DIGITAL INTERCOM
TB7000

INTERCOM DIGITAL DE COMUNICACIONES

SISTEMA INDICO

KROMA TELECOM S.A

MANUAL
TB7000D01

V 1.3
August 2004

KROMA
TELECOM S.A.

Pol. Ind. Alcobendas - C/ La Granja, 80
28108 Madrid - SPAIN
Tel. 34 91 661 45 14
Fax. 34 91 484 03 49
www.kromatelecom.com
intercom@kromatelecom.com

0 HISTORIC REVIEW

V1.3 AUGUST 2004

- New Desktop Panel TP7210.
- New Menu for TP7100 LCD.
- Level variation at analogue interfaces TA7000.
- Electric schematics incorporated.
- Manuals unified (technical, user, software).

V1.2 OCTOBER 2003

- INDICO GUI Upgrade
- New equipments:
  - TM7016, TM7024 matrixes (16x16 and 24x24 XPT respectively).
  - TW7000 Wireless Intercom System.
  - TA7004 Telephone Set Interface.
- New Functioning:
  - Online Menu.
  - XPT by DTMF telephone set.

V1.1 AUGUST 2003

- Individually installed equipments:
  - Rear panel views.
  - pinout for the new double rear panel for interfaces.
- New functioning:
  - Tally's at terminales.
  - XPT by DTMF telephone set.
- INDICO GUI Upgrade.
- New equipments:
  - TA7001 interface for ISDN Audiocodec (Pronto2).
  - TA7002 PSTN line interface.

1 MAIN FEATURES TB7000

1.1 MASTER TM7000

- Controller can manage up to 128x128 (which consists of four 32x32 matrixes).
- Up to 8 config maps can be stored, called.
- Map loading from floppy disk (via front panel or PC).
- User interface thru LCD and front keyboard: status checking, ports assigned and maps available.
- Map config thru windows-run “Indico” software.
- PC Connection thru RS232, which allows online edit & load of maps, XPT checking.
- Redundant PS available with voltage leds.
- Connection thru twisted 8-wire FTP CAT 5 with RJ45 connectors.

1.2 MATRIX TM7032

- 32-port modules (32x32 crosspoints), escalable to 128x128 (four 32-port modules). For more-than-128x128 maps, a RL7124 router is needed (1024x1024 max).
- Distributed topology: phisically separated units are networked thru local ring.
- XPT level variation from –12dB till +12dB.
- 16-bit digital resolution.
- Connection thru twisted 8-wire FTP CAT 5 with RJ45 connectors.

1.3 PANELS TP7000

- Transmission/Reception of audio/data in digital format, full duplex, with independednt lines in each way of the cable.
- Diverse functioning of keys (LATCH or PTT or both) configurable via software at user level.
- 24-bit codec with 41,66Khz interpolation.
- Level control of digital port and analogue aux port thru a potentiometer at front panel.
- XPT level variation from –12dB till +12dB.
- Analogue Aux Input/Output. As an option, this port can be connected to an analogue matrix (KROMA TB6000 type).
- Dettachable mic with XLR connector: choose among dynamic or electrect by jumper hardware.
- Headset connection thru front panel with jack connector.
- GPIO Input/Output with aux tally.
- External Power Supply (+15v).
- Connection thru twisted 8-wire FTP CAT 5 with RJ45 connectors.

- Different type of panels:
    - TP7016 -> 16-key panel. 1 Unit high.
    - TP7010 -> 16-key panel with double LCD and reconfigurable labels. 2 Units high.
    - TP7100 -> 8-key panel with graphic LCD that allows the systems configuration. 2 Units high.

- TP7210 -> Desktop 16-key panel with LCD and dialling keypad for managing calls.

1.4 INTERFACES

- They can either fit into the frame rack TR7000 or being rack-mounted.

1.4.1 INTERFACES FOR RACK FRAME TR7000

- Interface Boards for connecting external audio sources, analogue signals or interconnections with other equipments, to be fitted into the rack frame TR7000.
- Each rack frame can have up to 12 boards (6 pairs).
- 24-bit resolution codecs.
- Input/Output analogue margin: 12dBv.
- Level variation of digital ports from -12dB and +12dB.
- Different types of interfaces:
    - TA7000 -> Interface for 4-wire analogue sources. With 4 ports. Transformer-isolated.
    - TA7003 -> Interface for 2-wire analogue sources. With 4 ports. Transformer-isolated.
    - TA7002 -> Interface for PSTN telephone lines. With two ports. It implements FXO interface (tip, ring).
    - TA7004 -> Interface for Phonesets. With two ports. I t implemets FXS interface.
    - TD7000 -> Interface for ISDN (G.711 protocol). With two ports. Configurable for two B channels of one line or one B channel of two lines.
    - TA7001 -> Interface for ISDN (G.722 protocol). With two ports. For remotely controlling Pronto2 audiocodec from an user panel.
    - TD7001 -> Interface for GSM (900Mhz y 1800Mhz). With one port.
- Each digital port has independent inputs, so they can be grouped via software.
- Connection thru twisted 8-wire FTP CAT 5 with RJ45 connectors.
- Analogue connection thru SUBD9 and SUBD62 (high density).
- Redundant Power Supply with led indicators.

1.4.2 AUTONOMOUS UNITS

- Autonomous Units for the interconnection of external networks to the intercom system, GPIOs, repeaters, etc.
- Integration with config software (INDICO).
- 24-bit resolution codecs.
- Input/Output analogue margin: 12dBv.
- Individual level variation between -12dB and +12dB.
- Interfaces:
    - TI7011 -> Interface for connecting Voice-Over-IP to the digital matrix. Useful for remote panels without matrixes and connection with systems via virtual IP port (100Kb/s minimum bit rate).
    - GP7020 -> With 20 configurable GPIOs. Optoisolated inputs are activated by tension, inputs are activated by contact closure.
- Connection thru twisted 8-wire FTP CAT 5 with RJ45 connectors.

1.5 MECHANICAL SPECIFICATIONS

- TM7000 → 1 Unit high, full rack, 41 cm deep, 6,5 Kg weight.
- TM7032 → 1 Unit high, full rack, 47 cm deep, 4 Kg weight.
- TM7064 → 2 Units high, full rack, 41 cm deep, 8 Kg weight.
- TM7096 → 3 Units high, full rack, 47 cm deep, 12 Kg weight.
- TM7128 → 4 Units high, full rack, 47 cm deep, 16 Kg weight.
- TP7010 → 2 Units high, full rack, 15 cm deep, 3,4 Kg weight.
- TP7016 → 1 Unit high, full rack, 15 cm deep, 2,5 Kg weight.
- TP7100 → 2 Units high, full rack, 15 cm deep, 3,4 Kg weight.
- TP7210 → 8,5 cm high, 26,5 cm wide, 18 cm deep. 2,1 Kg weight.
- TR7000 → 3 Units high, full rack, 35 cm deep, 4 Kg weight (w/o boards).
- TI7011 → 1 Unit high, full rack, 32 cm deep, 4,7 Kg weight.
- GP7020 → 1 Unit high, full rack, 18 cm deep, 2,2 Kg weight.

2 SET UP

2.1 MASTER TM7000

When rack-mounting the controller, **leaving one free unit high above it is recommended for ventilation purposes**.

One external power supply is provided with the equipment. Redundant PS is advisable though. Its connectors are located at the right side of the rear panel, labeled as A and B. A front led would indicated when a missing or faulty PS.

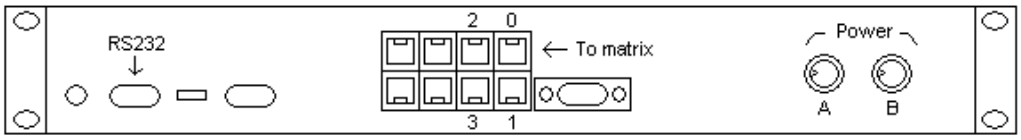


Figure 2.1 Rear View of TM7000.

RS232 communication (PC) is done via propietary protocol. For the cabling, follow this pinout:

SUBD9 MALE PC	SUBD9 MALE MASTER
1 No connect	1 No connect
2 Transmitter	2 Transmitter
3 Receiver	3 Receiver
4 No connect	4 No connect
5 Gnd	5 Gnd
6 No connect	6 No connect
7 No connect	7 No connect
8 No connect	8 No connect
9 No connect	9 No connect

Scheme 2.1 PC-TM7000 pinout.

Pins 2 and 3 must be twisted and pin5 with ground. Female SUBD9 connectors are used between COM port and male SUBD9 connector of the TM7000.

Connection with Matrix is done by the first four RJ45 connectors, labeled as "*Digital XPT's*". For the pinout, see page 11.

Other TM7000 connectors are only used by technical staff of Kroma.

2.2 MATRIX TM7032-64-96-128

The closer the matrix to the Master, the better (max distance allowed: 10m). One next to the other is advised. See figure below.

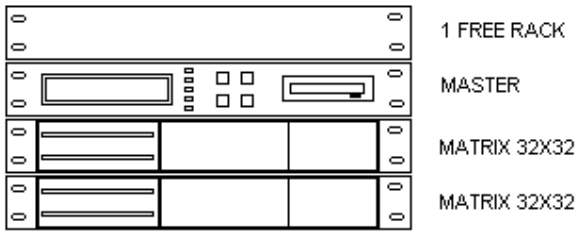


Figure 2.2 64x64 matrix location

Matrix is powered with the same type of PS of the Master, thru rear connectors labeled as '*Power A*' and '*Power B*' located at the left side of the rear panel. One external power supply is provided with the equipment. Redundant PS is advisable though.

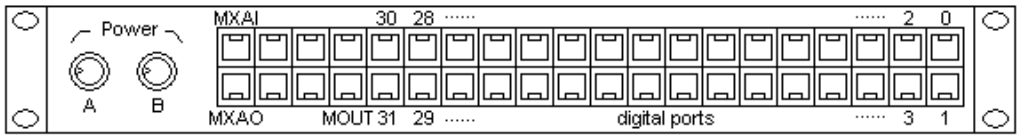


Figure 2.3 Rear View of the Matrix

32 matrix ports are available (labeled as ***0 to 31)*** where TP7000 user panels, TR7000 interface boards and TW7000 wireless intercom can be connected. First port is located at the right upper side. The rest to 31 goes up to the left.

Master-Matrix interconnection is done between "M-out" (Matrix) and "XPT digital" (Master) RJ45 connectors. Synchro data for the whole system go thru this data line. For that reason, ***connection must be strongly fixed.***

See below a 32x32 matrix connection to the master.

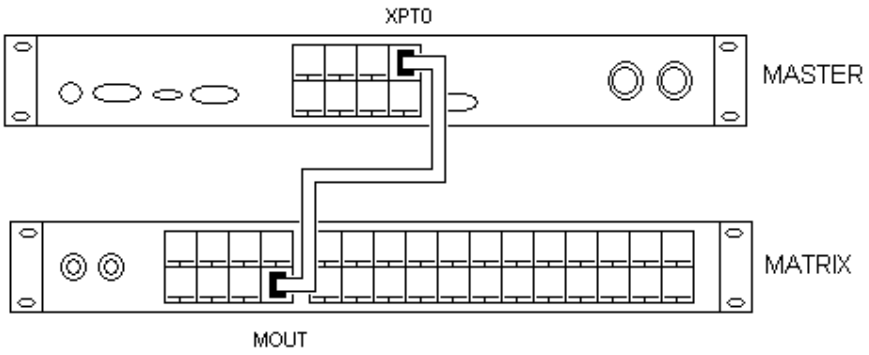


Figure 2.4 32x32 matrix connection to master.

For keeping the dynamic nature of each matrix, follow these instructions when connection master and different matrixes:

MATRIX	MASTER
1 Matrix TM7032 32x32	
Matrix 0: MOUT	TO DIGITAL XPT 0
2 Matrix TM7064 64x64	
Matrix 0: MOUT	TO DIGITAL XPT 0
Matrix 1: MOUT	TO DIGITAL XPT 1
3 Matrix TM7096 96x96	
Matrix 0: MOUT	TO DIGITAL XPT 0
Matrix 1: MOUT	TO DIGITAL XPT 1
Matrix 2: MOUT	TO DIGITAL XPT 2
4 Matrix TM7128 128x128	
Matrix 0: MOUT	TO DIGITAL XPT 0
Matrix 1: MOUT	TO DIGITAL XPT 1
Matrix 2: MOUT	TO DIGITAL XPT 2
Matrix 3: MOUT	TO DIGITAL XPT 3

Scheme 2.2 Matriz-Master connection

Kroma provides the master-matrix connection. Connection thru twisted 8-wire FTP CAT 5 with RJ45 connectors. See the pinout figure below:

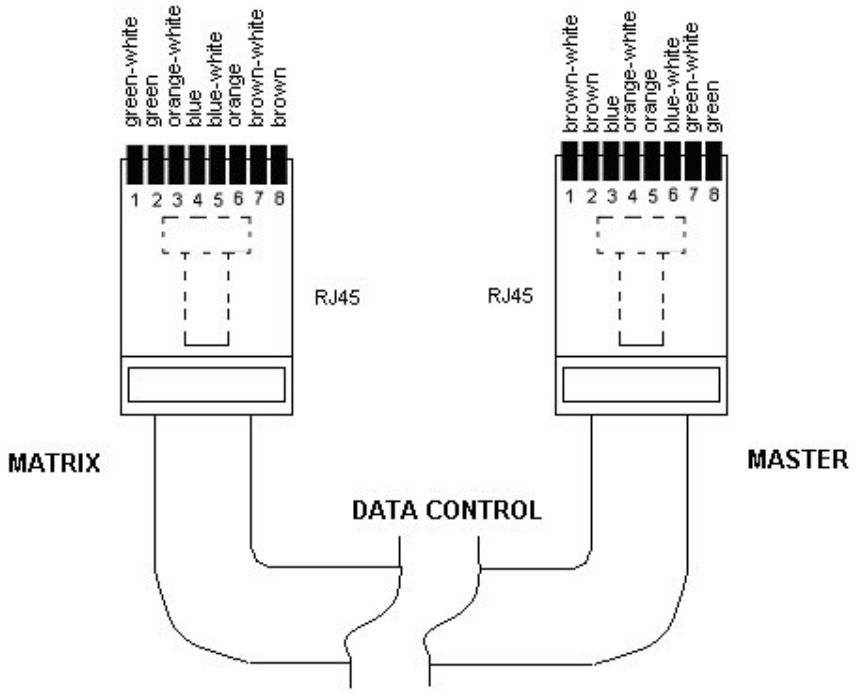


Figure 2.5 Pinout of Matriz-Master.

When more than 32x32 maps, ring interconnection among matrixes is needed, so they can share the audio multiplexes.

A 64x64 configuration consists of two 32x32 matrixes, each one connected to the Master and also between them thru RJ45 connectors labeled as '*MXA*I' and '*MXAO*' (Múltiplex A Input, Múltiplex A Output). See page 14 for the pinout and below for the interconnection.

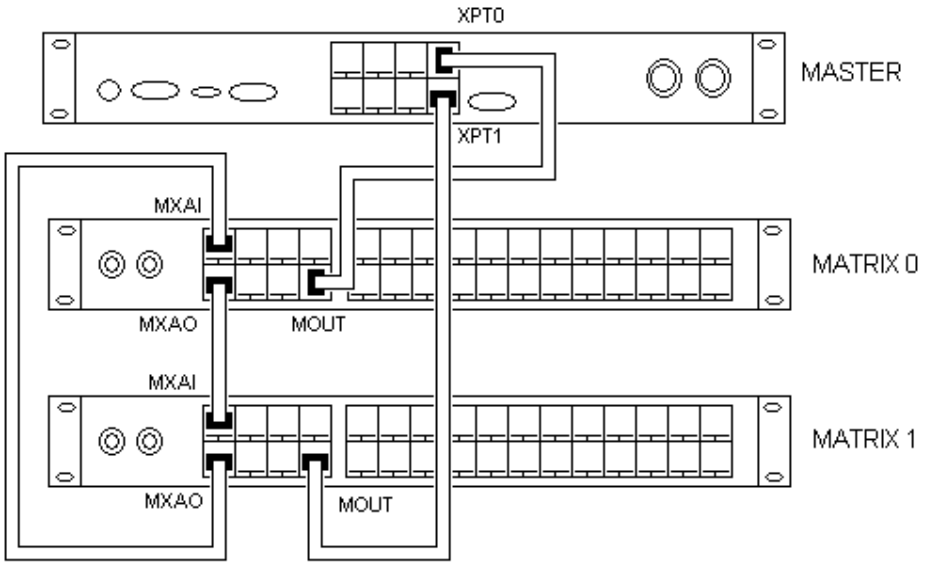


Figure 2.6 64x64 Matrix-Master interconection.

A 96x96 configuration consists of three 32x32 matrixes, each one connected to the Master and also between them thru RJ45 connectors labeled as '*MXA*I' and '*MXAO*' (Múltiplex A Input, Múltiplex A Output). See below for the interconnection..

