel:

STAT – two-colour diode

- off: the card has not been recognised by the controller,
- flashes red: the card has been recognised but not initiated by the equipment (e.g. a faulty card, the card in the course of initialisation),
- shines constantly red: the card has been recognised and initiated by the equipment, but is not referred to in the PBX database,
- shines constantly green: the card has been initiated and functions properly,
- shines constantly green, sometimes flashes red: activation/deactivation of the L1 layer (e.g. connection of a telephone to a card socket).

4.8.8 System digital accessory module

Module names: MAC.MRJ-16CTS
 MAC.MKB-16CTS
 MAC.MRJ-8CTS
 MAC.MKB-8CTS
 MAC.MRJ-4CTS
 MAC.MKB-4CTS

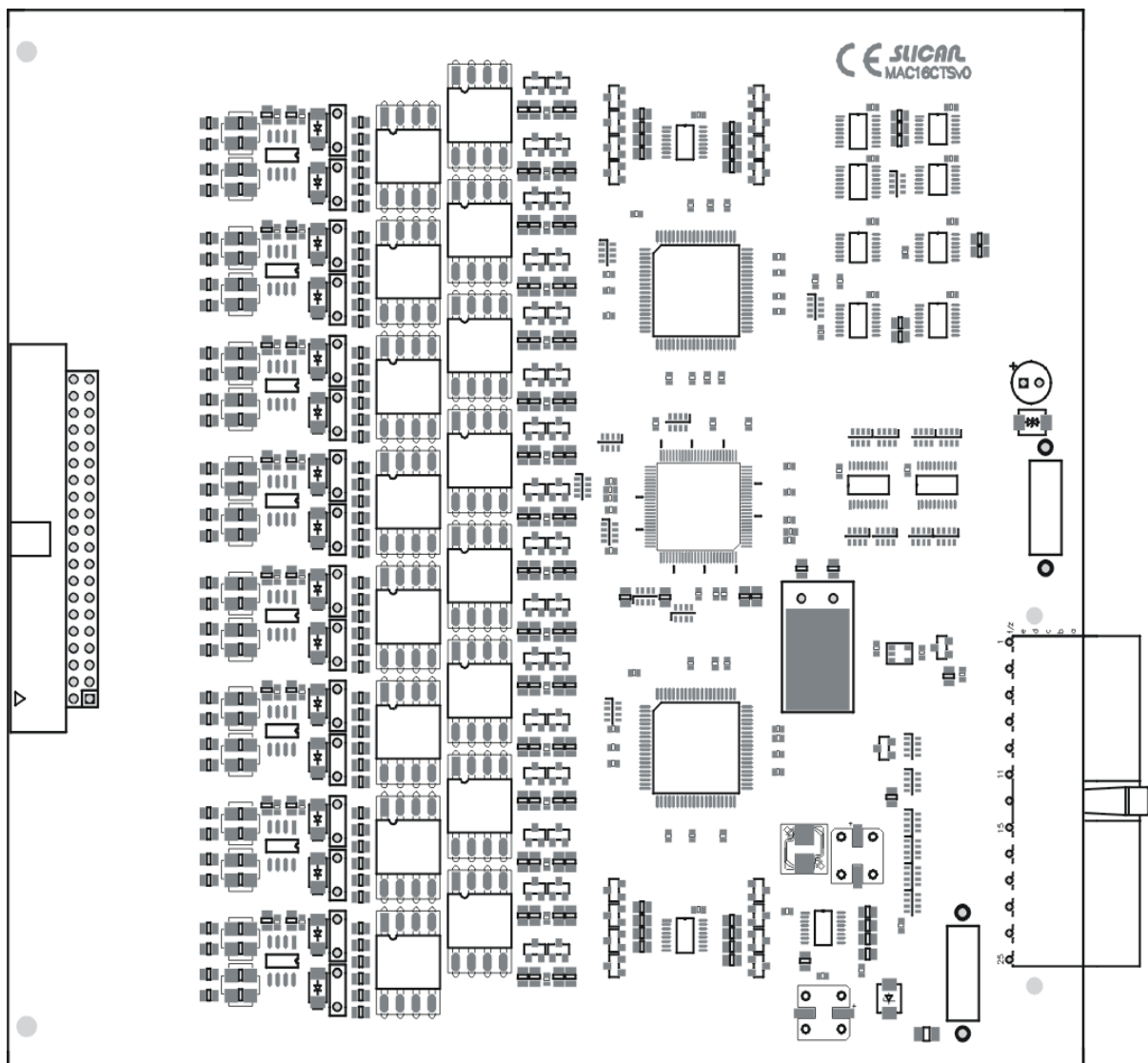
Short description of the card:

Digital accessory cards include accessories for system telephone sets CTS-202 and CTS-102.

Print name: MAC16CTSv1

 MAC16CTS
Card designations: MAC8CTS
 MAC4CTS

View of the digital system accessories card:



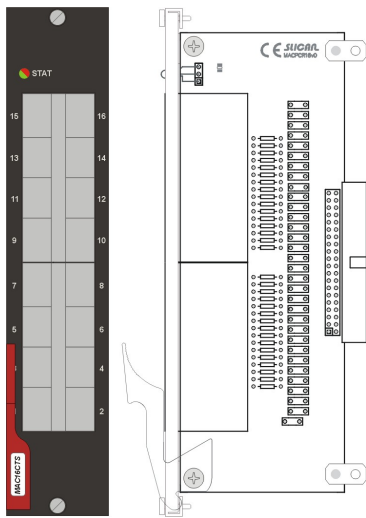
Installation of the card in the PBX:

All cards with system digital accessories (CTS) are installed in slots marked **SLOT 1** to **SLOT 10**.

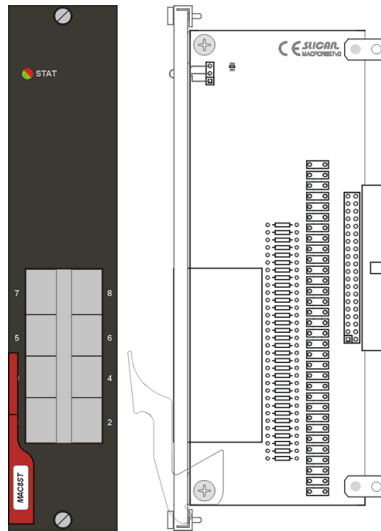
Types of accessory cards:

MAC16CTS	16 ports U _{p0} (CTS)
MAC8CTS	8 ports U _{p0} (CTS)
MAC4CTS	4 ports U _{p0} (CTS)

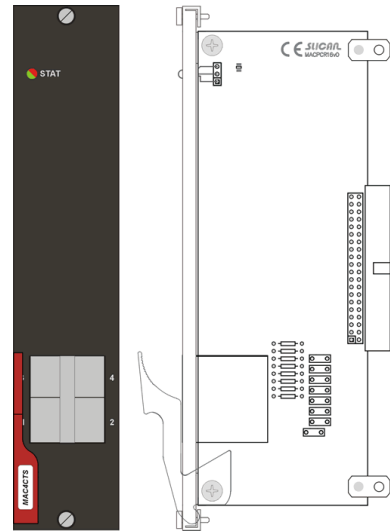
Front panels:



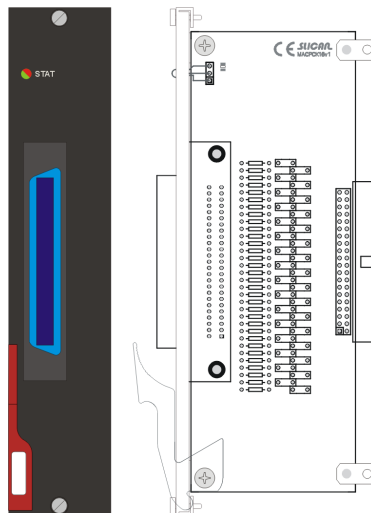
MAC.PCRJ-16AB



MAC.PCRJ-8AB



MAC.PCRJ-4AB



MAC.PCKB-16AB

Short description of diodes on the front panel:

STAT – two-colour diode

- off: the card has not been recognised by the controller,
- flashes red: the card has been recognised but not initiated by the equipment (e.g. a faulty card, the card in the course of initialisation),
- shines constantly red: the card has been recognised and initiated by the equipment, but is not referred to in the PBX database,
- shines constantly green: the card has been initiated and functions properly,
- shines constantly green, sometimes flashes red: activation/deactivation of the L1 layer (connection of a CTS telephone to a card socket).