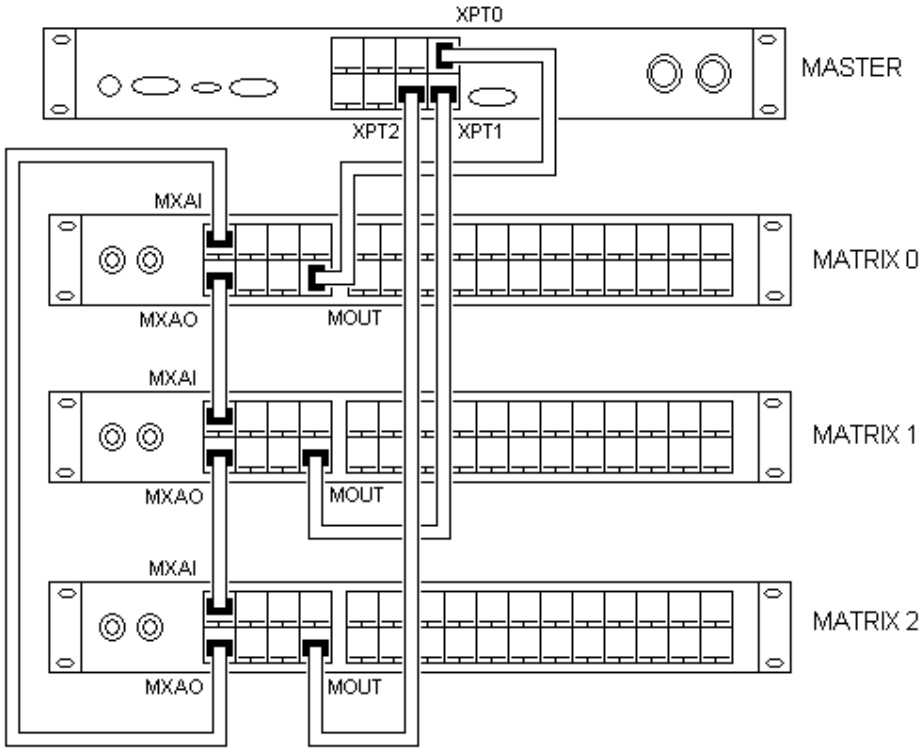


Figure 2.7 96x96 matrix-master interconnection.

A 128x128 configuration consists of four 32x32 matrixes, each one connected to the Master and also between them thru RJ45 connectors labeled as '*MXA*I' and '*MXAO*' (Múltiplex A Input, Múltiplex A Output). See below for the interconnection..

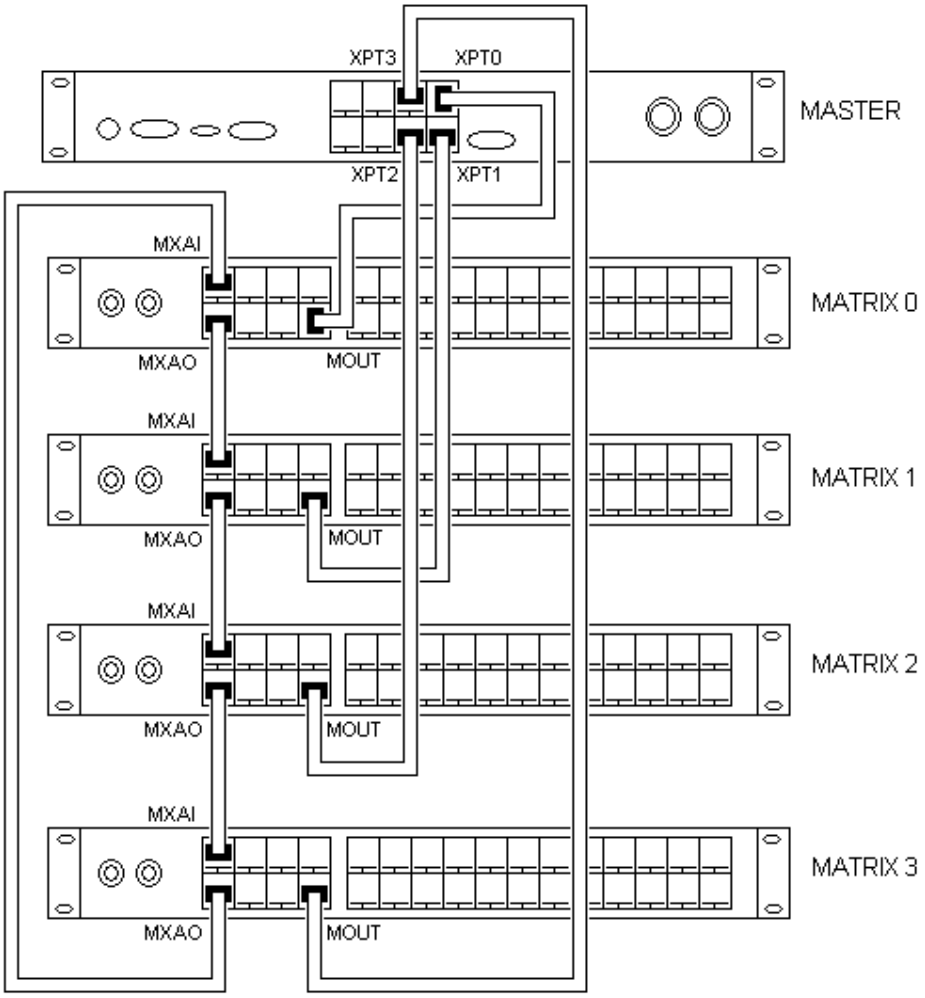


Figure 2.8 128x128 matrix-master interconnection.

Connection thru twisted 8-wire FTP CAT 5 with RJ45 connectors. It´s a pin to pin configuration. See the chart below:

MATRIX	MATRIX
1 Matrix 32x32	
No connect	No connect
2 Matrix 64x64	
Matrix 0: MXAO	Matrix 1: MXAI
Matrix 1: MXAO	Matrix 0: MXAI
3 Matrix 96x96	
Matrix 0: MXAO	Matrix 1: MXAI
Matrix 1: MXAO	Matrix 2: MXAI
Matrix 2: MXAO	Matrix 0: MXAI
4 Matrix 128x128	
Matrix 0: MXAO	Matrix 1: MXAI
Matrix 1: MXAO	Matrix 2: MXAI
Matrix 2: MXAO	Matrix 3: MXAI
Matrix 3: MXAO	Matrix 0: MXAI

Chart 2.3 Audio interconnection among matrixes.

Max distance of matrixes interconnection: 10m. See below for the colour pairing:

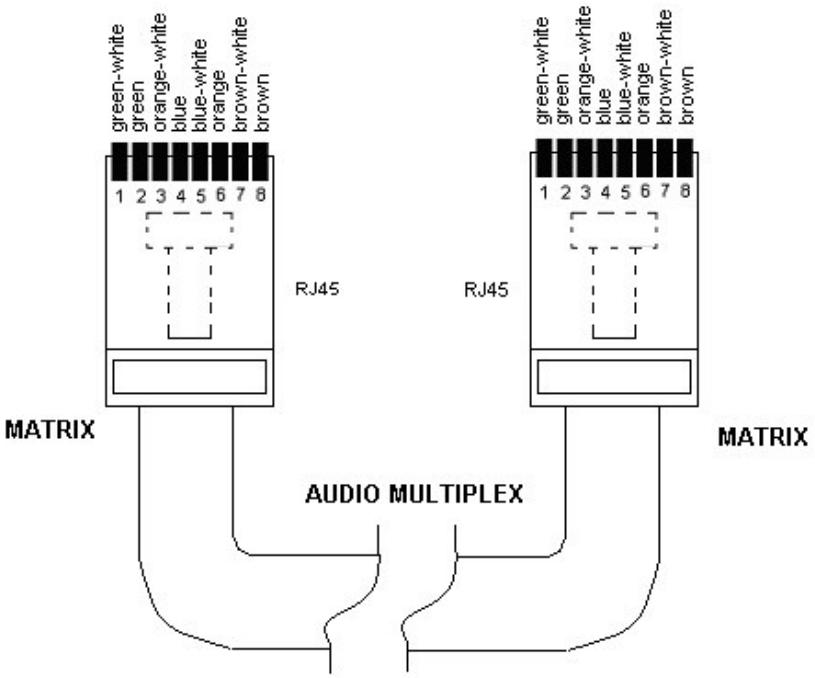


Figure 2.9. Matriz-matriz connection.

2.3 PANELS TP7000

All user panels are connected in the same way, even TP7210, the desktop terminal.

Rack-mounted panels (TP7100, TP7010 and TP7016) are powered by external PS (+15v) thru jack connector at the left side of the rear panel. This PS is supplied with the equipment and is compatible with TW7000 wireless intercom.

There are cable fixers next to the jack entry to avoid disconnections. See below the rear panel of panels TP7016, TP7010 and TP7100.

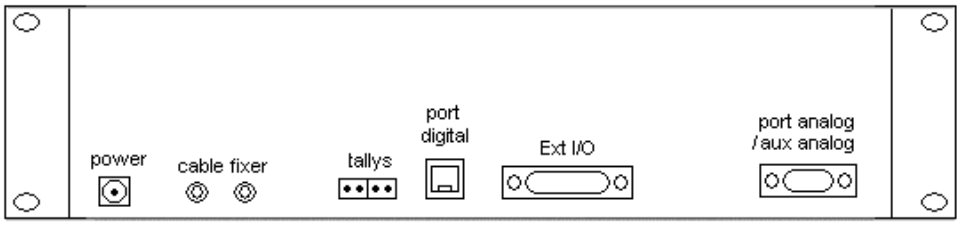


Figure 2.10 Rear view of rack-mount panels.

PS of desktop panel (+12v, -12v and +5v) is not compatible with rack-mount panels and does not need cable fixers as it uses twisted connectors. See below its rear view:

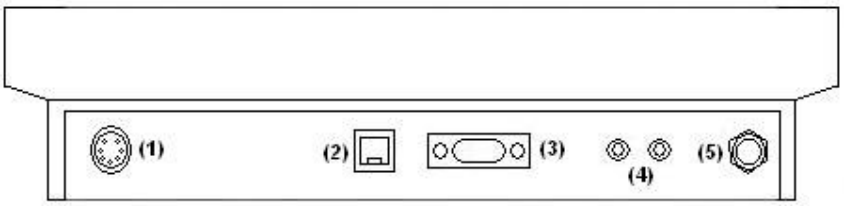


Figure 2.11 Rear view of TP7210.

Connection with matrix is made with a twisted 8-wire FTP CAT 5 cable with RJ45 connectors (digital port). Max distance: 300m. See below the pinout (pin-to-pin):

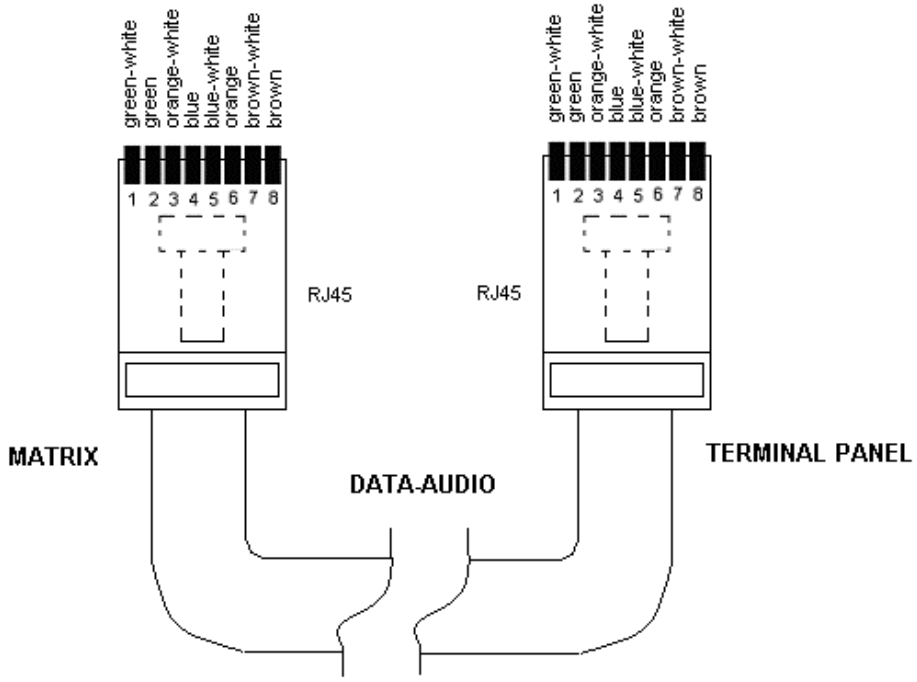


Figure 2.12 Matrix-panel pinout.

Panels are provided with an analogue auxiliary input/output for them to be connected to the analogue matrix (TM6000), so they may serve as analogue panels as well. Panels may work as digital, analogue or both at the same time.

In the last case, there will be keys programmed from digital software and other keys from the analogue config programme. Do not assign both systems to the same key as the difference in response time may generate malfunctioning.

Digital level is varied with the potentiometer labeled as “Main” at the front panel. Analogue audio will be changed with the “Aux” control.

This aux port can also be used for 4-wire external audio sources (on-air local monitoring, floor manager communications) and be sent (together with the audio coming from the panel´s microphone) to the digital matriz. The audio coming from the digital matrix or the microphone may also be output thru the aux port (if chosen by jumper). See below the analogue audio configuration thru the SUBD9 conector:

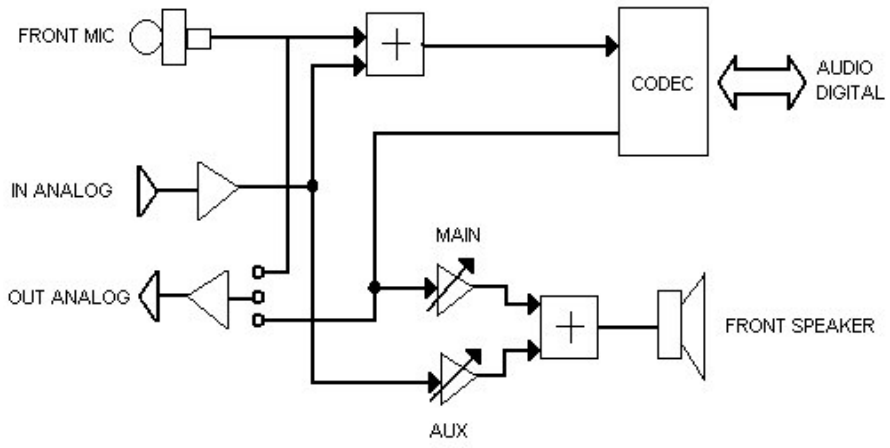


Figure 2.13 Input/Output Audio Configuration.

If we want to send the digital audio coming from the matrix to the aux analogue connector, we should change the jumper at solder J6. If not changed, the audio coming from the mic will be sent then. See below:

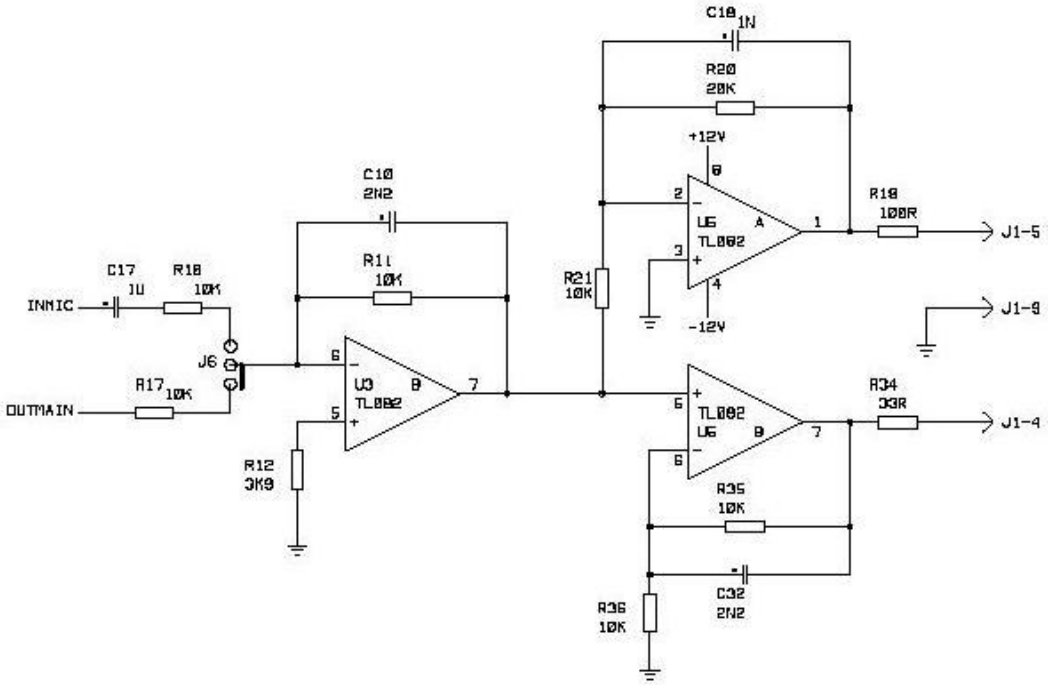


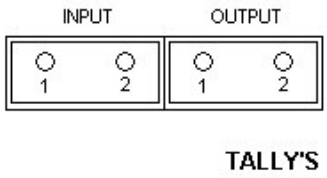
Figure 2.14 Configuration of analogue audio from digital matrix.