4.8.9 ASS analogue trunk module

Short description of the card:

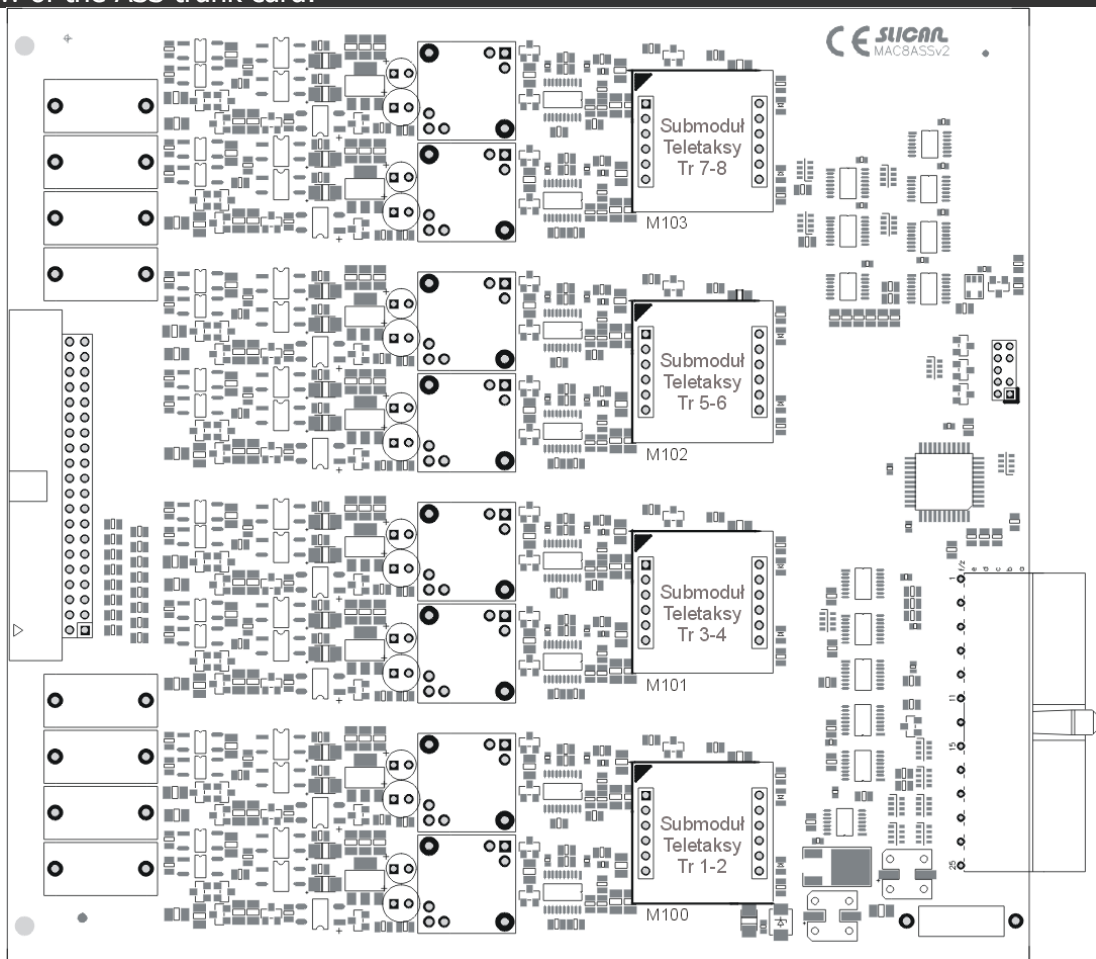
Module name: *MAC.MRJ-8ASS*
MAC.MRJ-4ASS

The ASS trunk card is intended for connecting the PBX to analogue subscriber lines of the PSTN network.

Print name: *MAC8ASSv2*

Card designations: *MAC8ASS*
MAC4ASS

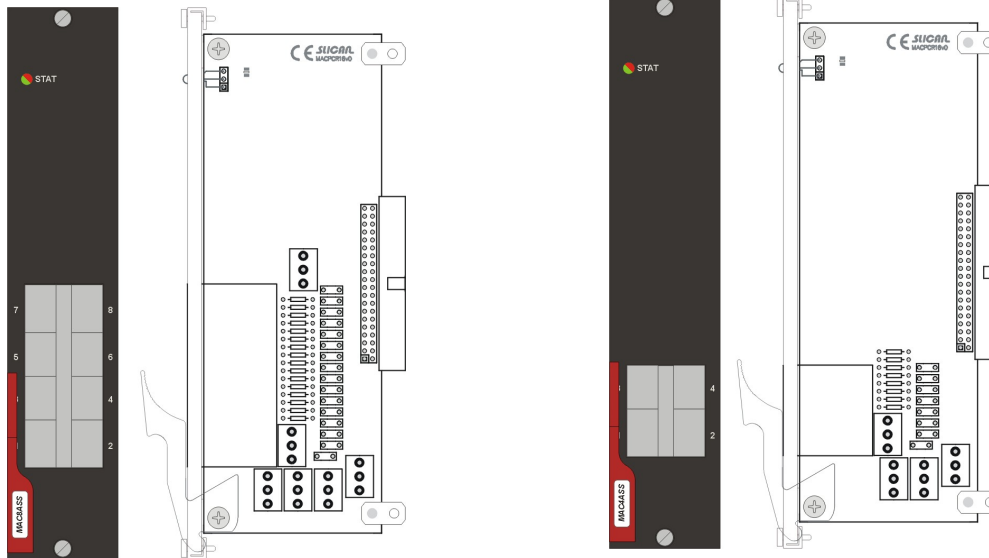
View of the ASS trunk card:



Installation of the card in the PBX:

All analogue trunk cards are installed in slots marked **SLOT 1** to **SLOT 10**.

Front panels of the cards:



MAC.PCRJ-8AB

MAC.PCRJ-4AB

Short description of the diode on the front panel:

STAT – two-colour diode

- off: the card has not been recognised by the controller,
- flashes red: the card has been recognised but not initiated by the equipment (e.g. a faulty card, the card cannot be programmed, the card in the course of initialisation),
- flashes green: the card in the course of programming,
- shines constantly red: the card has been recognised and initiated by the equipment, but is not referred to in the PBX database,
- shines constantly green: the card has been initiated and functions properly,
- shines constantly green, sometimes flashes red: traffic on one of the accessories (a ring, an output to a trunk).

4.8.10 Analogue port module

Short description of the card:

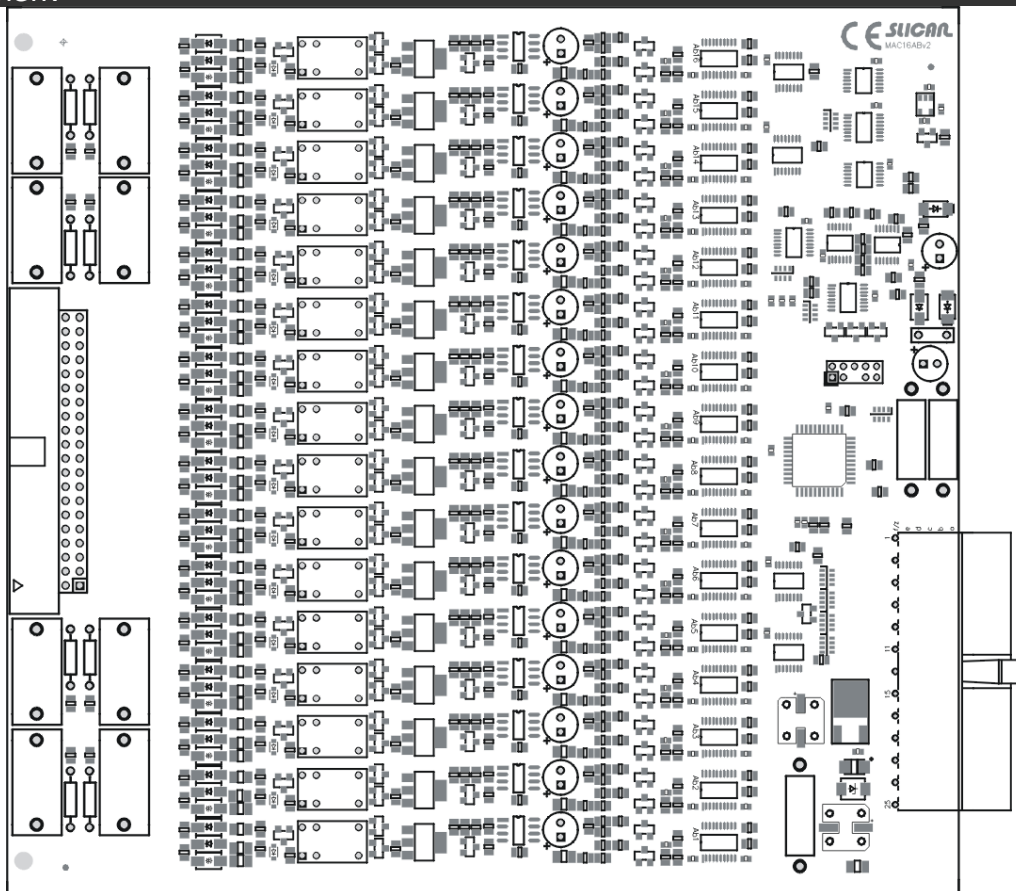
Module name: MAC.MRJ-16AB
 MAC.MRJ-8AB
 MAC.MKB-16AB
 MAC.MKB-8AB

Analogue port cards are intended for operating analogue telephone sets with DTMF or impulse dialling. All cards are fitted with the CLIP function.

Print name: MAC16ABv2

Card designations: MAC16AB
 MAC8AB

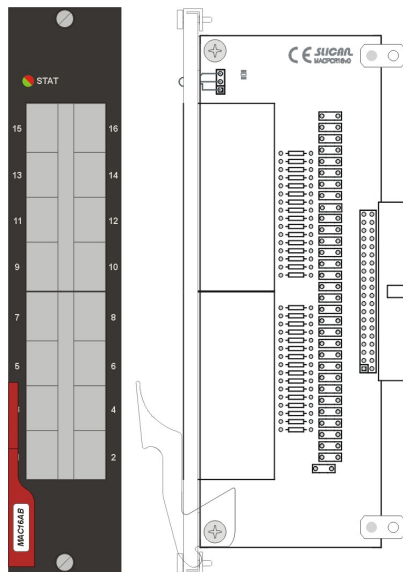
Card view:



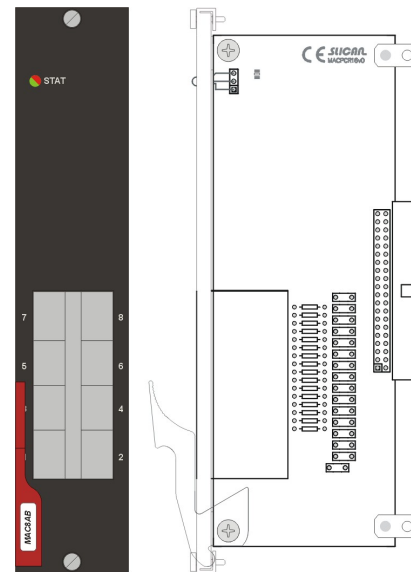
Installation of the card in the PBX:

All cards with subscriber analogue accessories are installed in slots marked **SLOT 1** to **SLOT 10**.

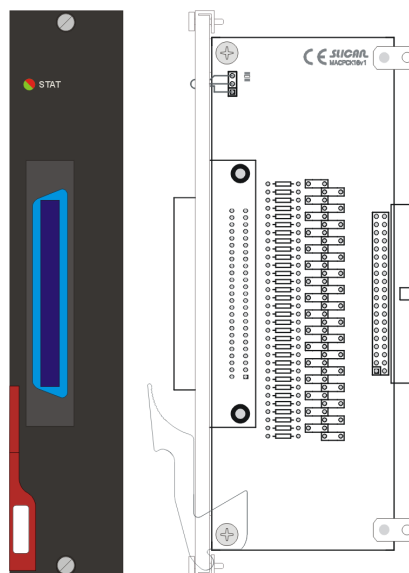
Front panels of the cards:



MAC.PCRJ-16AB



MAC.PCKB-16AB



MAC.PCRJ-8AB

Short description of the diode on the front panel:

STAT – two-colour diode

- off: the card has not been recognised by the controller,
- flashes red: the card has been recognised but not initiated by the equipment (e.g. a faulty card, the card cannot be programmed, the card in the course of initialisation),
- flashes green: the card in the course of programming,
- shines constantly red: the card has been recognised and initiated by the equipment, but is not referred to in the PBX database,
- shines constantly green: the card has been initiated and functions properly,
- shines constantly green, sometimes flashes red: traffic on one of the accessories (a ring, picking up/hanging up a handset).

4.8.11 VoIP module

Module name: MAC.M-0VoIP

Print name: MACVOIPv2

Card designation: MACxVoIP

Short description of the card:

VoIP cards ensure integration of the PBX with the Internet telephony. Number of channels possible to use depends on:

- number of installed DSP sub-modules (1DSP =4 VoIP channels. Maximally 4 DSP sub-modules
- purchased license code.

The card serves up to 1000 subscribers, including

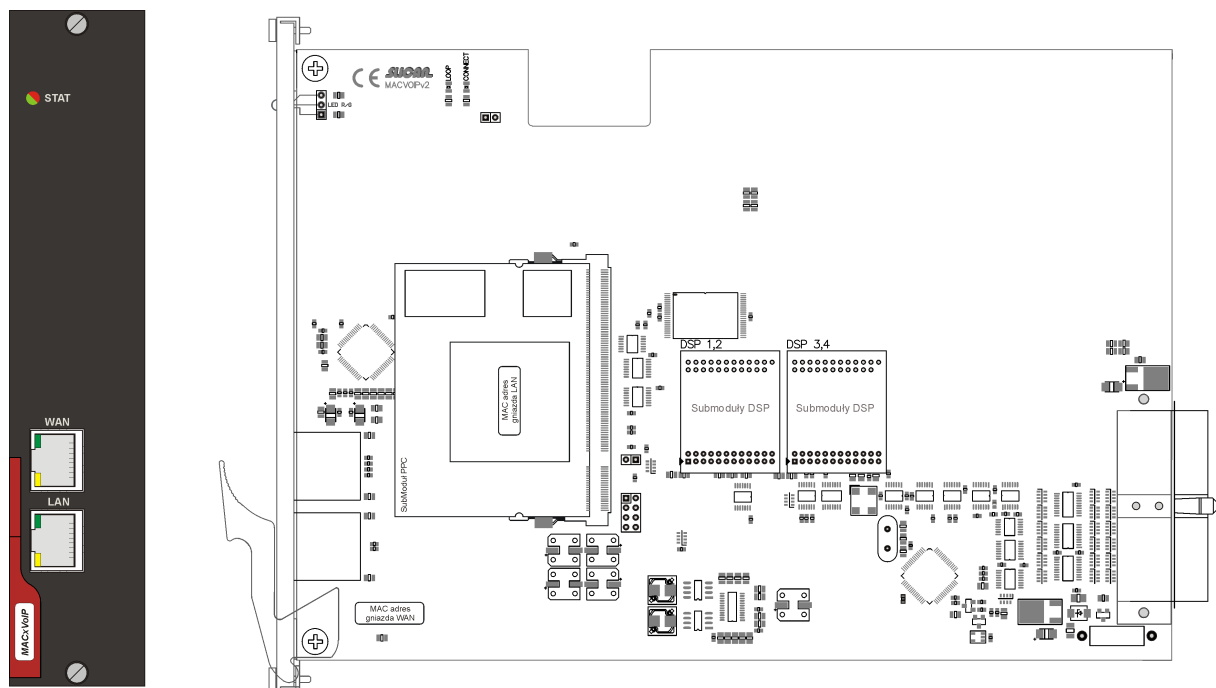
- up to 18 clients equipped with CTS-202.IP system telephones

- rest equipped with any terminal (hardware software) equipment that supports SIP, IAX protocols.

Card enables transmission with rate 10/100 Mbs.

For VoIP purposes, sub-modules SM.DSP or SM.DSP-V can be used.

View of the MAC0VoIP card (with sub-modules inserted) and the card front panel:



Installation of the card in the PBX:

The card can be installed in any slot marked **Slot 1** to **SLOT 10**.

Technical specification

Short description of the diode on the front panel:

STAT – two-colour diode

- off: the card has not been recognised by the controller,
- flashes red: the card has been recognised but not initiated by the equipment (e.g. a faulty card, the card in the course of initialisation),
- shines constantly red: the card has been recognised and initiated by the equipment, but is not referred to in the PBX database and not connected to the controller or blocked due to the lack of SDN,
- shines constantly green: the card has been initiated and functions properly,
- shines constantly green, sometimes flashes red: a change in the configuration of the card, subscribers or translation.

Location of MAC addresses for LAN and WAN interfaces:

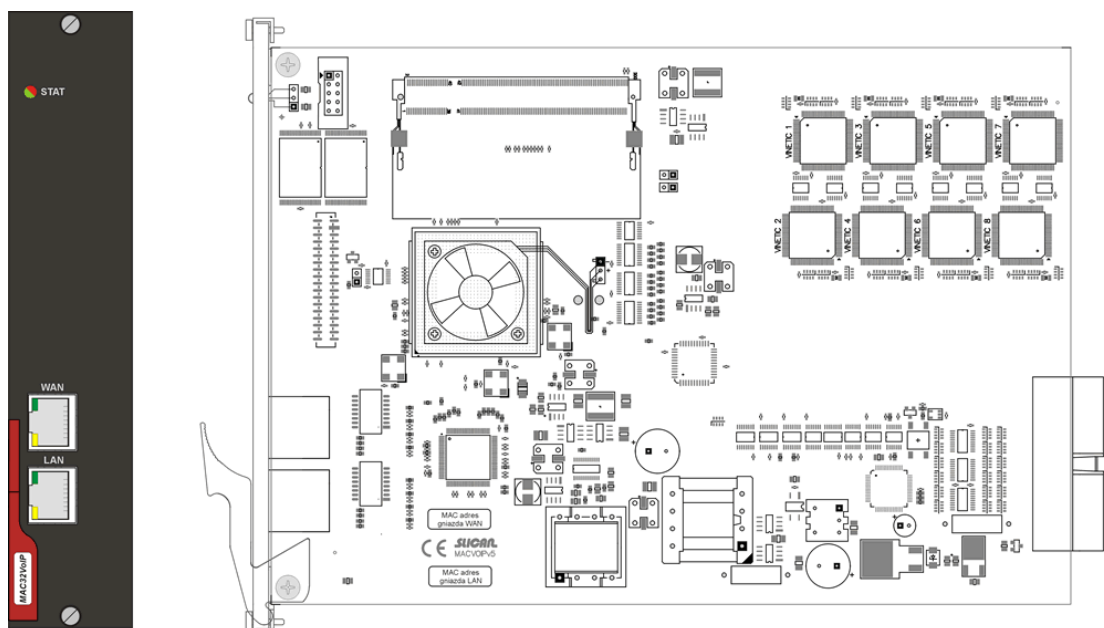
MAC address for LAN interface is located on label of PPC sub-module, while MAC address for WAN interface is located near fixing place of lever used to draw out module from PBX.

4.8.12 MAC32VoIP module

Krótki opis karty:

Module name:	MAC.M-32VoIP	VoIP cards enable calls realization via IP network. Possible to use number of channels depends on: <ul style="list-style-type: none">• Purchased license code – max 32.
Print name:	MACVOIPv5	Card can maintains up to 1000 VoIP subscribers/accounts, including: <ol style="list-style-type: none">1. up to 18th system phones CTS-202.IP2. remain VoIP subscribers/accounts are equipped with any SIP or IAX terminal (hardware or software).3. Transmission rate 10/100 Mbs
Card designation:	MAC32VoIP	Card cannot be extended. Card is equipped with Auto MDI-MDIX function.

View of the MAC32VoIP card and the card front panel:



Installation of the card in the PBX:

The card can be installed in any slot marked **Slot 1** to **SLOT 10**.

Short description of the diode on the front panel:

STAT – two-colour diode

- off: the card has not been recognised by the controller,
- flashes red: the card has been recognised but not initiated by the equipment (e.g. a faulty card, the card in the course of initialisation),
- shines constantly red: the card has been recognised and initiated by the equipment, but is not referred to in the PBX database and not connected to the controller or blocked due to the lack of SDN,
- shines constantly green: the card has been initiated and functions properly,
- shines constantly green, sometimes flashes red: a change in the configuration of the card, subscribers or translation.

Location of MAC addresses for LAN and WAN interfaces:

MAC addresses for LAN and WAN interface are located near fixing place of lever used to draw out module from PBX.

4.8.13 EbdRec calls recording module

Modules names: MAC.M-8REC-HD160GB
MAC.M-16REC-HD160GB

Print name: MACVOIPv2

Card designations: MACxREC

Short description of the card:

The EbdRec calls recording card allows registering of calls for both incoming/outgoing traffic and in the internal one.