For the aux analogue I/O, see below the pinout of the male SUBD9 connector.

SUBD9 MALE	FUNCTION TP7000
1	DATA -
2	DATA +
3	GND
4	OUT analog audio -
5	OUT analog audio +
6	GND
7	IN analog audio -
8	IN analog audio +
9	GND

Chart 2.4 Analogue port pinout.

On the rear panel, the user may also find GPIO for tally purposes. It can be easily programmed (as it´s done with keys) for general purpose functions such as on air, video switchers, etc. Input is activated by tension (+12v), output is activated by contact closure. See below the pinout. [NB: Desktop panel (TP7210) does not come with this I/O].



INPUT:	OUTPUT:
1 IN +	1 OUT ON/OFF
2 IN -	2 OUT ON/OFF

Figure 2.15 Tally I/O Pinout.

2.4 INTERFACES

2.4.1 RACK FRAME TR7000

Interfaces are inserted in a rack-mounted frame (3 units high) with up to 12 slots. Max distance with matrix: 300m. [NB: When digitizing analogue signals, the shorter the distance between the analogue source and the A/D converter board, the better, so as to have a S/N ratio high enough])

It is provided with redundant power supply (220v, with option to switch to 110v – check electrical schematics). They´re front-swappable – before unplugging them, uncrew the security bolts above mains connectors on the rear panel. See below:

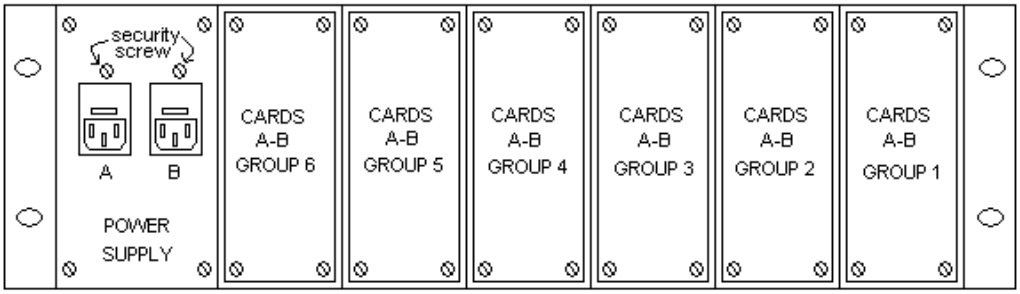


Figure 2.16 Rear view of TR7000.

Boards are inserted at the front panel, connecting to its rear panel (where the connectors for external sources are located). Rear panels can be:

- *Double* → They connect two boards of the same type together. Up to six double rear panels can be fitted into the rack frame, totalling 12 boards.
- *Single* → The connect to one board. Up to six single rearpanels can be fitted into the rack frame, totalling six boards. The other six slots are blank panelled.

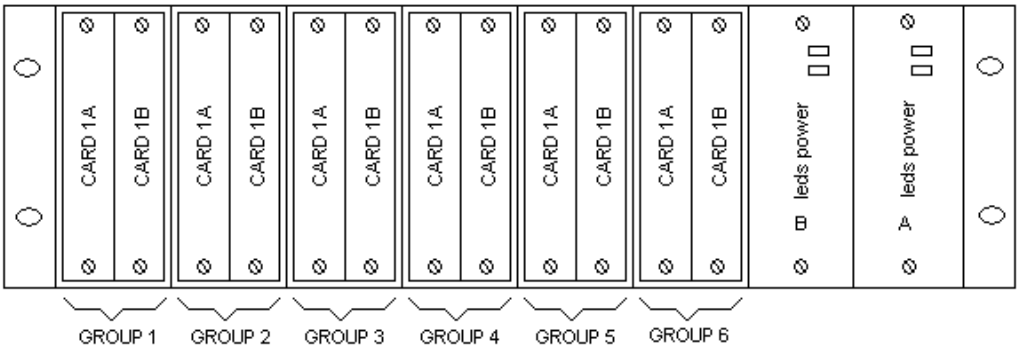


Figure 2.17 Front view - TR7000 with double rear panels (12 boards)

With double rear panels, the user can have up to 12 boards. NB: there must be six pairs of boards, not 12 different boards. NB: its high density connectors may make the installing somewhat difficult.

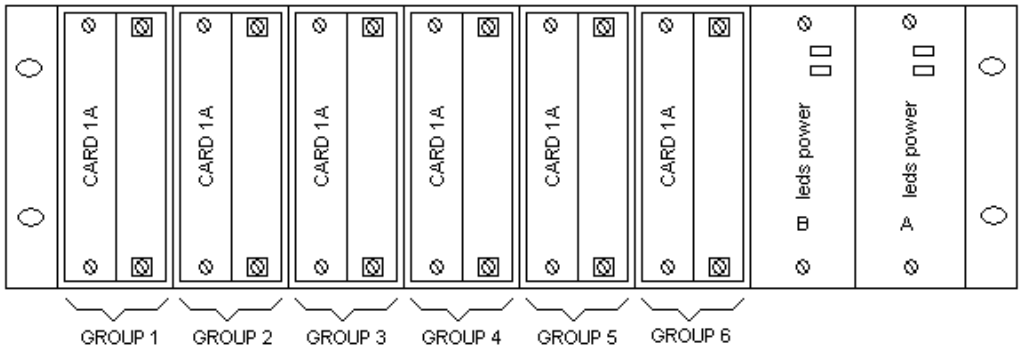


Figure 2.18 front View - TR7000 with single rear panels (6 boards)

User must specify what type of rear panel she prefers.

Each board must match its rear panel. **NB: Do not mismatch them. Permanent malfunctioning may occur.**

Connection is done thru twisted 8-wire FTP CAT 5 with RJ45 connectors. Analogue connection will depend on the type of rear panel selected.

PS is redundant and provides –20v and +20v. Leds will indicate missing or faulty PS.

2.4.2 ANALOGUE TA7000, TA7003

Interfaces for analogue sources (4-wire TA7000 and 2-wire TA7003) are provided with four ports. Each one must be connected to the matrix by a different cable and thru the RJ45 connectors.

There are two types of rear panels (each one fills two slots):

- **Single** → for one board. With four RJ45 connectors and four female SUBD9 connectors.

- **Double** → for two boards (two TA7000, two TA7003 or one TA7000 and one TA7003). With 8 RJ45 connectors and one female SUBD62 connector.

At the single rear panel, each analogue/digital port consists of a pair of SUBD9-RJ45 connectors, beginning with “zero” (upper part) and ending with three” (lowest part of the board):

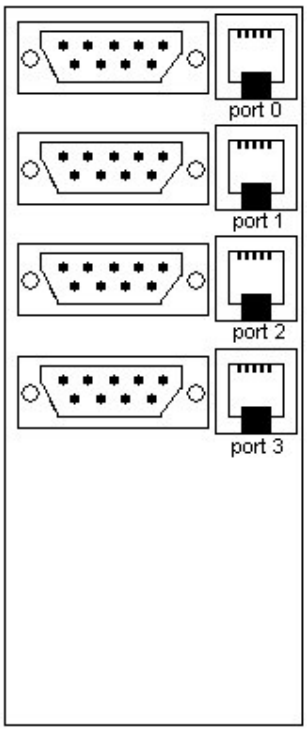


Figure 2.19 Single rear panel of TA7000 and TA7003.

The analogue connectors may be used for connecting to the Analogue Intercom TB6000 or as Input/Output with the following pinout:

SUBD9H	FUNCTION TA7000	FUNCTION TA7003
1	DATA -	DATA -
2	DATA +	DATA +
3	GND	GND
4	IN analog audio -	IN/OUT analog audio -
5	IN analog audio +	IN/OUT analog audio +
6	Power source +20v	Power source +20v
7	OUT analog audio -	Reserved
8	OUT analog audio +	Reserved
9	Power source –20v	Power source –20v

Tabla 2.5 Pinout for analogue connector.

1 and 2 pins are not necessary to be connected as they are reserved for remotely controlling thru RS-485.

Double rear panel consists of 8 digital/analogue ports. See below:

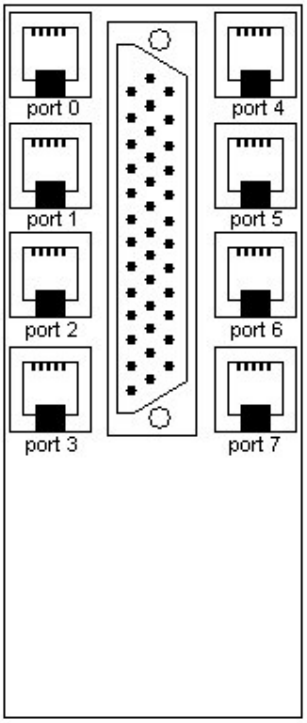


Figure 2.20 Rear view of double TA7000 and TA7003.

The whole analogue connection (Input/Output) is made at the female SUBD62.

For a TA7000 and numbering the ports from 0 to 7, this is the pinout:

PIN	FUNCTION TA7000	PIN	FUNCTION TA7000	PIN	FUNCTION TA7000
1	Data – 0	**22**	Data – 4	**43**	In Audio + 4
2	Data + 0	**23**	Data + 4	**44**	In Audio – 4
3	In Audio + 0	**24**	Out Audio – 0	**45**	Out Audio – 4
4	In Audio – 0	**25**	Out Audio + 0	**46**	Out Audio + 4
5	In Audio + 1	**26**	GND	**47**	In Audio + 5
6	In Audio – 1	**27**	GND	**48**	In Audio – 5
7	Data – 1	**28**	Out Audio – 5	**49**	Data – 5
8	Data + 1	**29**	Out Audio + 5	**50**	Data + 5
9	Out Audio – 1	**30**	Out Audio + 1	**51**	In Audio + 6
10	In Audio + 2	**31**	GND	**52**	In Audio – 6
11	In Audio – 2	**32**	GND	**53**	Data – 6
12	Data – 2	**33**	Out Audio – 6	**54**	Data + 6
13	Data + 2	**34**	Out Audio + 6	**55**	In Audio + 7
14	Out Audio – 2	**35**	Out Audio + 2	**56**	In Audio – 7
15	In Audio + 3	**36**	GND	**57**	Data – 7
16	In Audio – 3	**37**	GND	**58**	Data + 7
17	Data – 3	**38**	Out Audio – 7	**59**	Out Audio + 7
18	Data + 3	**39**	GND	**60**	GND
19	Out Audio – 3	**40**	Out Audio + 3	**61**	+ 20v Vout
20	+ 20v Vout	**41**	+ 20v Vout	**62**	- 20v Vout
21	- 20v Vout	**42**	- 20v Vout	-	-

Chart 2.6 Pinout for SUBD62 - TA7000.

For a TA7003 and numbering the ports from 0 to 7, this is the pinout:

PIN	FUNCTION TA7003	PIN	FUNCTION TA7003	PIN	FUNCTION TA7003
1	Data – 0	**22**	Data – 4	**43**	In/Out Audio + 4
2	Data + 0	**23**	Data + 4	**44**	In/Out Audio – 4
3	In/Out Audio + 0	**24**	Reserved	**45**	Reserved
4	In/Out Audio – 0	**25**	Reserved	**46**	Reserved
5	In/Out Audio + 1	**26**	GND	**47**	In/Out Audio + 5
6	In/Out Audio – 1	**27**	GND	**48**	In/Out Audio – 5
7	Data – 1	**28**	Reserved	**49**	Data – 5
8	Data + 1	**29**	Reserved	**50**	Data + 5
9	Reserved	**30**	Reserved	**51**	In/Out Audio + 6
10	In/Out Audio + 2	**31**	GND	**52**	In/Out Audio – 6
11	In/Out Audio – 2	**32**	GND	**53**	Data – 6
12	Data – 2	**33**	Reserved	**54**	Data + 6
13	Data + 2	**34**	Reserved	**55**	In/Out Audio + 7
14	Reserved	**35**	Reserved	**56**	In/Out Audio – 7
15	In/Out Audio + 3	**36**	GND	**57**	Data – 7
16	In/Out Audio – 3	**37**	GND	**58**	Data + 7
17	Data – 3	**38**	Reserved	**59**	Reserved
18	Data + 3	**39**	GND	**60**	GND
19	Reserved	**40**	Reserved	**61**	+ 20v Vout
20	+ 20v Vout	**41**	+ 20v Vout	**62**	- 20v Vout
21	- 20v Vout	**42**	- 20v Vout	-	-

Chart 2.7 Pinout for SUBD62 - TA7003.

Connection is done thru twisted 8-wire FTP CAT 5 with RJ45 connectors. Max distance to matrix: 300m.

Inside TA7003 there are four potentiometers in case the user may want to increase the Sidetone (return signal). By default, they are adjusted to a minimum of 10%:

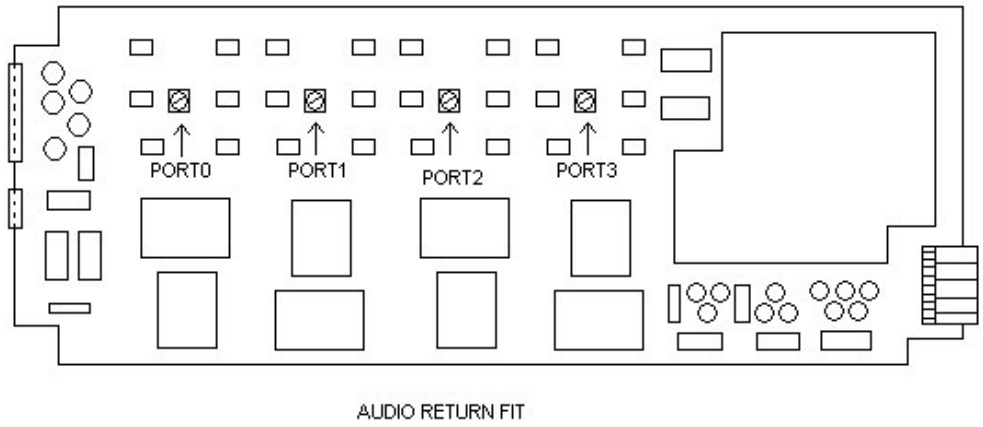


Figure 2.21 Adjustment of sidetone - TA7003.

- PORT 0 → Sidetone adjustment at potentiometer R24.
- PORT 1 → Sidetone adjustment at potentiometer R62.
- PORT 2 → Sidetone adjustment at potentiometer R103.
- PORT 3 → Sidetone adjustment at potentiometer R141.

TA7000 is transformer-isolated, so if the analogue equipment to be connected does not have transformer, common pin must be connected to ground.

See below examples of how to use TA7000 with single rear panel. In case of double rear panel, all analogue audio sources go to one SUBD62. There should be stated the digital ports to be used and then connect to the assigned analogue pins.

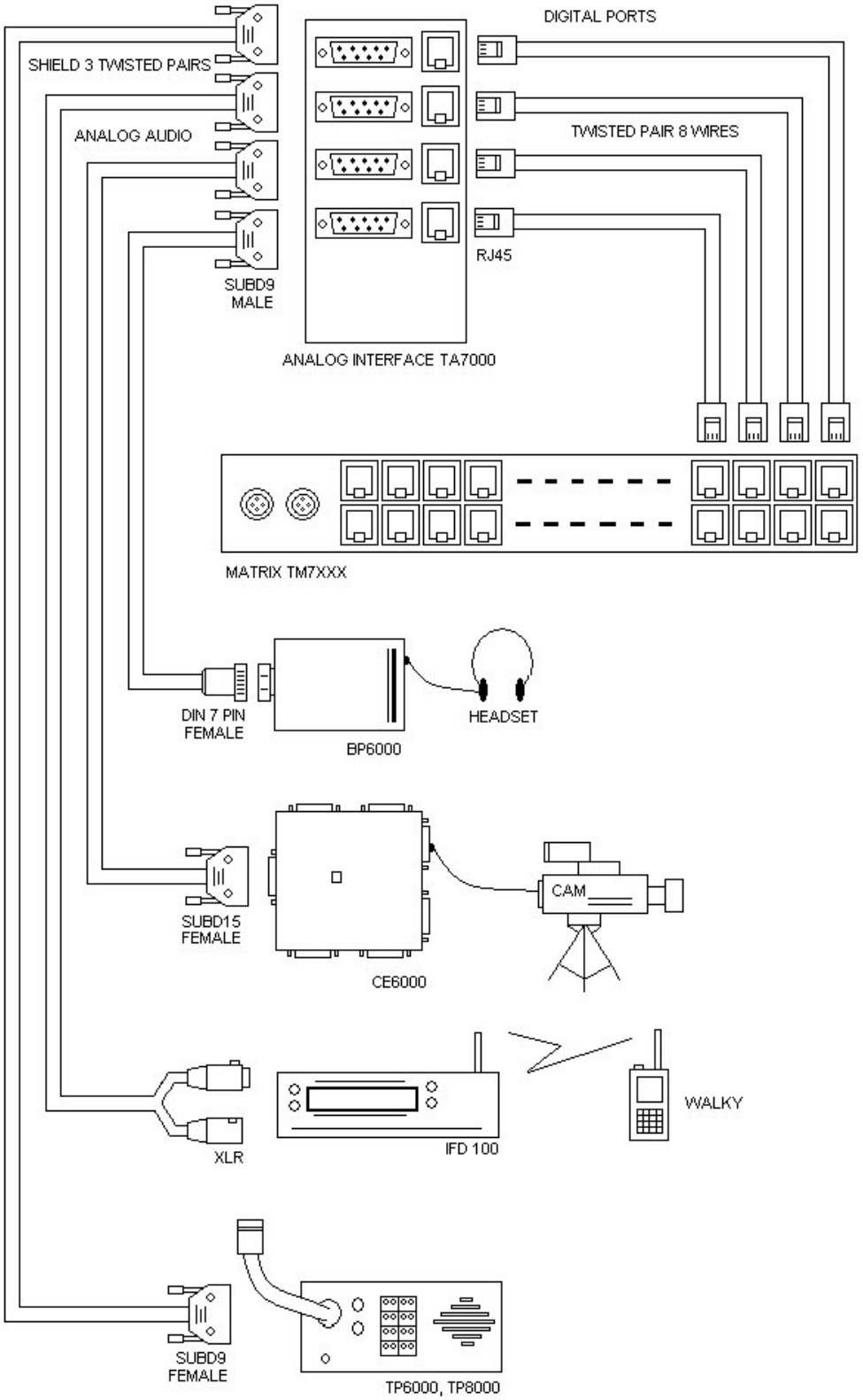


Figure 2.22 TA7000 – examples of use.