The number of channels that can be used on the card depends on:

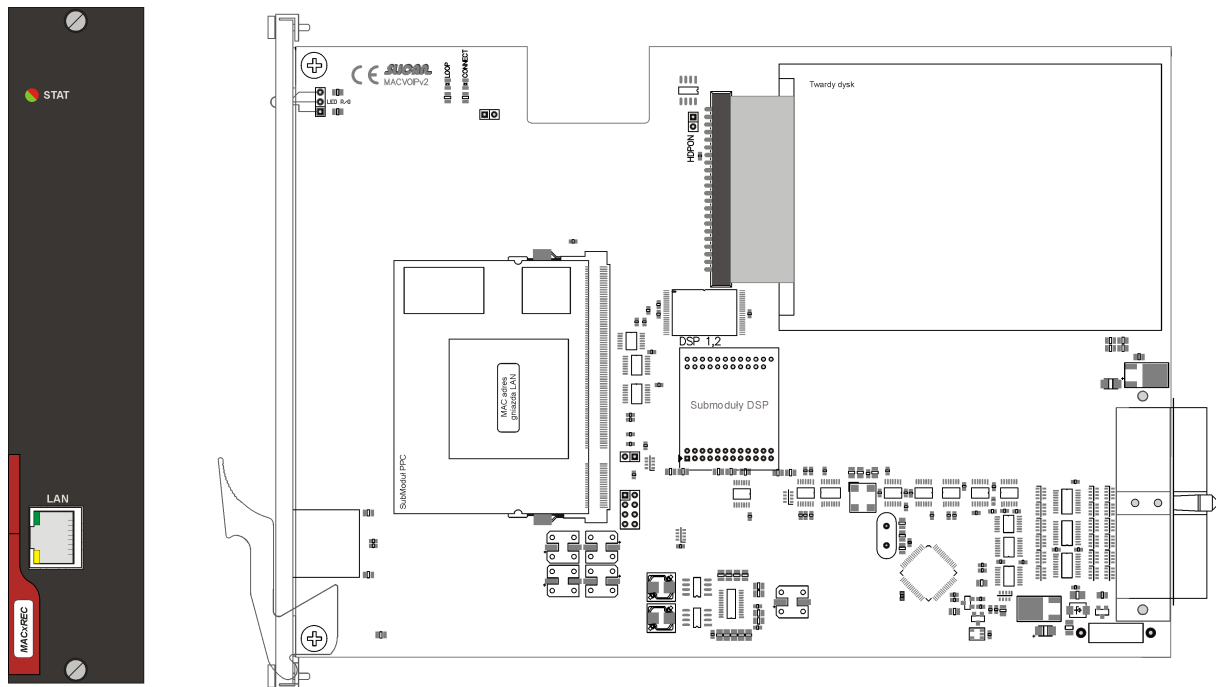
- Purchased license code,
- number of DSP sub-modules installed on the card (max 4 DSP for every card).

The capacity of the disk installed on the card makes it possible to record approx. 25000 hours of calls.

Card enables transmission rate 10/100 Mbs

Technical specification

View of the MACxREC card and the card front panel:



Cards MAC.M-8REC-HD160GB and MAC.M-16REC-HD160GB look identical, they only differ in the number of the DSP modules inserted. System maintain up to 8 cards.

Installation of the card in the PBX:

The card can be installed in any slot marked **Slot 1** to **SLOT 10**.

Short description of the diode on the front panel:

STAT – two-colour diode

- off: the card has not been recognised by the controller,
- flashes red: the card has been recognised but not initiated by the equipment (e.g. a faulty card, the card in the course of initialisation),
- shines constantly red: the card has been recognised and initiated by the equipment, but is not referred to in the PBX database and not connected to the controller or blocked due to the lack of SDN,
- shines constantly green: the card has been initiated and functions properly,
- shines constantly green, sometimes flashes red: a change in the configuration of the card, subscribers or translation.

Location of the MAC address for the LAN interface:

The MAC address for the LAN interfaces is on the label placed on the PPC sub-module.

4.8.14 GSM trunk module

Short description of the card:

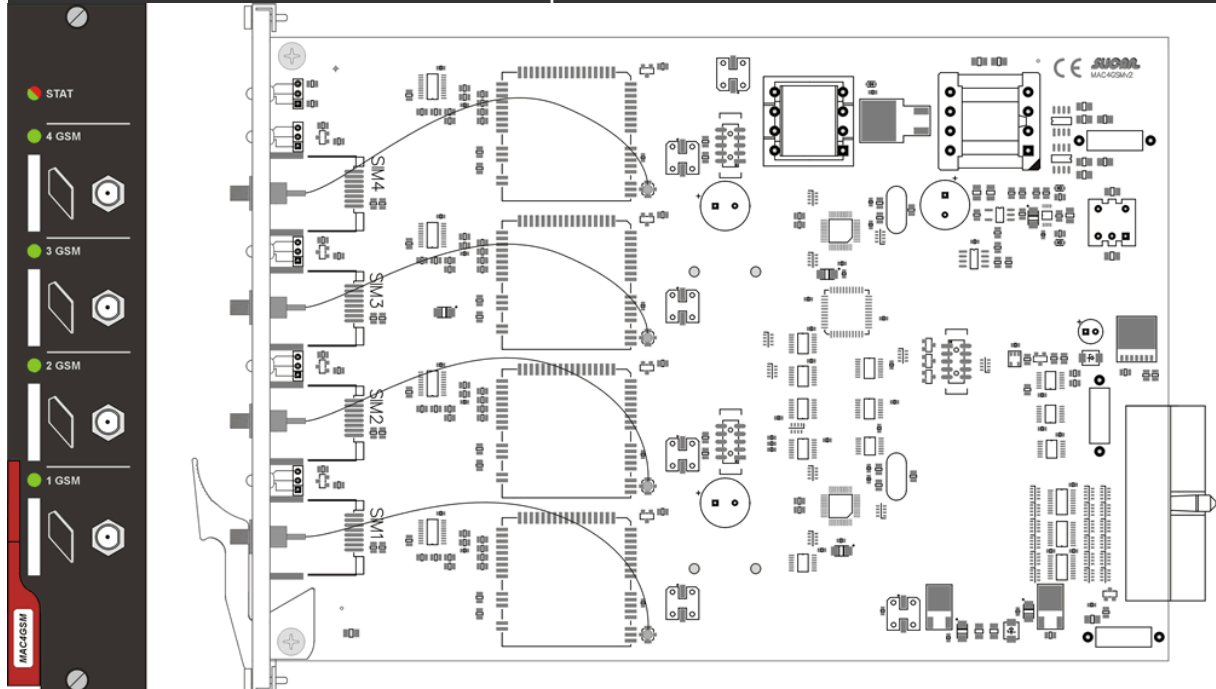
Module names: MAC.MA-4GSM
MAC.MA-2GSM
MAC.MA-1GSM

GSM trunk cards are intended for maintaining direct connections to the cellular telephony network. To operate the cards, external aerials delivered with the cards are required as well as SIM cards (to be placed on the card at sites marked SIM 1-4).

Print name: MAC4GSMv1

Card designations: MAC4GSM
MAC2GSM
MAC1GSM

View of the GSM card and the card front panel:



Installation of the card in the PBX:

All GSM translation cards are installed in slots marked **SLOT 1** to **SLOT 10**.

Short description of diodes on the front panel:

STAT – two-colour diode

- off: the card has not been recognised by the controller,
- flashes red: the card has been recognised but not initiated by the equipment (e.g. a faulty card, the card cannot be programmed, the card in the course of initialisation),
- flashes green: the card in the course of programming,
- shines constantly red: the card has been recognised and initiated by the equipment, but is not referred to in the PBX database,

Technical specification

- shines constantly green: the card has been initiated and functions properly,
- shines constantly green, sometimes flashes red: traffic on one of the accessories (a ring, an output to translation, and logging with the operator).

[1-4] GSM – the green diode

- is off: the GSM module is switched off,
- flashes (0.5 s. – ON, 0.5 s. – OFF): initialisation,
- flashes (0.25 s. – ON, 3 s. – OFF): a subscriber logged to the network,
- shines constantly: an ongoing call.

Outer aerials for GSM trunk cards:

Aerials with integrated plugs for installing on the cards are delivered with GSM translation cards. The set is as shown below.



The aerials should be connected to the front panel of the GSM card. The SMA type plug of the SMA aerial cable (3 m long) should be tightened carefully. Incautious use of tools may result in damage to the connection. The aerial must only be connected or disconnected with the PBX switched off.

A suitable aerial arrangement is essential for quality of signal reception. Therefore, the aerials should be placed in a vertical position, as far as possible from the PBX and from other electrical and electronic equipment emitting electromagnetic radiation which might interfere with the GSM signal and adversely affect the PBX operation.

Aerial cables should not be installed in parallel with the PBX cabling. Two ports located in the upper rear part of the PBX casing are intended for leading out the cables (this applies to designs in manufacturer 12U and 22U casings).

Make sure that the aerial is not used in the direct vicinity of working stations. Aerials must not be installed in places where mobile telephones are used.

4.8.15 Controlling module 4RL4SN

Short description of the card:

Module names: MAC.MRJ-4RL4SN

Print name: MAC8RELV0

Card designations: MAC8REL

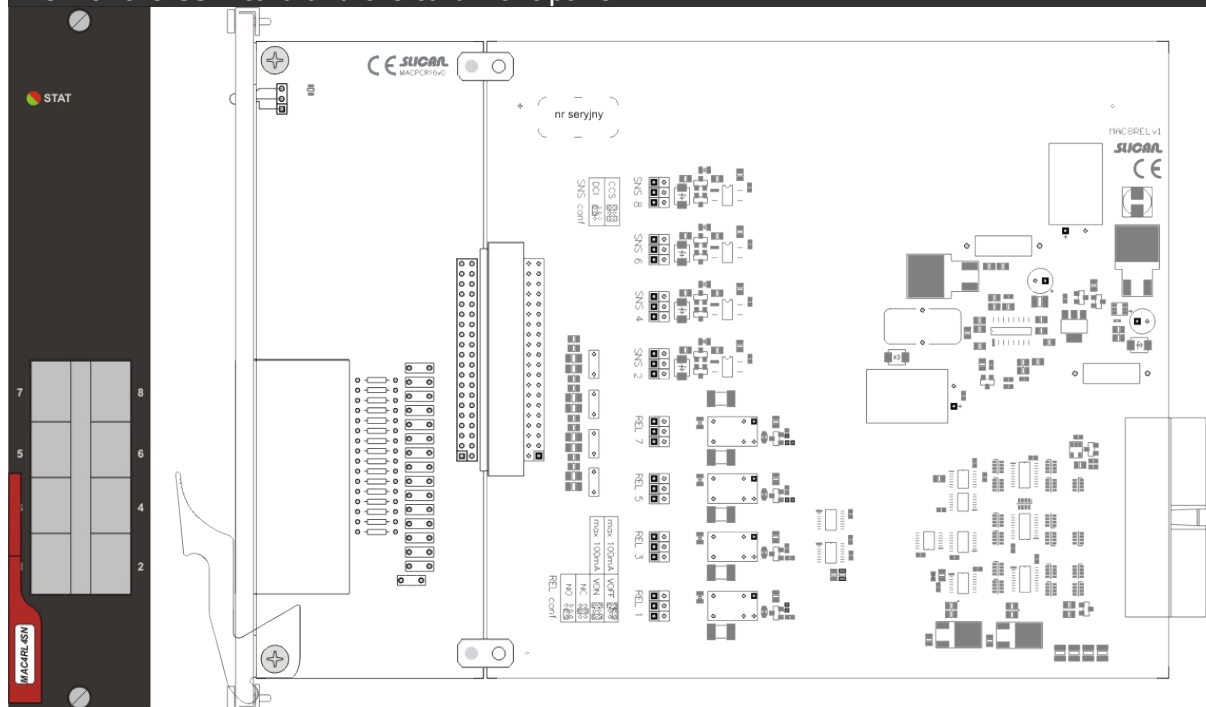
Controlling card is equipped with following ports:

- 4 REL relay terminals,
- 4 SNS sensor terminals.

SNS working modes:

- DCI – voltage release - Max 5-30V DC
- CCS – shorting release

View of the GSM card and the card front panel:



Short description of card:

Cards **4RL4SN** are equipped with following ports:

- 4 REL relay terminals,
- 4 SNS sensor terminals.

CNS working modes:

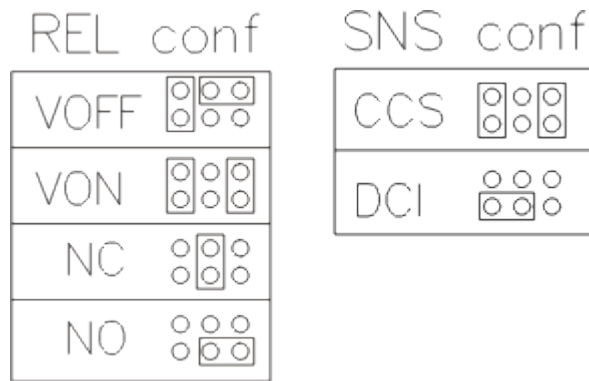
- DCI – voltage release - Max 5-30V DC
- CCS – shorting release

REL working modes:

- NO (Normal open)/NC (Normal connected)- shorting/pause release - Max. load 42Vac/0.5A, 42Vdc/1A
- VON (voltage release) / VOFF (lack of voltage release) – V=24V/max:100mA

Technical specification

Configuration:



Installation of the card in the PBX:

All GSM translation cards are installed in slots marked **SLOT 1** to **SLOT 10**.

4.8.16 Shelf supply unit module

Short description of the card:

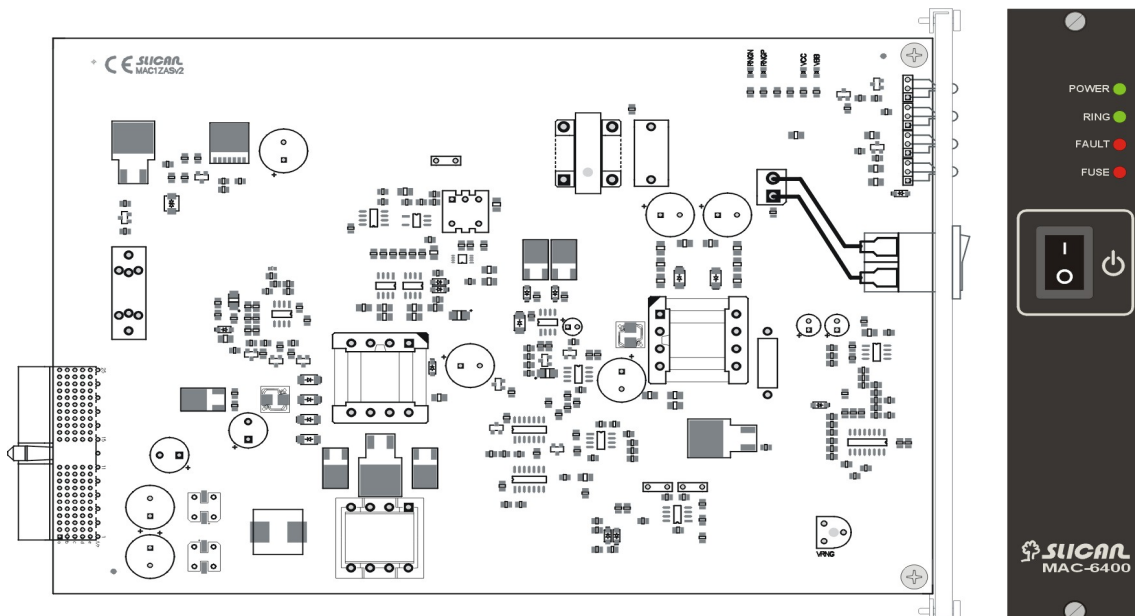
Module name: MAC.M-1ZAS

Print name: MAC1ZASv2

Shelf supply unit cards are intended for power supplying the PBX shelf equipment. Only one supply unit can be installed on each shelf.

Card designation: MAC1ZAS

View of the shelf supply unit card and the card front panel:



Installation of the card in the PBX:

The shelf supply unit card is installed in the slot dedicated for the unit and marked **POWER**.

Short description of diodes on the supply unit front panel:

POWER – green diode

- on: the power supply unit functions correctly (values of VCC, VBB and VLL voltages are correct)

RING – green diode

- on: the RNG voltage level is above 45V AC

FAULT – red diode

- constantly on: there is a power supply failure – the supply voltage too low or too high, a short-circuit/overload on the shelf or a blown fuse

FUSE – red diode

- constantly on: the fuse has blown

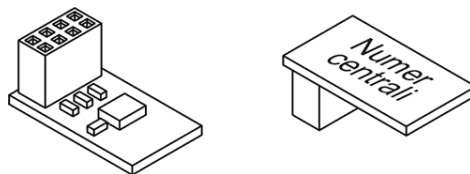
4.8.17 PBX electronic number (SDN) submodule**Short description of the card:**

Module name: SM.SDN

Print name: SDNv0

Types of cards: SDN

An PBX electronic number submodule is a physical system installed on the PBX controller card, in its memory the PBX factory number is stored. If the PBX has a different number than that in the submodule, or does not have any number at all, the licenses assigned to the PBX will not be active. Any purchased licences will also be blocked when the sub-module is removed from the PBX.

View of the SDN submodule card:**Installation of the card in the PBX:**

The SDN sub-module card is installed on the PBX main controller card.

4.8.18 DSP submodule

Short description of the submodule:

Sub-module name: SM.DSP

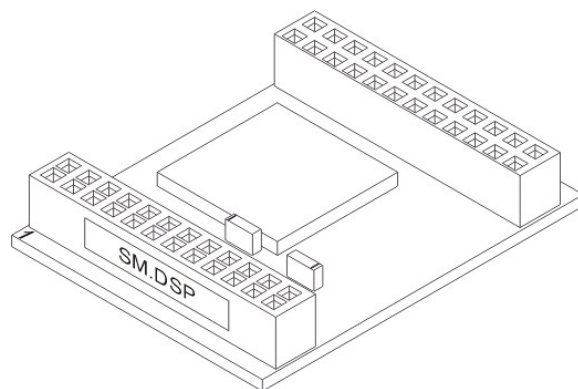
DSP sub-modules occur in two designs:

1. SM.DSP - supports G711a/ μ and GSM codecs
Can be used on VoIP and REC cards
2. SM.DSP-V - supports G711a/ μ and G729 codecs
Can be used on VoIP cards.

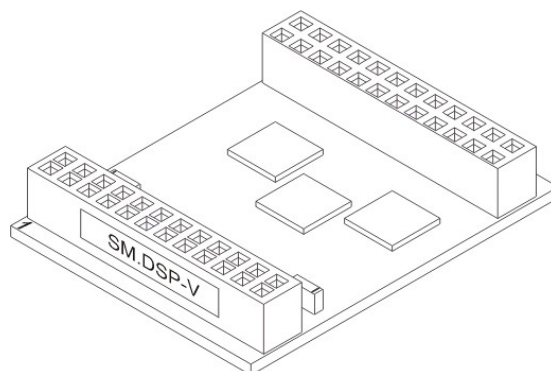
Print name: DSPMODv1

Sub-module designation: DSP

View of the DSP submodule:



View of the DSP-V submodule:



Installation of the card in the PBX:

DSP sub-modules are installed directly on the VoIP or REC cards or at the sites marked DSP 1,2 and DSP 3,4. Blinded hole for pin facilitates inserting, prevents against mistake. Sub-modules are located with surface wit printing to card (VoIP or REC).