- BP6000 ➔ analogue beltpack with a male 7-pin DIN connector. See below the pinout with the matrix:

DIN 7 270 MALE	FUNCTION BP6000
1	OUT analog audio +
2	GND
3	IN analog audio +
4	OUT analog audio -
5	IN analog audio -
6	Supply source -v
7	Supply source +v

Chart 2.8 BP6000 Pinout.

Beltpack connects directly to an analogue port of the rear panel of TA7000. The pinout is:

DIN 7 270 FEMALE TO BP6000	SUBD9 MALE TO TA7000
1	5
2	3
3	8
4	4
5	7
6	9
7	6

Chart 2.9 Pinout TA7000 and BP6000.

Cable to use is 7 x 0.11 with a max distance of 50m.

- CE6000 ➔ Concentrator for analogue sources with six ports. A male 15-pin SUBD connects to the matrix with the following pinout:

SUBD 15 MALE	FUNCTION CE6000
1	OUT analog audio +
2	OUT analog audio -
3	GND
4	GND
5	Supply source +v
6	Supply source –v
7	Reserved
8	Reserved
9	GND
10	GND
11	IN analog audio +
12	IN analog audio -
13	GND
14	GND
15	Reserved

Chart 2.10 Pinout for CE6000.

CE6000 connects directly to an analogue port of the TA7000 thru a shielded 3-pair cable with the following pinout:

SUBD 15 FEMALE TO CE6000	SUBD9 MALE TO TA7000
1	5
2	4
3	3
4	3
5	6
6	9
11	8
12	7

Chart 2.11 Pinout TA7000 - CE6000.

Cable to use is COMELDAT TP(D)V 3x2x0.38.

- TP6000 and TP8000 ➔ Analogue user panels with a male 9-pin SUBD connector that connects to matrix with the following pinout:

SUBD 9 MALE	FUNCTION TP6000
1	Data -
2	Data +
3	GND
4	OUT analog audio -
5	OUT analog audio +
6	GND
7	IN analog audio -
8	IN analog audio +
9	GND

Chart 2.12 Pinout of TP6000.

Panels connect directly to an analogue port of the TA7000 thru a shielded 3-pair cable with the following pinout:

SUBD 9 FEMALE TO TP6000	SUBD9 MALE TO TA7000
1	1
2	2
3	3
4	4
5	5
6	3
7	7
8	8
9	3

Chart 2.13 Pinout TA7000 - TP6000.

Cable to use is COMELDAT TP(D)V 3x2x0.38.

- YAESU 8100 ➔ Wireless Base Station with two XLR connectors (male is output, female is input) and the following pinout:

XRL MALE	FUNCTION FT-8100
1	GND
2	OUT analog audio +
3	OUT analog audio -

Chart 2.14 Pinout for Base Station.

XRL FEMALE	FUNCTION FT-8100
1	GND
2	IN analog audio +
3	IN analog audio -

Chart 2.15 Pinout for Base Station.

Base station connects directly to an analogue port of the TA7000 thru a shielded 2-pair cable that separates into the two XLR input/output connectors. This is the pinout:

XLR FEMALE TO FT-8100	SUBD9 MALE TA7000
1	3
2	5
3	4
XLR MALE TO FT-8100	
1	3
2	8
3	7

Chart 2.16 Pinout TA7000 and Base Station FT-8100.

- Vertex Standard VXR-7000 ➔ Repeater for Walkie Talkie with analogue RJ45 connector:

RJ45 LINE	FUNCTION VXR-7000
1	Squelch +
2	Squelch -
3	OUT analog audio +
4	OUT analog audio -
5	IN analog audio +
6	IN analog audio -
7	TX Key Mic+
8	TX Key Mic-

Chart 2.17 Pinout – repeater station.

This station connects directly to an analogue port of TA7000 thru a FTP 8-wire twisted pair CAT5. One end has a RJ45 connector and the other a male SUBD9:

RJ45	SUBD9 MALE TA7000
3	5
4	4
5	8
6	7

Chart 2.18 Pinout TA7000 - VXR-7000.

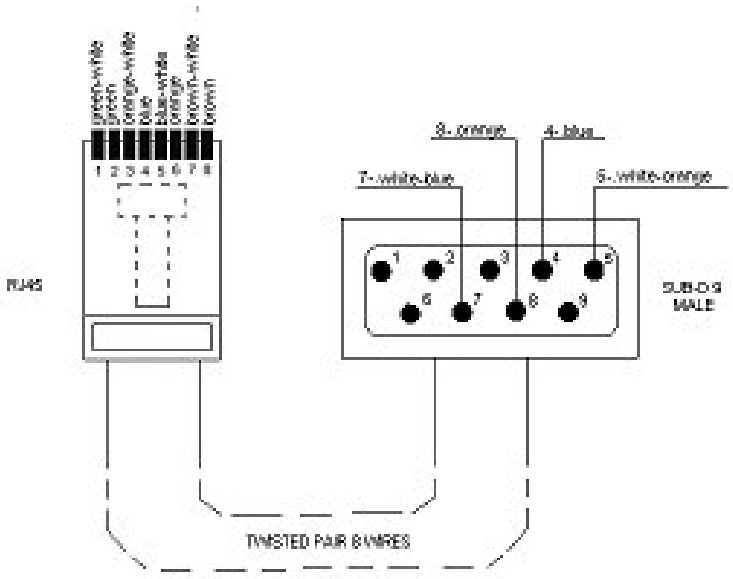


Chart 2.23 Pinout TA7000 – Repeater station.

2.4.3 INTERFACE FOR PSTN LINES TA7002

They are FXO interfaces to PSTN line. With two ports, we must bring two cable from the rear panel of the board to the matrix.

There are two types of rear panels (each one fills two slots):

- **Single** → for one board. With two RJ45 connectors (to matrix), two female SUBD9 connectors (analogue I/Os) and two RJ11 telephone connectors.

- **Double** → for two boards (two TA7002). With 4 RJ45 connectors, two RJ11 telephone connectors and one female SUBD62 connector.

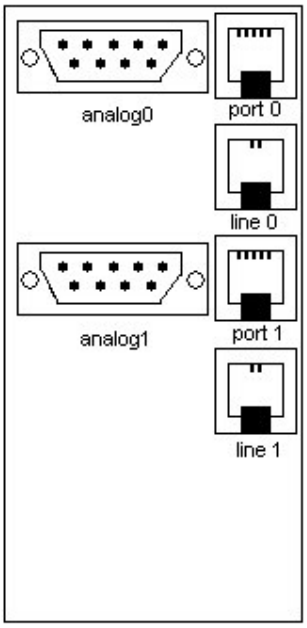


Figure 2.24 Rear single panel TA7002.

The double rear panel can fit two TA7002. The TA7004 board is compatible so one of each can be inserted into a double rear panel.

NB: At the rear panel, RJ11 connector labelled as ´line 0' is associated to digital 'port 1' and RJ11 connector labelled as ´line 1' is associated to digital 'port 0', that is, PSTN lines must be "crossed" with the digital ports.

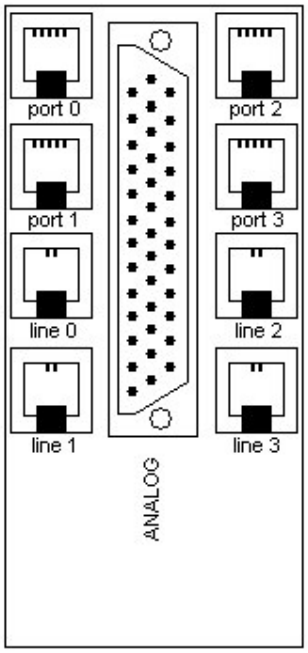


Figure 2.25 Double rear panel TA7002.

Connectors are associated to its functions:

- PORT ➔ RJ45 Connector to the matrix. With the same pinout that the panels TP7000 (Page 16).

- LINE ➔ RJ11 Connector for PSTN lines. Used pins are the central ones.

- ANALOGUE ➔ SUBD9H Connector (single rear) and SUBD62H connector (double rear) for Auxiliary Analogue Input/Output. It can be used for connecting to the analogue intercom TB6000 or to send/receive the telephone audio in analogue format.

The pinout for the SUBD9 connectors is:

SUBD9 FEMALE	FUNCTION TA7002
1	DATA -
2	DATA +
3	GND
4	IN analog audio -
5	IN analog audio +
6	Source +20v
7	OUT analog audio -
8	OUT analog audio +
9	Source –20v

Chart 2.19 Pinout for analogue connector: SUBD9.

Pins 1 and 2 are reserved for remote control thru RS-485, so there´s no need for connecting them.

For the SUBD62 connector (double rear), this is the pinout for the digital ports (from 0 to 3):

PIN	FUNCTION TA7002	PIN	FUNCTION TA7002	PIN	FUNCTION TA7002
1	Data – 0	**22**	GND	**43**	Data – 2
2	Data + 0	**23**	GND	**44**	Data + 2
3		**24**	GND	**45**	
4	In Audio + 0	**25**		**46**	In Audio + 2
5	In Audio – 0	**26**	GND	**47**	In Audio – 2
6		**27**	GND	**48**	
7	Out Audio + 0	**28**	GND	**49**	Out Audio + 2
8	Out Audio – 0	**29**		**50**	Out Audio – 2
9		**30**		**51**	
10	Data – 1	**31**	GND	**52**	Data – 3
11	Data + 1	**32**	GND	**53**	Data + 3
12		**33**	GND	**54**	
13	In Audio + 1	**34**		**55**	In Audio + 3
14	In Audio – 1	**35**		**56**	In Audio – 3
15		**36**	GND	**57**	
16	Out Audio + 1	**37**	GND	**58**	Out Audio + 3
17	Out Audio – 1	**38**		**59**	Out Audio – 3
18	GND	**39**	GND	**60**	GND
19		**40**		**61**	+ 20v Vout
20	+ 20v Vout	**41**	+ 20v Vout	**62**	- 20v Vout
21	- 20v Vout	**42**	- 20v Vout	-	-

Chart 2.20 Pinout: SUBD62.

Each digital port is connected to its analogue channel (In / Out audio) and its telephone number.

2.4.4 INTERFACES FOR PHONESETS TA7004

They are interfaces (FXS) for phonesets (conventional or DECT). With two ports, we must bring one cable to the matrix per each port.

There are two types of rear panels (each one fills two slots):

- **Single** → for one board. With two RJ45 connectors (to matrix), two female SUBD9 connectors (analogue I/Os) and two RJ11 telephone connectors.

- **Double** → for two boards (two TA7002). With 4 RJ45 connectors, two RJ11 telephone connectors and one female SUBD62 connector.

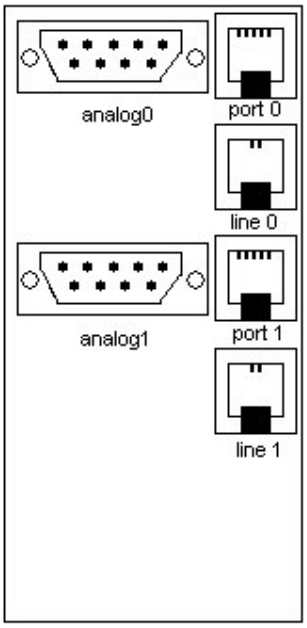


Figure 2.26 Single rear TA7004.

The double rear panel can fit two TA7002. The TA7004 board is compatible so one of each can be inserted into a double rear panel.

NB: At the rear panel, RJ11 connector labelled as ´line 0' is associated to digital 'port 1' and RJ11 connector labelled as ´line 1' is associated to digital 'port 0', that is, PSTN lines must be "crossed" with the digital ports.

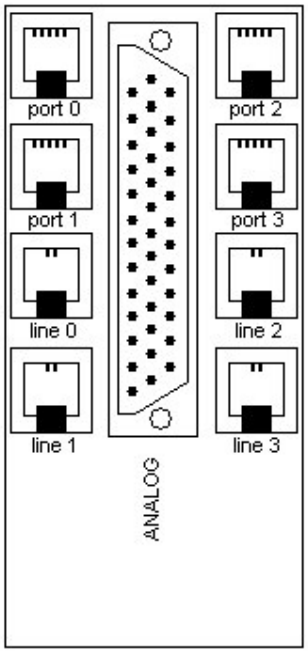


Figure 2.27 Double rear TA7004.

Connectors are associated to its functions:

- PORT ➔ RJ45 Connector to the matrix. With the same pinout that the panels TP7000 (Page 16).

- LINE ➔ RJ11 Connector for PSTN lines. Used pins are the central ones.

- ANALOGUE ➔ SUBD9H Connector (single rear) and SUBD62H connector (double rear) for Auxiliary Analogue Input/Output. It can be used for connecting to the analogue intercom TB6000 or to send/receive the telephone audio in analogue format.

The pinout for the SUBD9 connectors is:

SUBD9 FEMALE	FUNCTION TA7004
1	DATA -
2	DATA +
3	GND
4	IN analog audio -
5	IN analog audio +
6	Source +20v
7	OUT analog audio -
8	OUT analog audio +
9	Source –20v

Chart 2.21 Pinout for female SUBD9.

Pins 1 and 2 are reserved for remote control thru RS-485, so there´s no need for connecting them.

For the SUBD62 connector (double rear), this is the pinout for the digital ports (from 0 to 3):

PIN	FUNCTION TA7004	PIN	FUNCTION TA7004	PIN	FUNCTION TA7004
1	Data – 0	**22**	GND	**43**	Data – 2
2	Data + 0	**23**	GND	**44**	Data + 2
3		**24**	GND	**45**	
4	In Audio + 0	**25**		**46**	In Audio + 2
5	In Audio – 0	**26**	GND	**47**	In Audio – 2
6		**27**	GND	**48**	
7	Out Audio + 0	**28**	GND	**49**	Out Audio + 2
8	Out Audio – 0	**29**		**50**	Out Audio – 2
9		**30**		**51**	
10	Data – 1	**31**	GND	**52**	Data – 3
11	Data + 1	**32**	GND	**53**	Data + 3
12		**33**	GND	**54**	
13	In Audio + 1	**34**		**55**	In Audio + 3
14	In Audio – 1	**35**		**56**	In Audio – 3
15		**36**	GND	**57**	
16	Out Audio + 1	**37**	GND	**58**	Out Audio + 3
17	Out Audio – 1	**38**		**59**	Out Audio – 3
18	GND	**39**	GND	**60**	GND
19		**40**		**61**	+ 20v Vout
20	+ 20v Vout	**41**	+ 20v Vout	**62**	- 20v Vout
21	- 20v Vout	**42**	- 20v Vout	-	-

Chart 2.22 Pinout for SUBD62.

Each digital port is connected to its analogue channel (In / Out audio) and its telephone number.

2.4.5 RDSI G.722 PRONTO2 TA7001

It´s an interface for Pronto2 (the 2-port ISDN Audiocodec, which uses G.722 protocol) with four ports for four B channels.

TA7001 connects to the RJ45 labeled as "*ISDN S/T"* for remotely controlling the calling and converting into digital the audio.

There are two types of rear panels (each one fills two slots):

- **Single** → for one board. With four RJ45 connectors (to matrix) and four female SUBD9 connectors (analogue I/Os) for Pronto2.

- **Double** → for two boards (two TA7001). With 8 RJ45 connectors and one female SUBD62 connector for Pronto2.