5 System installation

5.1 Installation requirements

- The PBX should not be installed:
 - in highly insulated rooms,
 - in rooms with a high humidity level,
 - in rooms with a high dust level,
 - too close to equipment emitting a strong electromagnetic field,
 - in rooms where the PBX may be exposed to chemical agents.
- It is recommended to install the PBX in a vertical position in the manufacturer's 19" casing or in the customer's casing that complies with the requirements for fire-safe casings in conformity with the PN-EN 60950 standard "Safety of information technology equipment". If the PBX is installed in the user's rack, a required space for installation of individual PBX components must be provided. This applies to both PBX shelves and cabling, as well as the power supply system with the battery power supply support.
- Due to some service activities, e.g. replacement of batteries, it is recommended that the rear panel of the PBX casing is at some distance from the wall of the room where the equipment is to be operated.
- The PBXs should be power supplied from a 230V, 50Hz AC power grid.

WARNING!

The 230V main socket for power supplying the PBX should be fitted with a protective grounding pin and the effectiveness of the so provided electric shock protection should be confirmed with a relevant official record. Failure to comply with the above requirement is a cause of electric shock hazard!

- At the installation site, an access must be provided to the main earthing bus (terminal) so that to enable earthing of the PBX (through connecting a cable, with a cross section conformable with the relevant standard, to the protective earthing terminal marked as ).

WARNING!

The PBX must ALWAYS be earthed (irrespective of whether the PBX is installed in the manufacturer's casing or in the user's rack), considering the earthing impact on the effectiveness of protection against voltage surges from telecommunication lines connected to the MAC-6400 PBX. For the same reason, one should remember to tighten firmly enough those screws fastening accessory card front panels to the PBX shelf casing.

5.2 Installation requirements regarding the emergency supply system

Slican MAC-6400 PBXes are fitted with an emergency power supply system. To enable system functioning, the PBXes installed in manufacturer's 19" casings have been equipped with 3 **12V/17Ah** batteries connected in series.

When an order is placed for PBXes intended for installing in the customer's rack, the accumulator battery is optional equipment. The recommended accumulator batteries are EP 17-12 by EUROPOWER, or their equivalents.

5.3 Instructions for PBX installation in the user's casing

5.3.1 Inter-shelf connections in front of the PBX

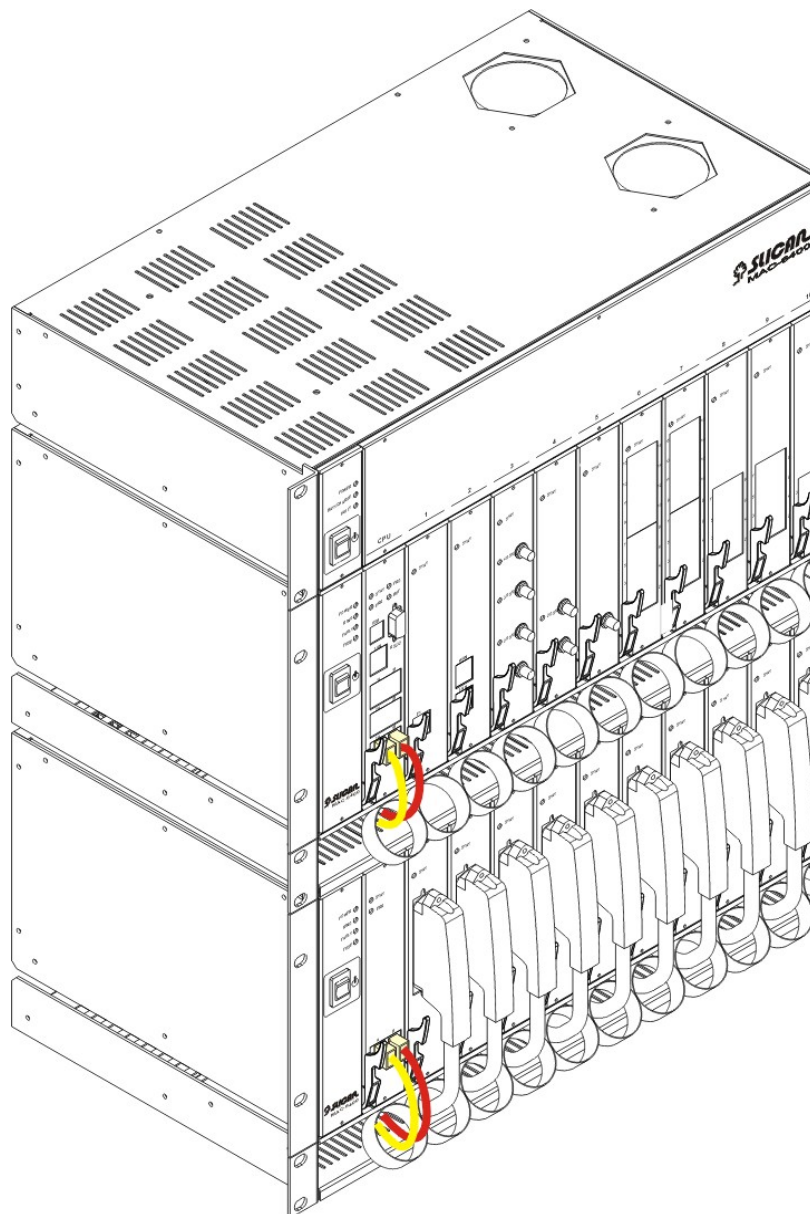


Fig. 5.1.: Inter-shelf connection in MAC-6400.EU-2SH

Inter-shelf connections at the front of the PBX are limited to connecting interfaces 1A and 1B of the slave controller (SPU) with respective interfaces A and B of the master controller (MPU) by means of the provided cables as ended with RJ-45 plugs. The *yellow cable*, marked additionally with label 1A (presented in the above Figure on the left-hand side) is intended for connecting A sockets, whereas the second *red cable*, designated as 1B, connects the B ports. The table below presents the connection system:

Controller interface Slave shelf number	SPU	MPU	Cable colour	Cable designation
1	A	1A	yellow	1A
	B	1B	red	1B
2	A	2A	yellow	2A
	B	2B	red	2B
3	A	3A	yellow	3A
	B	3B	red	3B

Table 5.1: System of inter-shelf connections between controllers

WARNING!

Any change in the length of the cables connecting A and B interfaces is not allowed for the sake of the cable transmission properties.

5.3.2 Connections at the back of the MAC-ZERO

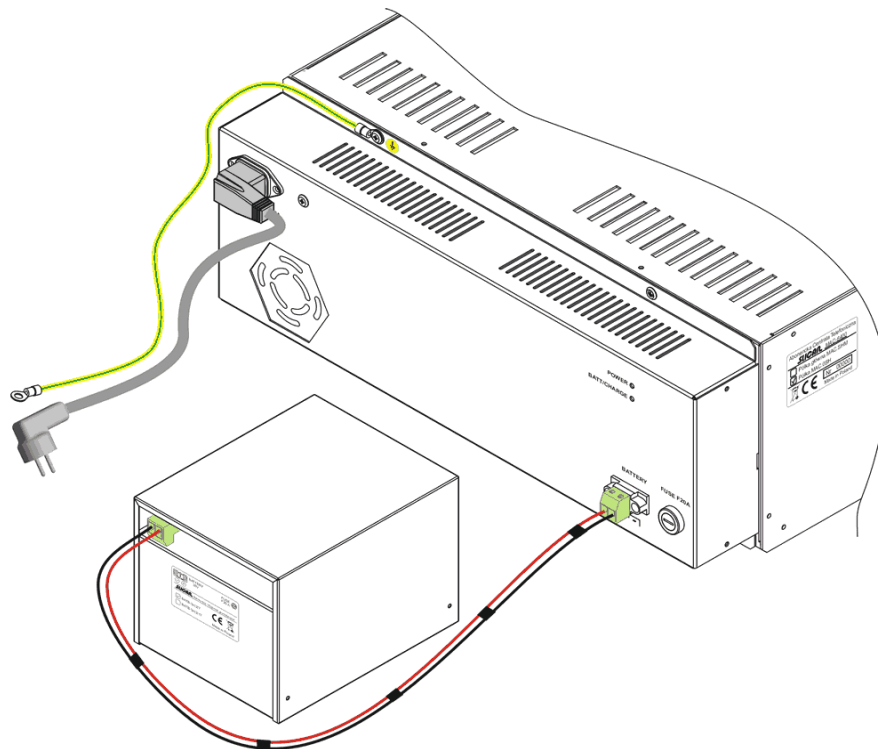


Fig. 5.2.: Connection of Slican MAC-ZERO

On the rear side of PBX there are following terminals:

- Socket for connecting power supply 230V~.
- Socket for connecting bateries of backup supply.
- Fuse socket.

5.3.3 Inter-shelf connections at the back of the MAC-6400

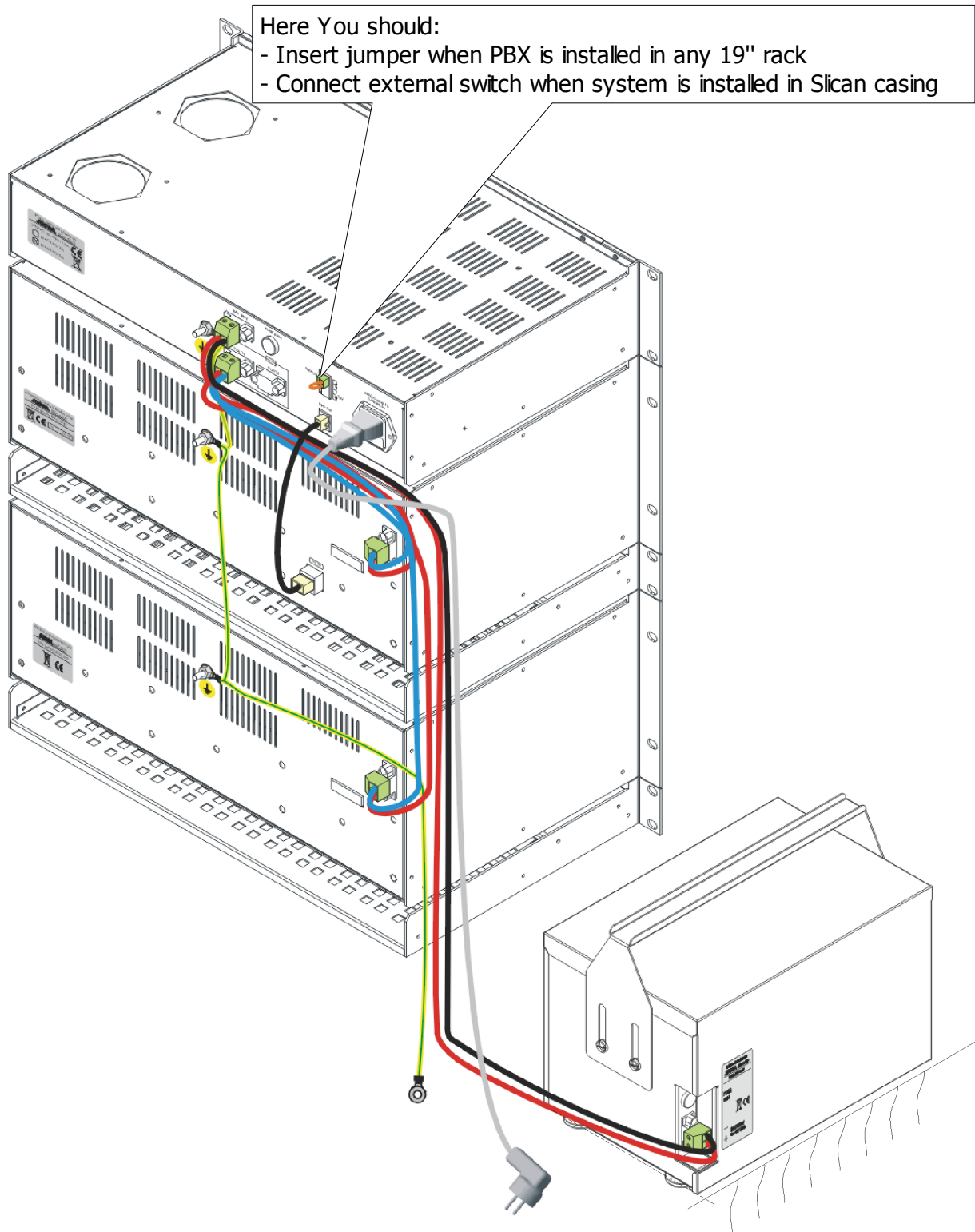


Fig. 5.3. Inter-shelf connection for MAC-6400.EU-2SH

The following connections are to be made at the back of the PBX:

- main supply unit shelf – PBX shelves,
- main supply unit shelf – accumulator battery,
- equalizing connection between shelves (optionally, depending on the rack design).

The first type connections are related to supply distribution. Using the cables provided ending with *green* plugs (to rule out the possibility of confusing the polarity while connecting), the supplying VOUT outputs of the main supply unit must be connected with the VIN inputs (sockets also in *green*) situated on individual shelves. The VOUT1 output supplies the master shelf and the first slave shelf and VOUT2 the second and third shelves which are equipped with slave controllers.

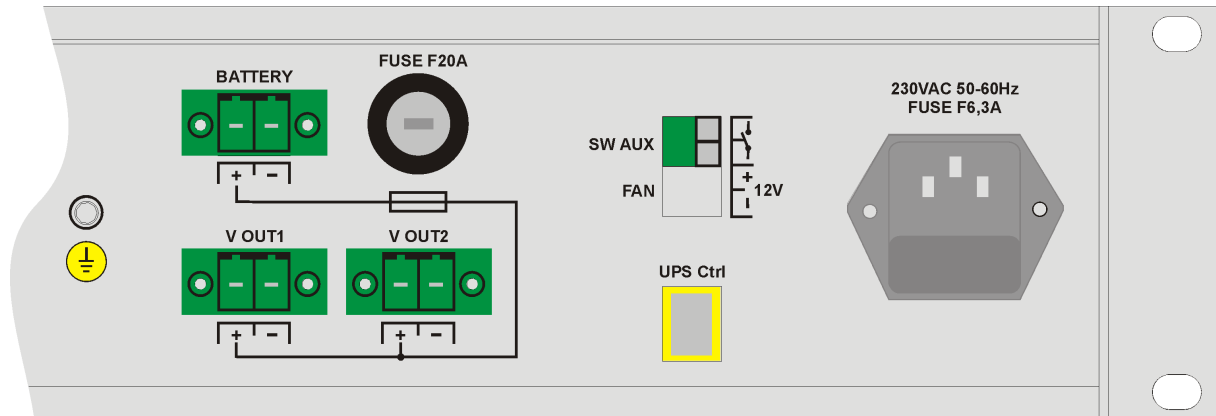


Fig. 5.4. Back view of main supply unit

Additionally, a connection must be made between UPS Ctrl sockets that are situated on the master shelf (as equipped with the MPU) and the main supply unit shelf. The black cable ended with RJ-45 plugs is used for this purpose.

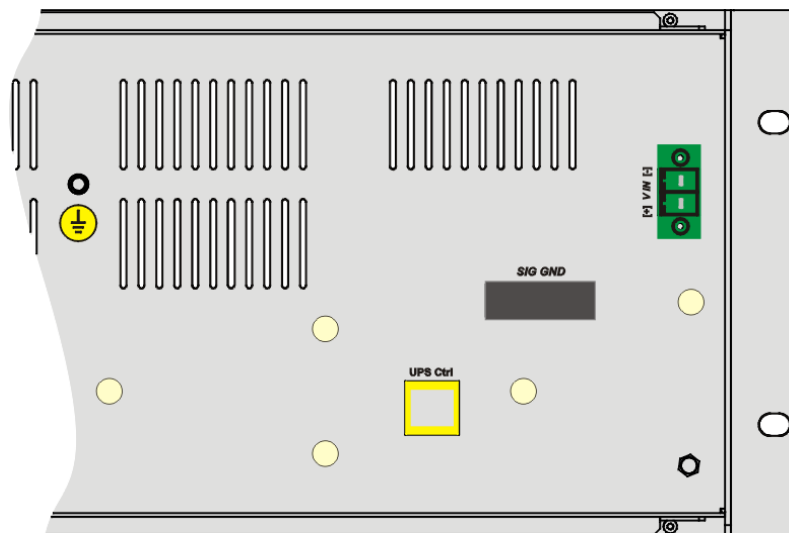



Fig. 5.5.: PBX master shelf – back view

5.3.4 Backup supply

To connect the accumulator battery, just make a connection between the BATTERY socket of the main supply unit and the socket situated on the battery housing (the connection cable is delivered with the housing).

The equalising connections are optional and depend on the type of the rack where the

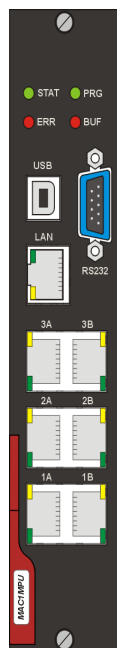
system is installed. If the manufacturer of the rack specifies that the rails to which shelves with equipment are to be bolted down to provide an electrical connection between individual shelves and the outer casing or the rack, it is not necessary to make such connections. Otherwise, equalising connections have to be made (the cable cross-section should be chosen in conformity with the relevant standard) between individual shelves and the rack protective terminal which should be marked with the following symbol:  (the same symbol is used for marking the sites on PBX shelves casings where the equalising cable should be connected).

It is possible to connect to the PBX an additional main switch that can be used, for instance, in emergency situations. To this end, the engaging cable in the SW AUX socket (situated at the back of the main supply unit casing) must be removed and replaced with the switch cables. As a result, the switch will be connected in series with the main supply unit switch, therefore remember that both switches must be ON (i.e. in position "1") so that the power is supplied to the individual shelves.

6 Connections and interfaces

6.1 Computer interfaces in MAC-6400 PBXs

Slican MAC-6400 PBXs can be reached locally by means of RS232 or USB connections or the LAN. The PBXs can also be connected to the WAN network. The WAN port is accessible, depending on whether or not the VoIP module is used in the system. All connections, irrespective of the design, are lead to the front panel, as shown in the illustrations.



1. RS-232 – available on the master controller card panel. It ensures access to HOTELP and CTIP protocols.

2. Ethernet LAN (RJ-45) – available on the master controller card. It makes it possible to manage the PBX through the LAN network, with the use of the ConfigMAN software, as well as cooperation TelefonCTI applications. Moreover, HOTELP and CTIP are available on this interface.

1. Ethernet LAN (RJ-45) – ensures VoIP communication in the local network.

2. Ethernet WAN (RJ-45) – ensures VoIP communication in the extended network.

3. USB – allows managing locally the PBX with the use of the ConfigMAN software.

6.2 Data communication interfaces

<i>Names used by Slican</i>	<i>Equivalent names applied by other manufacturers</i>	<i>Functionality</i>
CTS	U _{p0}	Digital port for CTS-202 and CTS-202.Plus telephone sets
AB	a/b; FXS	Internal analogue port
ASS	POTS; C.O.; FXO	External analogue port
ST	BRI (2B+D); S ₀ ; S ₀ int/ext;	ISDN out./in. digital port
E1	PRA; PRI (30B+D); S _{2M} ;	ISDN route digital port
LAN	Ethernet	Port LAN
WAN	WAN	Port WAN
GSM	GSM	Port GSM

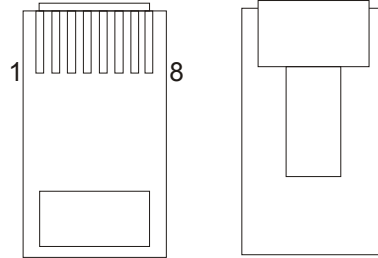
WARNING!