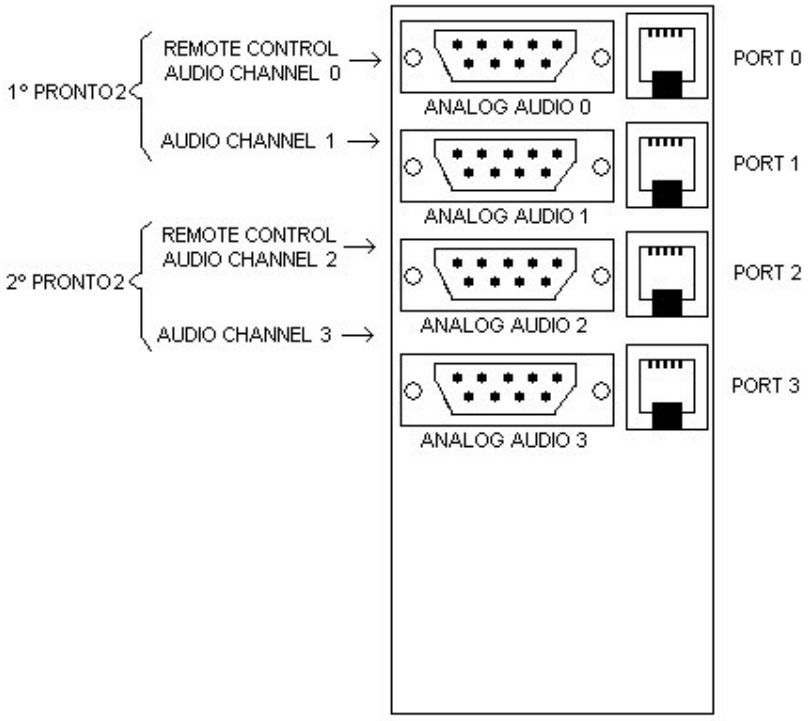


Figure 2.28 Single Rear Board of TA7001.

Connectors form two groups:

- PORT ➔ RJ45 Connector for connecting to the digital matrix. Pinout is the same that panels (pin to pin).

- ANALOGUE AUDIO➔ Female 9-pin SubD Connector for the analogue I/O and remote control of Pronto2.

Connection is done thru twisted 8-wire FTP CAT 5 with RJ45 connectors. Max distance to matrix: 300m.

Analogue connectors with even numbers ('ANALOG AUDIO 0' and 'ANALOG AUDIO 2') will handle one Pronto2:

SUBD9 FEMALE(0,2)	FUNCTION TA7001 INTERFACE
1	RX 232
2	TX 232
3	GND
4	IN analog audio -
5	IN analog audio +
6	Reserved Source +20v
7	OUT analog audio -
8	OUT analog audio +
9	Reserved Source –20v

Chart 2.23 Pinout for Female SUBD9 connector.

Analogue connectors with odd numbers ('ANALOG AUDIO 1' and 'ANALOG AUDIO 3') will handle the other Pronto2:

SUBD9 FEMALE(1,3)	FUNCTION TA7001 INTERFACE
1	Reserved
2	Reserved
3	GND
4	IN analog audio -
5	IN analog audio +
6	Reserved Source +20v
7	OUT analog audio -
8	OUT analog audio +
9	Reserved Source –20v

Chart 2.24 Pinout for Female SUBD9 connector.

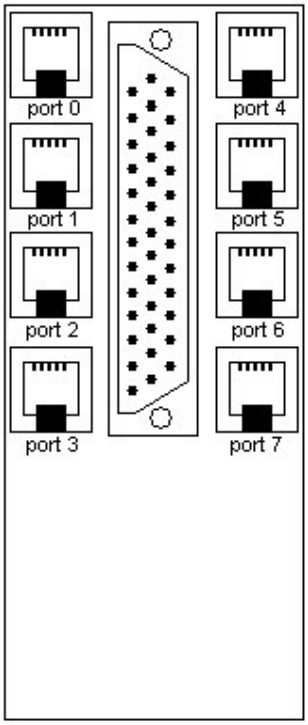


Figure 2.29 Double Rear TA7001.

The following pinout (62-pin SUBD) allows the connection of up to four Audiocodecs:

PIN	FUNCTION TA7001	PIN	FUNCTION TA7001	PIN	FUNCTION TA7001
1	RX232 0	**22**	RX232 4	**43**	In Audio + 4
2	TX232 0	**23**	TX232 4	**44**	In Audio – 4
3	In Audio + 0	**24**	Out Audio – 0	**45**	Out Audio – 4
4	In Audio – 0	**25**	Out Audio + 0	**46**	Out Audio + 4
5	In Audio + 1	**26**	GND	**47**	In Audio + 5
6	In Audio – 1	**27**	GND	**48**	In Audio – 5
7	Reserved	**28**	Out Audio – 5	**49**	Reserved
8	Reserved	**29**	Out Audio + 5	**50**	Reserved
9	Out Audio – 1	**30**	Out Audio + 1	**51**	In Audio + 6
10	In Audio + 2	**31**	GND	**52**	In Audio – 6
11	In Audio – 2	**32**	GND	**53**	RX232 6
12	RX232 2	**33**	Out Audio – 6	**54**	TX232 6
13	TX232 2	**34**	Out Audio + 6	**55**	In Audio + 7
14	Out Audio – 2	**35**	Out Audio + 2	**56**	In Audio – 7
15	In Audio + 3	**36**	GND	**57**	Reserved
16	In Audio – 3	**37**	GND	**58**	Reserved
17	Reserved	**38**	Out Audio – 7	**59**	Out Audio + 7
18	Reserved	**39**	GND	**60**	GND
19	Out Audio – 3	**40**	Out Audio + 3	**61**	+ 20v Vout
20	+ 20v Vout	**41**	+ 20v Vout	**62**	- 20v Vout
21	- 20v Vout	**42**	- 20v Vout	-	-

Chart 2.25 Pinout for SUBD62 connector.

The connectors at the Audiocodec´s end are of XLR type:

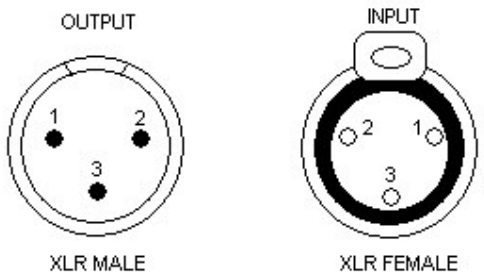


Figure 2.30 XLR Connectors of Pronto2.

Pronto2 has two audio channels: channel1 (left side) and channel2 (right side):

- Channel1 ➔ with two XLR connectors (female-input and male-output). Following pinout:

CHANNEL 1 LEFT	
XLR MALE OUTPUT	**XLR FEMALE INPUT**
1 GND	1 GND
2 OUT analog audio +	2 IN analog audio +
3 OUT analog audio -	3 IN analog audio -

Chart 2.26 Pinout for channel 1.

- Channel2 ➔ with two XLR connectors (female-input and male-output). Following pinout:

CHANNEL 2 RIGHT	
XLR MALE OUTPUT	**XLR FEMALE INPUT**
1 GND	1 GND
2 OUT analog audio +	2 IN analog audio +
3 OUT analog audio -	3 IN analog audio -

Chart 2.26 Pinout for channel 2.

Interface for control (RS232) is done thru the female SUBD9 connector of the Pronto2:

SUBD9 FEMALE	FUNCTION PRONTO2
1	Reserved
2	Tx 232
3	Rx 232
4	Reserved
5	GND
6	Reserved
7	Reserved
8	Reserved
9	Reserved

Chart 2.28 Pinout for control (SUBD9 connector).

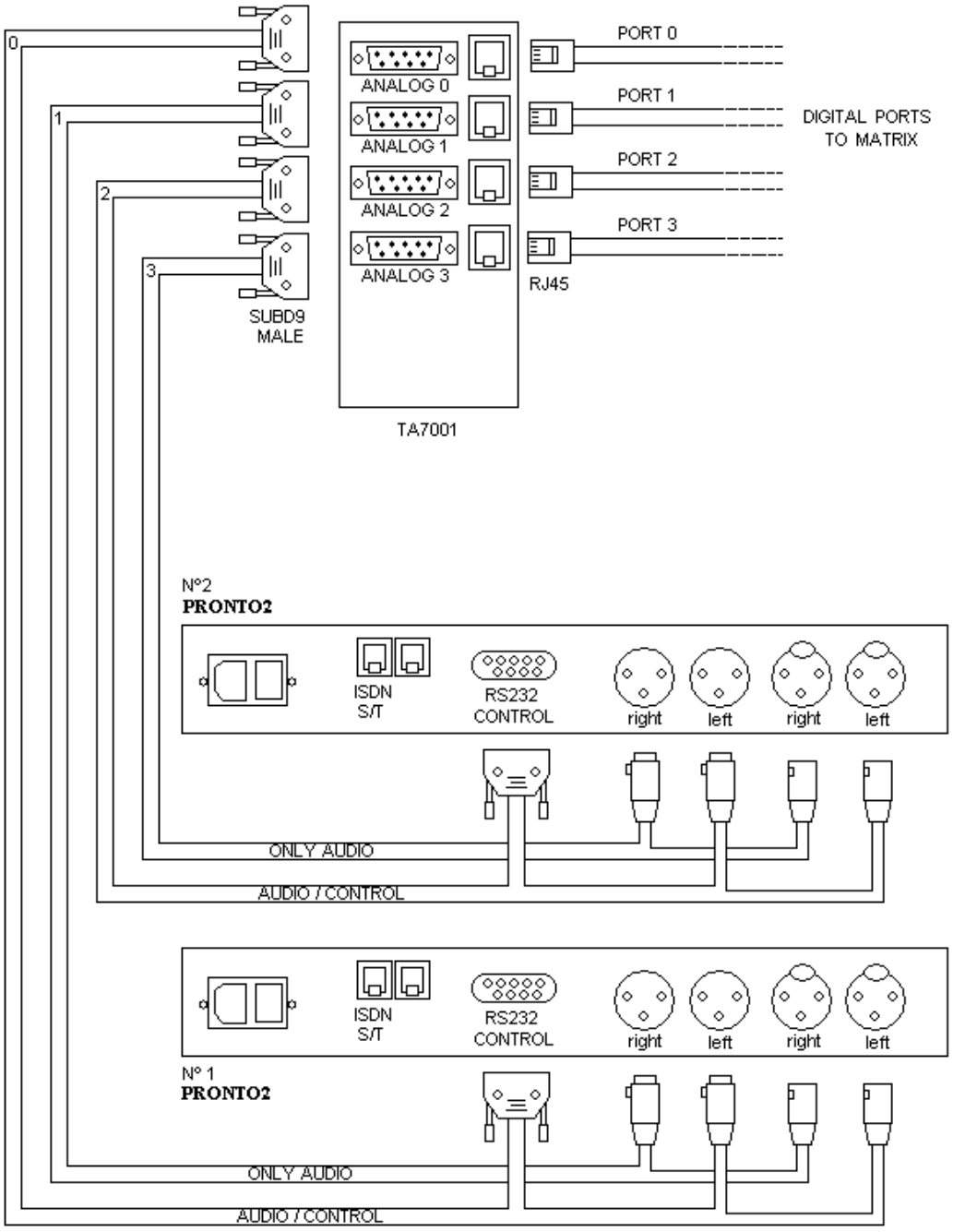


Figure 2.31 Connection for two Pronto2 Audiocodecs to one TA7001 with single rear.

Check the above figure and notice that the cable that connects the analogue audio from the even port of TA7001 to the channel 1 of Pronto2 Audiocodec also carries control data to the SubD connector. See below the pinout:

XLR LEFT MALE TO PRONTO2	SUBD9 MALE TO TA7001
1	3
2	8
3	7
XLR LEFT FEMALE TO PRONTO2	
1	3
2	5
3	4
SUBD9 MALE TO PRONTO2	
2	1
3	2
5	3

Chart 2.29 From channel 1 of Pronto 2 to the TA7001.

The other cable (from odd port of TA7001 to the channel 2 of Pronto2 Audiocodec) has this pinout:

XLR RIGHT MALE TO PRONTO2	SUBD9 MALE TO TA7001
1	3
2	8
3	7
XLR RIGHT FEMALE TO PRONTO2	
1	3
2	5
3	4

Chart 2.30 From channel 2 of Pronto 2 to the TA7001.

In case of double rear panel, audio and control data for both Pronto2 units goes thru the SubD62 connector. For pinout see chart 2.25.

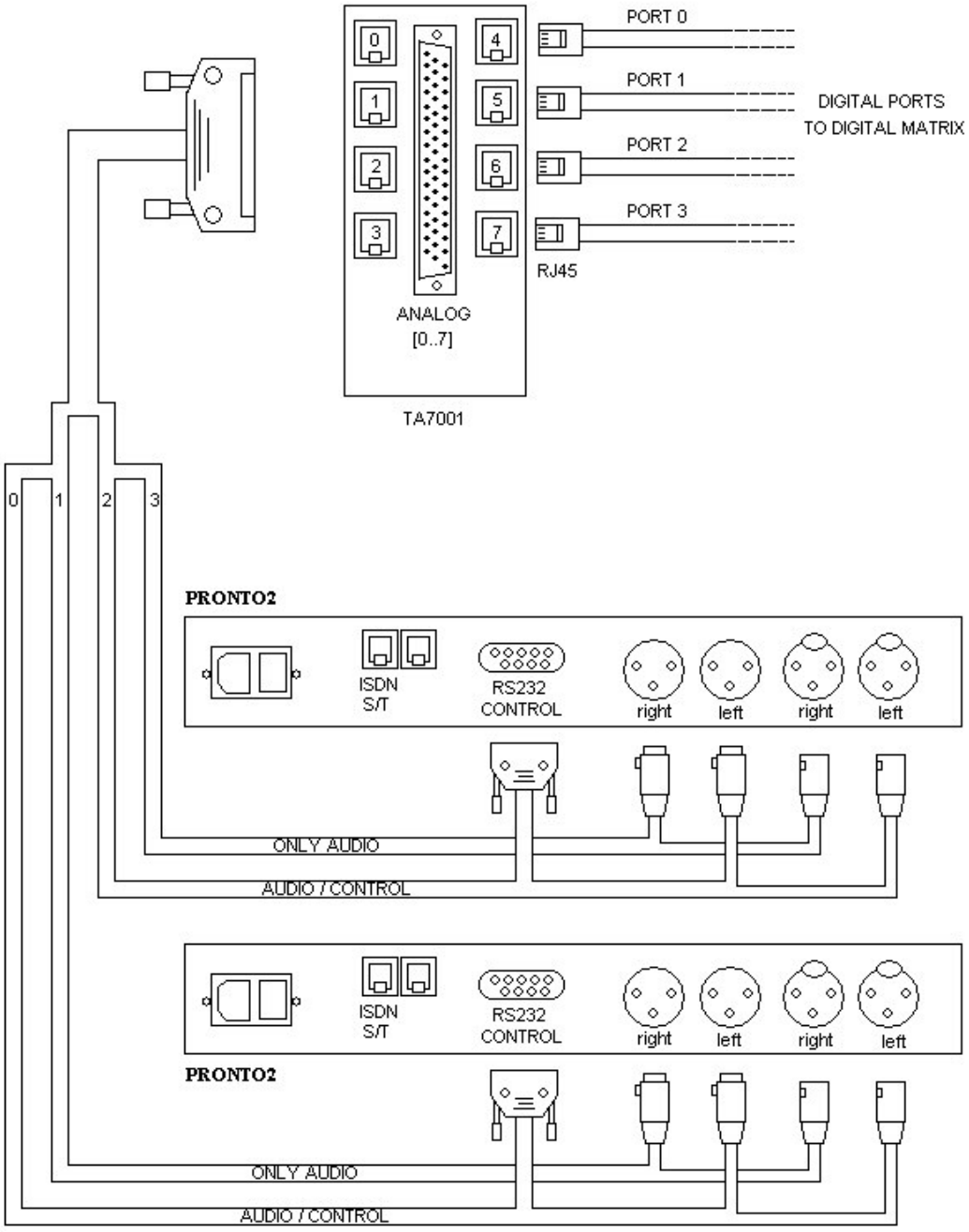


Figure 2.32 Connection for two Pronto2 units to one TA7001 with double rear panel.

2.4.6 RDSI G.711 TD7000

It´s the interface for ISDN lines (G.711) with two digital ports for connecting to the matrix.

So it´s capable of keeping two independent communications with one ISDN line or two communications with two ISDN lines; selected by soldering jumper:

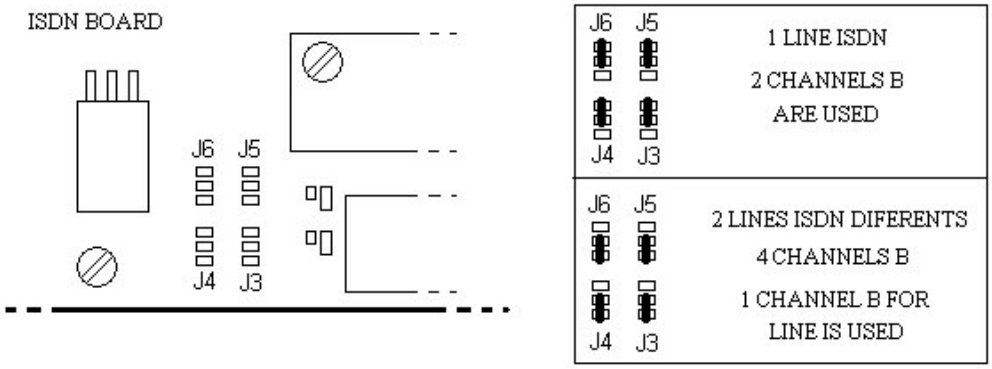


Figure 2.33 Selection of one or two ISDN lines.

If two ISDN lines chosen, there must be two independent connections between the ISDN lines and the TD7000: “ISDN 0” is for port 0, “ISDN 1” is for port 1.

By default, the configuration is two ports for the same ISDN line (the common use), so only one conection between the RJ45 connector labeled as “ISDN 0” and the ISDN line should be connected. Please note that this solution does not imply only one number because each of the two B channels of the ISDN line may have a different dialling number.

There are two types of rear panels (each one fills two slots):

- **Single** → for one board. With two RJ45 connectors (to matrix), two RJ45 connectors (to ISDN lines) and two female SUBD9 connectors (analogue aux I/Os).

- **Double** → for two boards. With four RJ45 connectors (to matrix), four RJ45 connectors (to ISDN lines) and one female SUBD62 connectors (analogue aux I/Os).

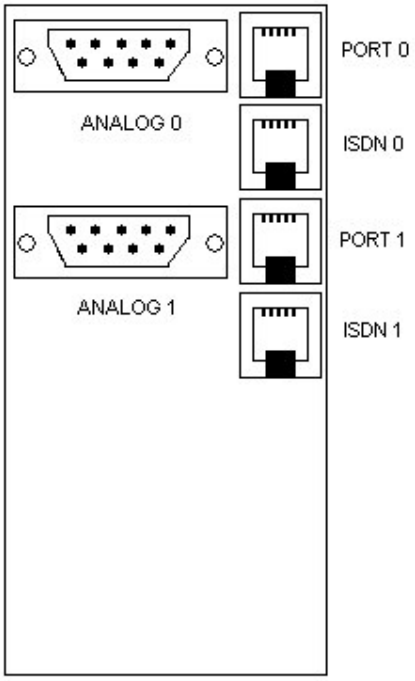


Figure 2.34 Single Rear Board - TD7000.

The analogue connector works at four wires without transformer. This is the pinout:

SUBD9 FEMALE	FUNCTION TD7000
1	DATA -
2	DATA+
3	GND
4	IN analog audio -
5	IN analog audio +
6	Source +20v
7	OUT analog audio -
8	OUT analog audio +
9	Source –20v

Chart 2.31 Pinout for SUBD9

There is no need to connect pins 1 and 2 as they are used for external remote control thru RS-485.

Connection is done thru twisted 8-wire FTP CAT 5 with RJ45 connectors. Max distance to matrix: 300m.

The double rear board groups four digital ports:

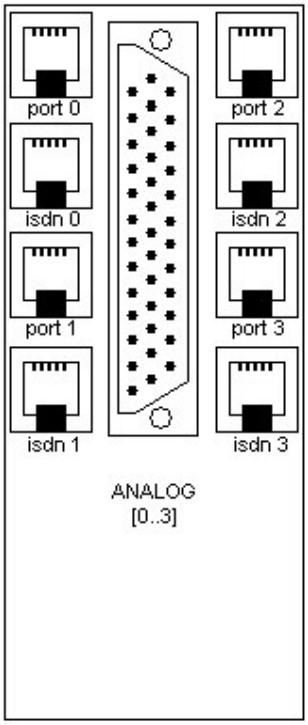


Figure 2.35 Double Rear TD7000.

PIN	FUNCTION TD7000	PIN	FUNCTION TD7000	PIN	FUNCTION TD7000
1	Data – 0	**22**	Data – 2	**43**	In Audio + 2
2	Data + 0	**23**	Data + 2	**44**	In Audio – 2
3	In Audio + 0	**24**	Out Audio – 0	**45**	Out Audio – 2
4	In Audio – 0	**25**	Out Audio + 0	**46**	Out Audio + 2
5	Reserved	**26**	GND	**47**	Reserved
6	Reserved	**27**	GND	**48**	Reserved
7	Reserved	**28**	Reserved	**49**	Reserved
8	Reserved	**29**	Reserved	**50**	Reserved
9	Reserved	**30**	Reserved	**51**	In Audio + 3
10	In Audio + 1	**31**	GND	**52**	In Audio – 3
11	In Audio – 1	**32**	GND	**53**	Data – 3
12	Data – 1	**33**	Out Audio – 3	**54**	Data + 3
13	Data + 1	**34**	Out Audio + 3	**55**	Reserved
14	Out Audio – 1	**35**	Out Audio + 1	**56**	Reserved
15	Reserved	**36**	GND	**57**	Reserved
16	Reserved	**37**	GND	**58**	Reserved
17	Reserved	**38**	Reserved	**59**	Reserved
18	Reserved	**39**	GND	**60**	GND
19	Reserved	**40**	Reserved	**61**	+ 20v Vout
20	+ 20v Vout	**41**	+ 20v Vout	**62**	- 20v Vout
21	- 20v Vout	**42**	- 20v Vout	-	-

Chart 2.32 Pinout for SUBD62.

There are four RJ45 connectors for the digital matrix (labeled as ‘ports [0..3]’) and other four RJ45 connectors for the ISDN lines (labeled as ‘isdn [0..3]’). The pinout for the ISDN lines is as follows:

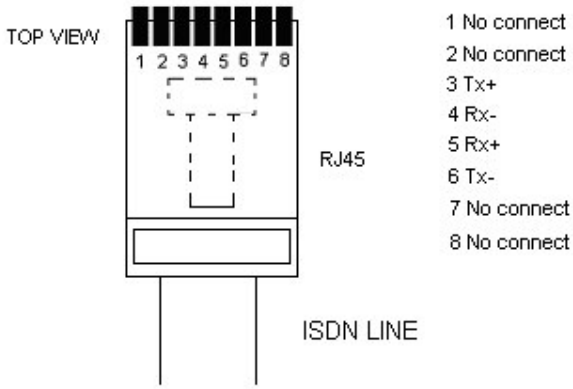


Figure 2.36 Pinout for ISDN.

2.4.7 GSM TD7001

It´s the board for GSM lines (900Mhz and 1800Mhz bands). A Smart Card (not provided, as the user must choose their preferred operator) must be inserted in the slot.

The antenna is provided and must connected to its connectos at the rear board.

There are two types of rear panels (each one fills two slots):

- **Single** → for one board. With one RJ45 connector (to matrix, pinout is similar to the panels´), one BNC connectors (to antenna) and one female SUBD9 connectors (analogue aux I/Os).

- **Double** → for two boards. With two RJ45 connectors (to matrix), two BNC connectors (to antenna) and one female SUBD9 connectors (analogue aux I/Os).

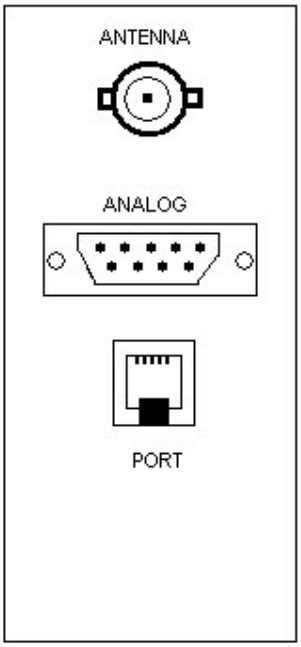


Figure 2.37 Single Rear Board TD7001.

Connection is done thru twisted 8-wire FTP CAT 5 with RJ45 connectors. Max distance to matrix: 300m.

There is no need to connect pins 1 and 2 as they are used for external remote control thru RS-485.

SUBD9 FEMALE	FUNCTION TD7001
1	DATA-
2	DATA+
3	GND
4	IN analog audio -
5	IN analog audio +
6	Source +20v
7	OUT analog audio -
8	OUT analog audio +
9	Source –20v

Chart 2.33 Pinout for SUBD9 (single rear).

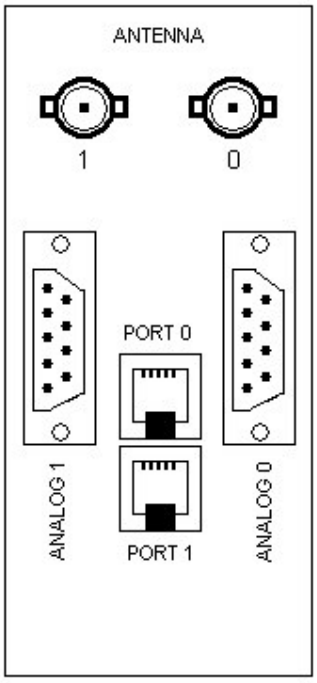


Figure 2.38 Double rear board TD7001.

The Smart card must be inserted into the slot at the fron panel or inside, at the GSM module. Before switching on the power supply of the frame rack, the SIM card must be inserted. If not, the rack frame must be switched off, the card slotted and the rack frame switched on again. See below:

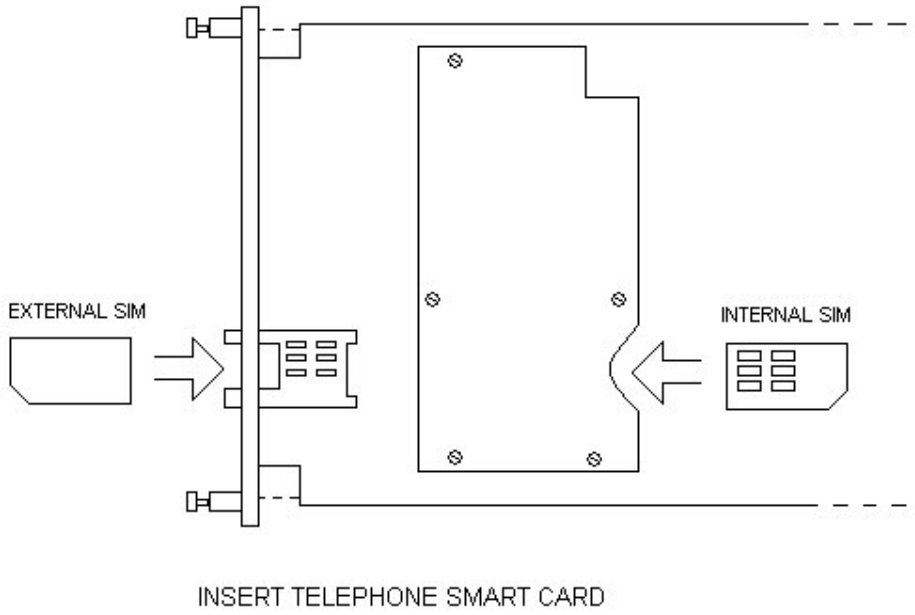


Figure 2.39 SIM insertion into the GSM module

Such card might be of any GSM operator working at 900 or 1800 Mhz. It is advised to insert the card (external or internal, but not both) and leave it there to avoid non-recognition in case of switching off.

NB: The card shouldn´t ask for PIN number. If so, the intercom system cannot recognise it.

NB: Never extract the card with the power on. Permanent damage may occur.

2.5 AUTONOMOUS UNITS

They are autonomous interfacing units (not boards to be inserted into the rack frame).

2.5.1 VoIP TI7011

This interface offers one communication channel (Voice-Over-IP) that may be used with a remote panel or other remote equipments.

For connecting to the Digital TB7000 use twisted 8-wire FTP CAT 5 with RJ45 connectors (max distance to matrix 300m). For connecting to the Digital TB6000 use shielded three-pair cabling with 9-pin SUBD connectors.

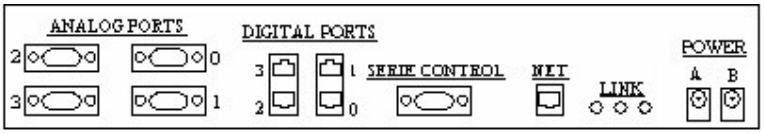


Figure 2.40 Rear panel TI7011

So far only one communication channel (analogue port 0, digital port 0) is allowed, but there are four connectors available for future upgrades.

Se below the pinout for analogue connector:

SUBD9 MALE	TW7000
1	DataControl-
2	DataControl+
3	GND
4	OUT analog audio -
5	OUT analog audio +
6	GND
7	IN analog audio -
8	IN analog audio +
9	GND

Chart 2.34 Pinout for analogue connector.

There´s a female 9-pin SubD connector for firmware upgrades thru RS232 with the following pinout (notice that the cable to the COM port of the PC is pin-to-pin):

SUBD9 FEMALE	TW7000
1	-
2	TX data
3	RX data
4	-
5	GND
6	-
7	-
8	-
9	-

Chart 2.35 Pinout for firmware connector.

For Ethernet connection plug a RJ45 to the connector labeled as 'net'. The systems allows a 10Mb/s communication using IP address (by default is **192.168.8.222**), but the user may change it (as well as the mask for providing net visibility).

Before switching on the equipment, these parameters (IP address, ports) must be configured. For this, use control port (RS232) thru '*hyperterminal*' Windows programme. Assign the following values using the serial port COM1:

Figure 2.41 Hyperterminal values.

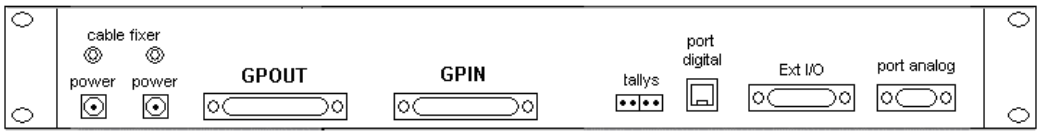
After configuring COM port of the PC as above, open the connection. Press Enter and it´ll appear the function menu of the TI7011. Check cabling and connection if the menu does not appear. Once menu´s on screen, choose option '0 - Modo Boot', insert **password (3210)**, then choose option '4 - Configurar los parámetros de red'. Once parameters have been inserted (and without switching off the equipment), press option '0 - Modo User' so as the chosen parameters are validated.

One external power supply is provided with the equipment. There´s a redundant PS as an option.

IMPORTANT: Minimim bandwidth required by the equipment is *100Kb/s.* *If less, communication will not be fluid enough and data errors may appear.*

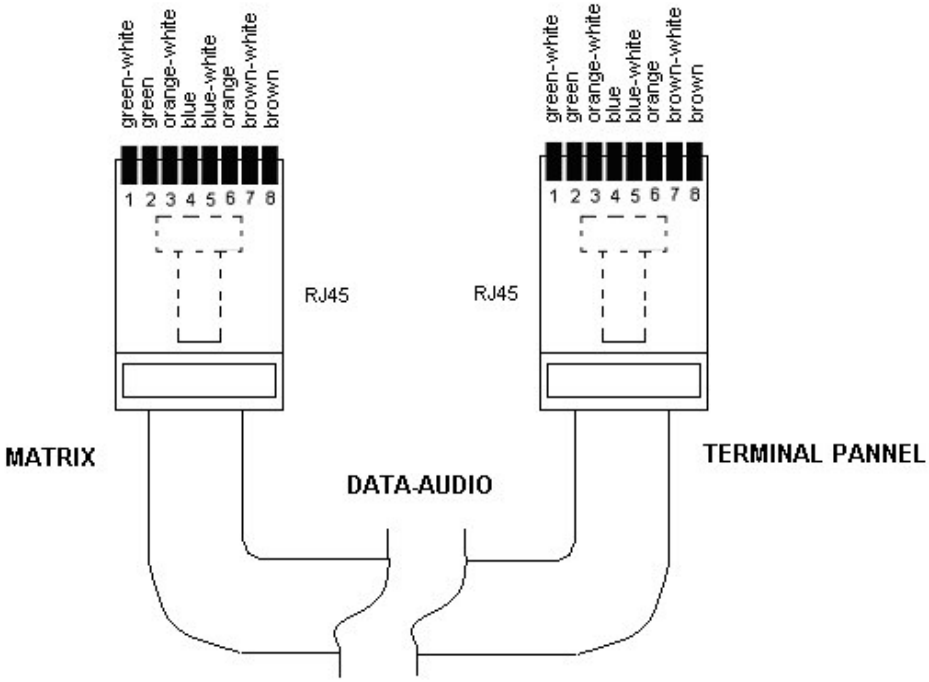
2.5.2 TALLYS GP7020

Powered by an external power supply (+15v) provided with the equipment. There´s a redundant PS as an option. See the two jack connectors below. It´s advised to use the cable fixers above them, so as to avoid accidental disconnetion.



Picture 2.42 Rear panel GP7020

For connecting to the Digital TB7000 use twisted 8-wire FTP CAT 5 with RJ45 connectors (max distance to matrix 300m). Cable is pin-to-pin as follows:



Picture 2.43 Pinout for conecting the GP7020 to the matrix.