The interface is accessible at the PBX provided that the PBX is fitted with appropriate cards.

6.3 Lines fitted with RJ-45 plugs

Access E1

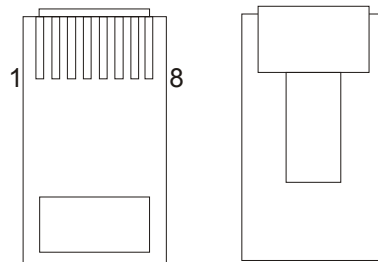
PIN	FUNCTION
1	RX1 (receiving pair)
2	RX2 (receiving pair)
3	GND
4	TX1 (sending pair)
5	TX2 (sending pair)
6	GND
7	GND
8	-36V ÷ -41,5V (supply of the HDSL modem)



Interface ST

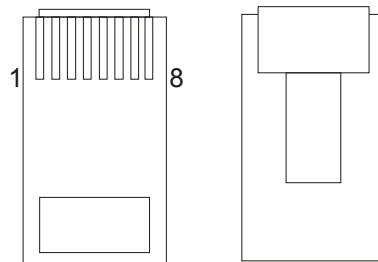
Set as INT

PIN	FUNCTION
1	
2	
3	LRA (receiving pair)
4	LXA (sending pair)
5	LXB (sending pair)
6	LRB (receiving pair)
7	
8	



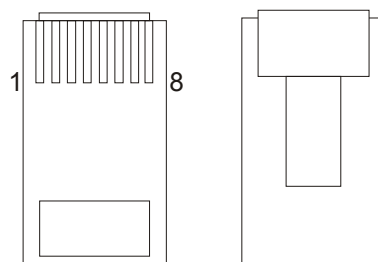
Set as EXT

PIN	FUNCTION
1	
2	
3	LXA (sending pair)
4	LRA (receiving pair)
5	LRB (receiving pair)
6	LXB (sending pair)
7	
8	



Interfaces ASS, AB, CTS

PIN	FUNCTION
1	
2	
3	
4	Line
5	Line
6	
7	
8	



6.4 Lines fitted with RJ-21 plug

Analogue and digital internal lines can be connected to a distribution frame situated in the vicinity of the PBX, and then to the MAC system (via *MAC.PCKB-16AB* front panels) with the use of 21-pair cable ended with the RJ-21 plug (*MAC.KB21-6m* – cable 6 metres long with the CENTRONICS 50-pin angle plug).

Interface AB, CTS

<i>Pair no.</i>	<i>Conductor "a" insulation colour</i>	<i>Connection lead no.</i>		<i>Conductor "b" insulation colour</i>
1	White	1	26	Blue
2	White	2	27	Orange
3	White	3	28	Green
4	White	4	29	Brown
5	White	5	30	Grey
6	Red	6	31	Blue
7	Red	7	32	Orange
8	Red	8	33	Green
9	Red	9	34	Brown
10	Red	10	35	Grey
11	Black	11	36	Blue
12	Black	12	37	Orange
13	Black	13	38	Green
14	Black	14	39	Brown
15	Black	15	40	Grey
16	Yellow	16	41	Blue
17	Yellow	17	42	Orange
18	Yellow	18	43	Green
19	Yellow	19	44	Brown
20	Yellow	20	45	Grey
21	White-blue	21	46	Blue
		22	47	
		23	48	
		24	49	
		25	50	

7 Specification of technical parameters of the Slican MAC-6400 PBX

CONNECTIONS

- VoIP
- CTS for CTS-202.IP

SIP, IAX

VoIP system digital telephone sets cooperating with the PBX with the use of a protocol developed by Slican

- GSM
- S₀ (2B+D) configurable
- S_{2M} (30 B+D)
- CTS for CTS-202 and CTS-202.Plus
- Analogue

Dual Band: GSM 900, GSM 1800

DSS1 (EURO-ISDN) protocol

DSS1 (EURO-ISDN) External protocol

Contacts for system digital sets with a signalling system developed by Slican

As per ASS signalling system

POWER SUPPLY

- Supply voltage
- Power consumption

~230V ± 10%, 50Hz

max 400W for MAC-6400.xU-2SH

max 740W for MAC-6400.xU-4SH

EMERGENCY SUPPLY

- Battery capacity / type
- Estimated time for supporting power supply from batteries

3 x 12V/17Ah (recommended batteries: EP 17-12 from EUROPOWER or their equivalents)

4h for the PBX with a capacity of approx. 500 ports

8h for the PBX with a capacity of approx. 100 ports

INTERFACES

- LAN
- RS – 232
- USB
- WAN

Ethernet 10/100 Mbps

2.0

Ethernet 10/100 Mbps

8 External dimensions of MAC-6400 PBXs

Casing dimensions

<i>Dimension</i>	<i>12U casing</i>	<i>22U casing</i>
<i>Hight</i>	840mm	1290mm
<i>Wide</i>	550mm	550mm
<i>Depth</i>	430mm	430mm

Dimensions without casings (with power supply unit)

<i>Dimension</i>	<i>MAC-6400.EU-0SH</i>	<i>MAC-ZERO</i>
<i>Hight</i>	102mm	102mm
<i>Wide</i>	483mm	483mm
<i>Depth*</i>	295mm	313mm

* Place for power plug should be added

9 Safety requirements in operating Slican MAC-6400 PBXes

A rigorous observation of safety rules is an absolute requirement for proper equipment operation.

The rules presented below are a basis for the manufacturer's considering any complaints and comments of the users.

The presented principles apply to installation and location of the PBX as well as to requirements regarding the power network and the data communication network.

9.1 Installation and service

- The equipment should be installed and started up by a qualified service centre authorised by the manufacturer.
- Any installation activities must be performed in compliance with proper installation rules and industrial safety regulations.
- Switches on the casing and the main supply unit put the equipment into the state of readiness and as a result, dangerous voltage may occur in the equipment.

9.2 Working environment

- The equipment should not be installed in any room with a high humidity in consideration of the service life and quality of operation of electronic components.
- In view of the risk of flooding with water, the equipment must not be placed in the vicinity of water reservoirs (e.g. tanks, taps).
- The PBX may not be placed in rooms with a high dustiness or a high electromagnetic field intensity.

In view of possible malfunctioning, interferences or discolouration of the casing, do not install the system:

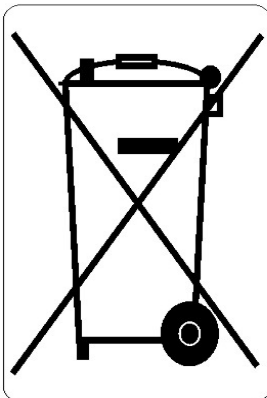
- in places directly exposed to sunrays,
- in places where vibrations or impacts are particularly frequent or strong,
- in the vicinity of radio aerial (in particularly in the shortwave range).

9.3 Electrical requirements

- The equipment should have a proper neutral earthing in the electric network or must be earthed. The quality of protective earthing should be systematically checked.
- All devices connected to the PBX should have certificates of conformity with the standards effective in the European Union.

10 Declaration of conformity and the proper disposal of the product

DECLARATION OF CONFORMITY			CE
Manufacturer: SLICAN sp. z o.o. ul. M. Konopnickiej 18 85-124 Bydgoszcz	Type: Subscriber telephone PBX	Model: SLICAN MAC-6400	
Product description: A subscriber telephone PBX with a modular construction and capacity of up to 640 ports. The following devices can be connected to the PBX: analogue all-purpose telephone sets with the decade dialling and DTMF, Slican system digital telephones of the CTS-202 series as well as ISDN (EuroISDN) terminals, VoIP (SIP, IAX) terminals, telephone PBX interface for the cellular telephony network and VoIP, gatephones, and, through the MAB adapter, acoustic devices. The PBX may cooperate with the public utility telecommunication network by means of analogue connections with the ASS signalling system, ISDN (EuroISDN) digital connections, including the BRA basic access and the PRA primary access, VoIP (SIP, IAX), GSM (1800MHz, 900MHz). The PBX supports protocols for communication between the PBX and the CTIP (<i>Computer Telephone Integration Protocol</i>) internal computer network as well as the HOTELP.			
The product is conformable with Directive 99/5/WE R&TTE and complies with the requirements of the following harmonised standards: EN 60950-1:2001 + A11:2004; EN 55022:1998 + A1:2000 + A2:2003; EN 55024:1998 + A1:2001 + A2:2003; EN 61000-3-2:2006; EN 61000-3-3:1995 + A1:2001			
Additional information: The current Declaration of conformity can be downloaded from our website www.slican.pl The equipment has been tested in a typical configuration, with connection to the telecommunication network and to typical cooperating devices of other manufacturers. It complies with technical and operational requirements for subscriber telephone PBXs and digital commutation systems for the Polish public utility telecommunication network. It also complies with the requirements concerning admissible disturbance levels for category B equipment. In the event of improper equipment installation, the equipment will be classified to category A, where the following warning formula applies: "The equipment is a category A product. In the home environment, it may cause radio frequency interferences which require taking suitable remedies by the user".			
Bydgoszcz, 20-11-2007		Dyrektor ds. Rozwoju  Czesław Noga CZŁONEK ZARZĄDU	



Proper equipment disposal (used electric and electronic equipment)

This designation placed on product or in texts regarding this product means, that after product operating time it shouldn't be removed together with other household wastes. To avoid harmful influence on natural environment and humans health as a result of uncontrolled waste removal, product should be separated from wastes of other types. It also should be properly recycled to enable reusing resources.

To obtain information about place and mode of environmental safe recycling this product individual user should contact with retail shop or local authorities. Business users should contact with supplier and check contract conditions. Product should not be removed together with other commercial wastes.