There´s an analogue connector for integrating the equipment to the analogue intercom TB6000. It might be used in future upgrades.

If the equipment is connected to the digital and analogue intercom systems at the same time, there will be GPIOs programmed from Indico software (TB7000) and others from the analogue TB6000. it´s advised not to programme the same GPIO key at both systems.

The analogue connection is done thru the 9-pin male SubD connector with the following pinout:

SUBD9 MALE	FUNCTION GP7020
1	DATA -
2	DATA +
3	GND
4	Reserved
5	Reserved
6	GND
7	Reserved
8	Reserved
9	GND

Chart 2.36 Pinout for analogue port.

Tally Input is done thru a high density female 62-pin SubD connector with 20 opto-isolated inputs with no ground contact (so an alectrical isolation between systems is established).

Each input has two balanced pins, one for the max positive voltage (IN+), the other for the max negative voltage (IN-). Max input cannot go above +48v at each pair of inputs and below +5v.

(+5v < Input < +48v)

There´s a +15-volt supply with GND connection (not by default) in case the external equipment outputs are of contact closure type.

PIN	FUNCTION GP7020	PIN	FUNCTION GP7020	PIN	FUNCTION GP7020
1	+15v	**22**	IN0+	**43**	+15v
2	IN1+	**23**	IN0-	**44**	IN2+
3	IN1-	**24**	GND	**45**	IN2-
4	GND	**25**	IN3+	**46**	GND
5	IN4+	**26**	IN3-	**47**	IN5+
6	IN4-	**27**	GND	**48**	IN5-
7	GND	**28**	IN6+	**49**	GND
8	IN7+	**29**	IN6-	**50**	IN8+
9	IN7-	**30**	GND	**51**	IN8-
10	GND	**31**	IN9+	**52**	GND
11	IN10+	**32**	IN9-	**53**	IN11+

12	IN10-	**33**	GND	**54**	IN11-
13	GND	**34**	IN12+	**55**	GND
14	IN13+	**35**	IN12-	**56**	IN14+
15	IN13-	**36**	GND	**57**	IN14-
16	GND	**37**	IN15+	**58**	GND
17	IN16+	**38**	IN15-	**59**	IN17+
18	IN16-	**39**	GND	**60**	IN17-
19	GND	**40**	IN18+	**61**	GND
20	IN19+	**41**	IN18-	**62**	+15v
21	IN19-	**42**	+15v	-	-

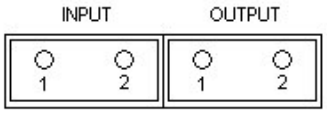
Chart 2.37 Pinout for female SUBD62 input connector.

The 20 outputs are programmable relays. Max voltage of switcher is 1000v DC.

PIN	**FUNCTION GP7020**	**PIN**	**FUNCTION GP7020**	**PIN**	**FUNCTION GP7020**
1	+15v	**22**	OUT0+	**43**	+15v
2	OUT1+	**23**	OUT0-	**44**	OUT2+
3	OUT1-	**24**	GND	**45**	OUT2-
4	GND	**25**	OUT3+	**46**	GND
5	OUT4+	**26**	OUT3-	**47**	OUT5+
6	OUT4-	**27**	GND	**48**	OUT5-
7	GND	**28**	OUT6+	**49**	GND
8	OUT7+	**29**	OUT6-	**50**	OUT8+
9	OUT7-	**30**	GND	**51**	OUT8-
10	GND	**31**	OUT9+	**52**	GND
11	OUT10+	**32**	OUT9-	**53**	OUT11+
12	OUT10-	**33**	GND	**54**	OUT11-
13	GND	**34**	OUT12+	**55**	GND
14	OUT13+	**35**	OUT12-	**56**	OUT14+
15	OUT13-	**36**	GND	**57**	OUT14-
16	GND	**37**	OUT15+	**58**	GND
17	OUT16+	**38**	OUT15-	**59**	OUT17+
18	OUT16-	**39**	GND	**60**	OUT17-
19	GND	**40**	OUT18+	**61**	GND
20	OUT19+	**41**	OUT18-	**62**	+15v
21	OUT19-	**42**	+15v	-	-

Chart 2.38 Pinout for male SUBD62 output connector.

At the rear panel the user may also find an auxiliary tally I/O, programmable as a key, for uses such as “on air”, switchers, etc. Inputs is activated by voltage (+12v), output by contact closure.



INPUT:	OUTPUT:
1 IN +	1 OUT ON/OFF
2 IN -	2 OUT ON/OFF

TALLY'S

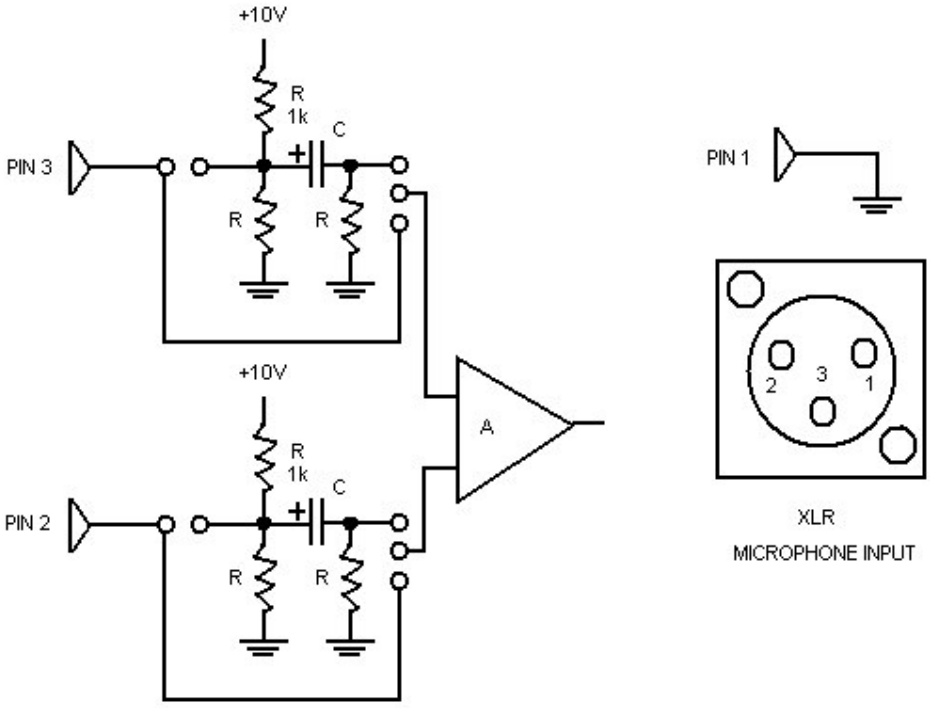
Picture 2.44. Pinout for the aux tally I/O.

2.6 MICROPHONY

2.6.1 MICROPHONE

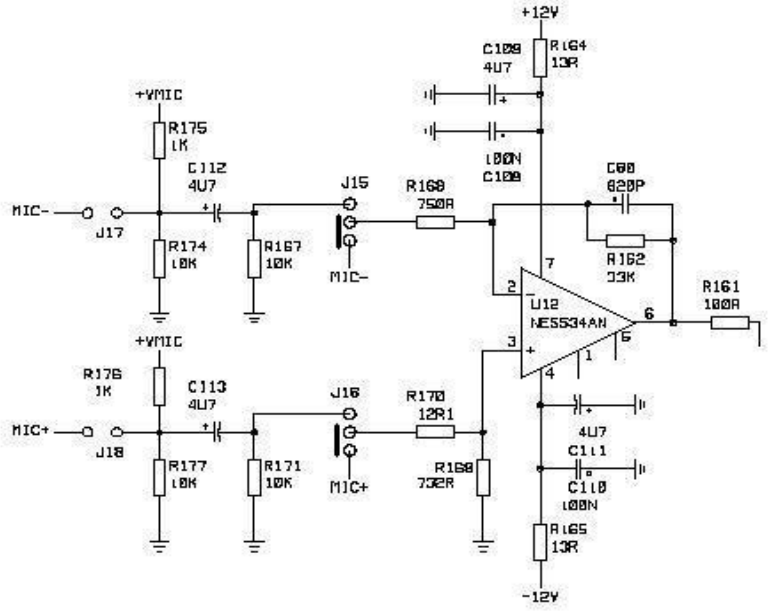
Microphone is used for the user panels, whose front panels are provided with female XLR connectors. User may change the standard configuration (electret/condenser, with +10v Phantom supply) to a dynamic type by *´jumper hardware*'.

The preamplifier at the input can be configured for selecting the microphone type, gain changes or even determine which contacts are active.



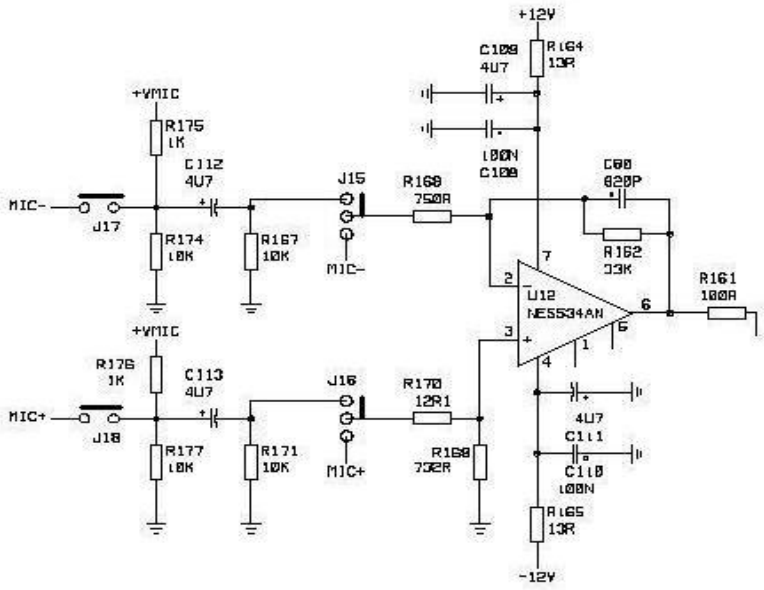
Picture 2.45 Preamplifier.

For having a dynamic microphone, see below the soldering jumper neede:



Picture 2.46 Dynamic microphone configuration.

For condenser, the configuration provided is as follows:



Picture 2.47. Condenser microphone configuration.

There are obsolete main boards in the market that cannot be changed as ndicated above. The components to be soldered for the needed preamplifier are (see the schematics of TP7000 provided with the CD):

- U18 NE5534AN, SO8
- C81, C83, C65 100nF, 1206
- R149 732R, 1206
- R148 12R1, 1206
- R147 750R, 1206
- R146 44k2, 1206
- C79 220pF, 0805
- R72 1k, 1206
- R73 2k, 1206
- C66, C67 10uF 16v, TANTALO-D

Also the following must be de-soldered:

- R72 at a side
- C65 at a resistor
- RAUX1 and RAUX2 under the board

In this case, headsets will need its own preamplifier to be incorporated.

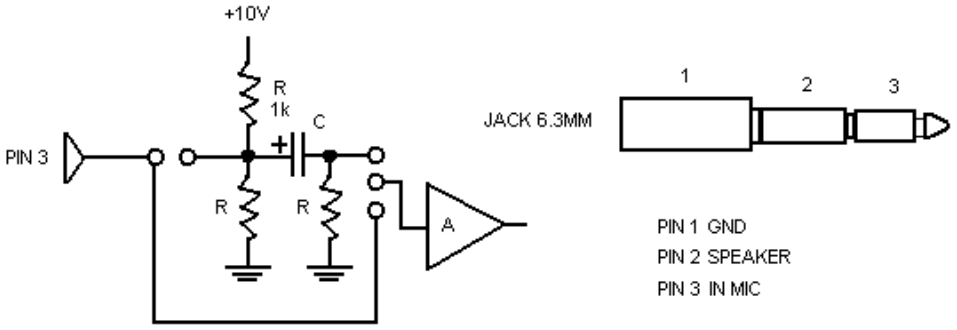
If a mic input level gain is wanted (with any configuration), change R162 resistor (33k) by a 68K one and C80 condenser (820pF) by a 390pF one, so doubling the gain.

If a mic input level decrease is wanted (with any configuration), change R162 resistor (33k) by a 15K one and C80 condenser (820pF) by a 1nF one, so halving the gain.

Tensión (+Vmic) is +10v DC. If a change needed, check with Kroma engineers, as resistor value of the internal power supply must be changed.

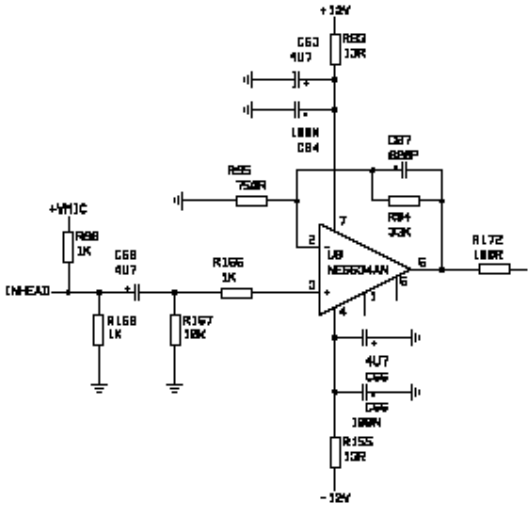
2.6.2 HEADSET

For rack-mounted user panels, headset input is for a 6,3-mm jack connector, with the followinf assigned pins:



Picture 2.48 Dynamic/Condenser Mic Configuration.

The headset mic preamplifier is independent from the XLR mic one. This way user may select the type of mic and tension modifying the headset input at the main board. For the rack-mounted panels, see below the schematics:

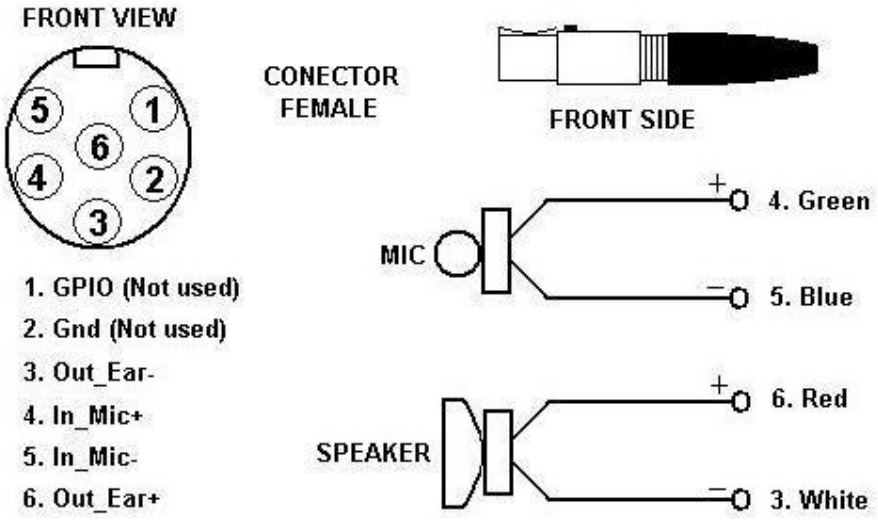


Picture 2.49. Headset input configuration.

For a dynamic headset mic, de-solder R96 resistor.

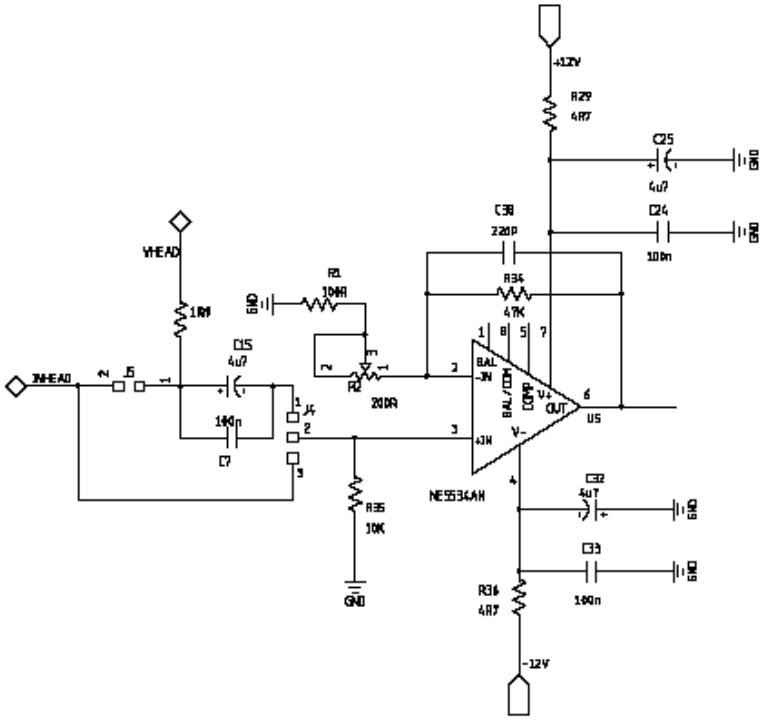
For doubling the mic gain (with dynamic or condenser mic), change R94 resistor (from 33k to 68K) and C67 condenser (from 820pF to 390pF).

The desktop panel (TP7210) uses a Mini XLR (Tiny QG) connector at its rear, withthe assigned pins as follows:



Picture 2.50 Desktop Panel Headset connector.

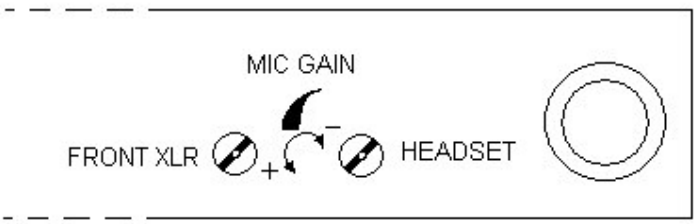
The headset mic preamplifier is independent from the XLR mic one. This way user may select the type of mic and tension modifying the headset input at the main board. For this panel, see below the schematics:



Picture 2.51. Desktop Panel Headset Input Configuration.

The standard configuration of desktop panel TP7210 is a condenser microphone. If user may want a dynamic mic at the headset, solder the J4 jumper (between pins 2 and 3) and de-solder J5 jumper.

Its rear panel is provided with potentiometers to adjust the gain of headset and XLR mics with a '*trimmer*'.



Picture 2.52. Mic Input variations at the TP210.

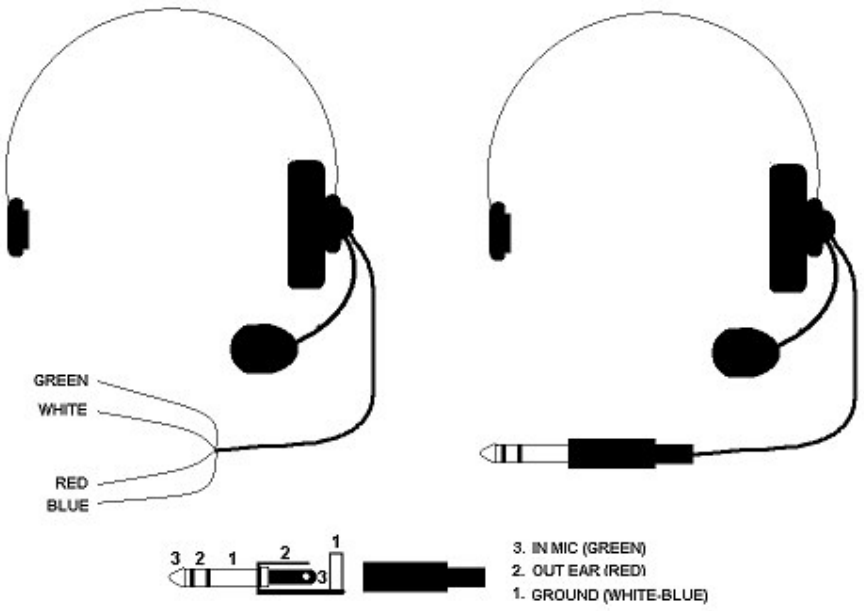
The headset provided is monoaural with electrect input:

MICROPHONE	
TYPE	ELECTRET
DIRECTIONALITY	DIFERENTIAL, NOISE CANCELLING
POWER SUPPLY	3.3V
CURRENT DRAIN	Icc = 400 uA max
SENSIVITY @ 1Khz (0dB=1V/µbar)	Vs = -62 dB (±3dB)
FREQUENCY BANDWIDTH	300-3400 Hz

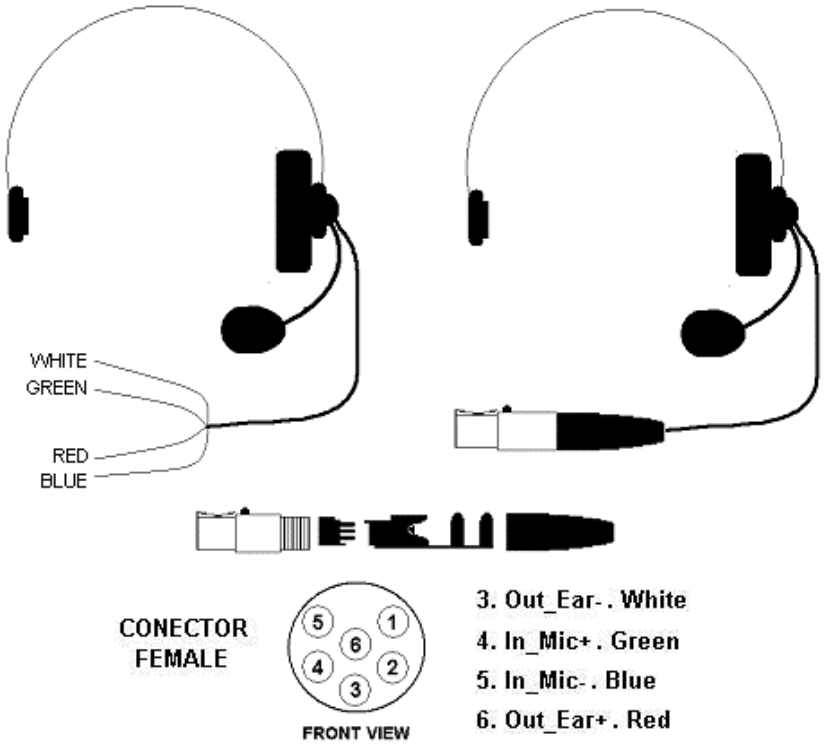
SPEAKER	
TYPE	ELECTRO-DINAMIC
IMPEDANCE @ 1Khz	300 Ω
SENSITIVITY @ 1Khz / 1mW	106 dB SPL (±3dB)
FREQUENCY BANDWIDTH	300-3400 Hz
WEIGHT (with cable)	40 g

Chart 2.39 Headset Tech Specs.

It´s the same headset forboth types of panels with two different connectors. See below:



Picture 2.53 Headset for TP7100, TP7010, TP7016 user panels.



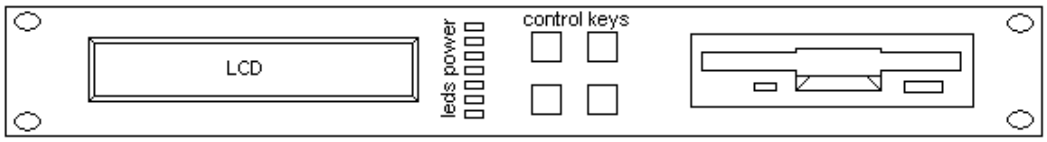
Picture 2.54 Headset for TP7210 desktop panel.

3 FUNCTIONING

3.1 MASTER TM7000

It is the controlling unit. It handles up to 32x32 matrixes, which sums up to 128 crosspoints. For up to 1024 full crosspoint systems, use the Intercom Router Intercom RL7124.

Its RAM keeps the active crosspoint map while its ROM has the saved 8 maps. When changing to a different map, system takes 6-8 seconds to load the new charts and send it to the panels.



Picture 3.1 Front view of Master TM7000.

Crosspoint maps are created by INDICO, the config programme provided. Its defaul password is KROMA. Once edited, the map must be loaded into the system either thru the floppy disk slot or the RS232 connection via a COM port of a laptop/PC.

Serial connection (second option above) allows a total control over the system, so there´s no need to use the keyboard at the front panel. New crosspoints can be created in real time, acting online with the active map.

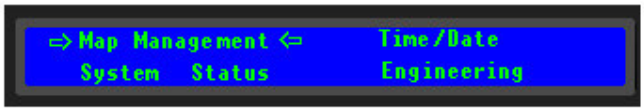
There is a user nterface at the front panel (LCD and keyboard) for managing the system and status checking as well. Its four keys are used as follows:

- OK ➔ It validates the chosen option.
- Cancel ➔ It cancels the chosen option or returns within the menu tree.
- => ➔ It moves to the right the cursor.
- <= ➔ It moves to the left the cursor.

The presentation screen shows the ative map and time of the system.

Picture 3.2 Presentation screen at the Master LCD.

Press OK to go to the main menu. First option is “Map management” menu. Second is “Time/Date” of the system. Third, “System status”, Finally fourth is “Engineering”, used for firmware upgradings.

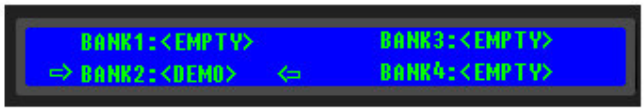


Picture 3.3 Main Menu.

See below the ‘*Map Management*’ menu with its options:

Picture 3.4 *Map Management* menu.

- Active Map => Press OK, choose the map to activate (among the eight available) and press OK to activate it. Pressing OK again we return to the main menu.



Picture 3.5 Map selection.

- Load Map => Used to save a map from a floppy disk. Press Ok to enter, choose the file, then the bank to use. Should a map be already loaded in that bank, it will be deleted.

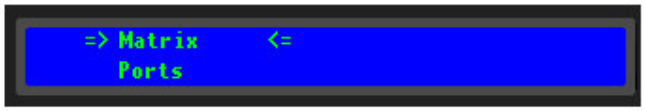
- Erase Map => Use this command to delete maps. Use arrows to locate the bank and then press OK.

- Backup Map => It saves a map onto a floppy disk. Use arrows to locate the bank and then press OK.

Use the Time/Date Menu to set these parameters. Use the arrows to change them. Then press OK:

Picture 3.6 Time/Date menu.

Entering ´*System Status*', user will find two options:



Picture 3.7 System Status Menu.

"Matrix" for matrix status checking and "Ports" for ports status checking (those being used at the active map).

According to the matrix model, the user will be informed about the different crosspoint boards. The models are:

- TM7032 -> Matrix "0" with one Board "A". It´s a 32-port matrix with one 32x32 crosspoint board.
- TM7064 -> Matrix "0" and Matrix "1" with two boards "A" and "B" at each matrix. It´s a 64-port matrix which consists of two 32-port units. Each of these two matrixes have one main crosspoint board and one extension crosspoint board.
- TM7096 -> Matrix "0", "1" and "2" with three boards "A", "B" and "C" at each matrix. It´s a 96-port matrix which consists of three 32-port units. Each of these three matrixes have one main crosspoint board and two extension crosspoint boards.
- TM7128 -> Matrix "0", "1", "2" and "3" with four boards "A", "B", "C" and "C" at each matrix. It´s a 128-port matrix which consists of four 32-port units. Each of these four matrixes have one main crosspoint board and three extension crosspoint boards.

Picture 3.8 Example of Crosspoint Board Status Checking.

Picture above shows a 64-port matrix with its two 32-port units (each one has two crosspoint boards). "A" Board is the master one and is "OK"; "B" is the extension one and being detected only at the first matrix ("Error").

At the port status checking option, user may see: port number, assigned label, type of terminal/panel and its status, which can be:

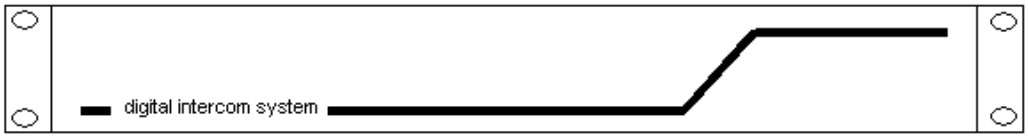
- OK ➔ The digital port works fine. Percentage shows the quantity of signals that are being sent effectively. An 95+ (measured average) would indicate right no errors.
- Warning ➔ The panel/terminal assigned by Indico to the port does not match the one detected by the matrix. Check the setting up and the programmed ports.

Error ➔ There is no connection with a configured port. Percentage´ll be 5-. At the picture below, Port 1 shows some kind of error.

Picture 3.9 Example of port status checking.

3.2 MATRIX TM7032-64-96-128

TM7032 Matrix receives the audio and data signals from panels, interfaces..., does the crosspoints according to Master unit commands as if a digital audio router. That means that all terminals must be connected to the 32 RJ45 connectors at its rear panel.

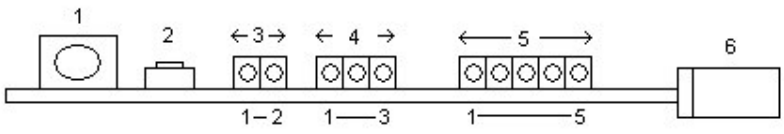


Picture 3.10 Front View of 32x32 Matrix.

This matrix has a 32x32 crosspoint board that communicates directly with the master unit thru a data cable.

System is scalable adding 32-port matrixes: 64x64, 96x96 and 128x128, with main crosspoint boards and extension boards. All matrixes are connected together to share the audio signals.

See below the controls and indicators of the board:

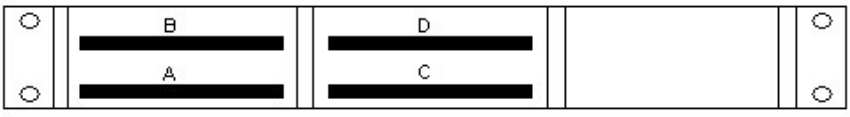


Picture 3.11 Front view of the Crosspoint Board.

- 1 ➔ It´s a connector for firmware upgrades. Reserved for Kroma engineering dept.
- 2 ➔ Reboot. For reconfiguring the board. It takes 30 seconds to become operative.
- 3 ➔ Green leds for power indication. When switched on, both must be lit:
  - 3.1 => +5v supply
  - 3.2 => +3.3v supply

- 4 ➔ Green leds for micro-controller status:
    - 4.1 => If flickering, there´s a configuration error (board remains un-opearive). As it can be temporary, switch off and on. When no light, it incicates normal functioning.
    - 4.2 => It´s on only during the initial configuration (30 seconds).
    - 4.3 => Working. If flickering, micro-processor is operative.
- 5 ➔ Red Leds for ports and control.
    - 5.1 => If flickering at the main XPT board, there´s a terminal asking for communication. The same led at the extension XPT should be off.
    - 5.2 => If flickering at the main XPT board, it shows normal RX/TX activity between matrix and master. If not flickering, master is not controlling the matrix. If flickering at the extension XPT, it shows normal RX/TX activity between main and extension boards.
    - 5.3 => If flickering at the main XPT board, there´s synchro clocking being received from the master unit. If not flickering, there´s a connection problem with the Master (boards remains un-operative). If flickering at the extension XPT board, multiplex is being normally received (in 32+ port configurations).
    - 5.4 => If flickering at the main XPT board, extension is being normally received (in 32+ port configurations). If flickering at the extension XPT board, extension is being normally received.
    - 5.5 => If flickering at the main XPT board, matrix is asking for communication with a terminal. The same led at the extension XPT should be off.
- 6 ➔ Extractor. It extracts the PCB board by pressing it to the right side.

A crosspoint board can be either Main (A; it sends the audio multiplex to the assigned ports) or Extension (B, C, D: they receives the audio multiplex from other matrixes in 32x port configurations). They are located as follows:

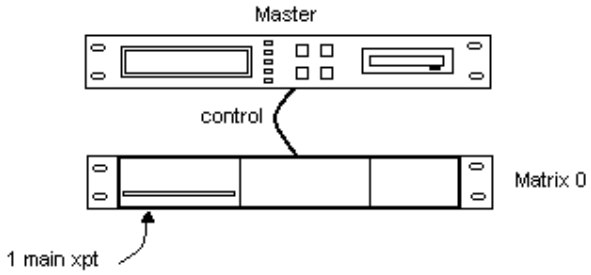


XPT'S MATRIX

Picture 3.12 XPT Boards at 128x128 matrix.

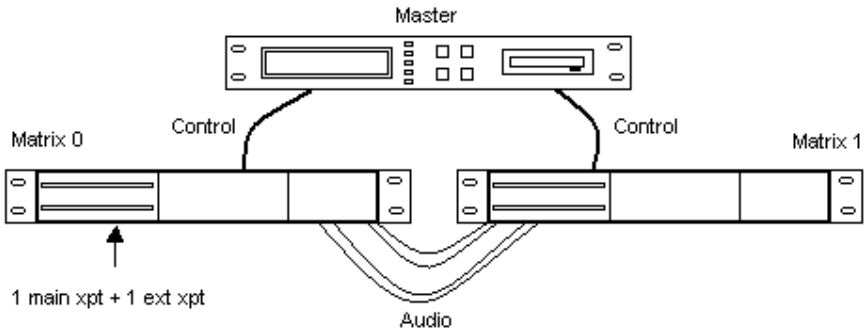
NB: NEVER EXTRACT XPT BOARD WHILE SWITCHED ON.

Basic configuration consists of a Master TM7000 connected to a Matriz TM7032 so as to get a 32x32 configuration. One XPT board will be enough for this configuration.



Picture 3.13 XPT Board at Matrix TM7032.

A Matrix TM7064 consists of 64 ports with two 32x32 matrixes connected to a Master. Each matrix will have two crosspoint boards: the main one and the extension.



Picture 3.14 XPT Boards at Matrix TM7064.

A Matrix TM7096 consists of 96 ports with three 32x32 matrixes connected to a Master. Each matrix will have three crosspoint boards: the main one and two extensions.

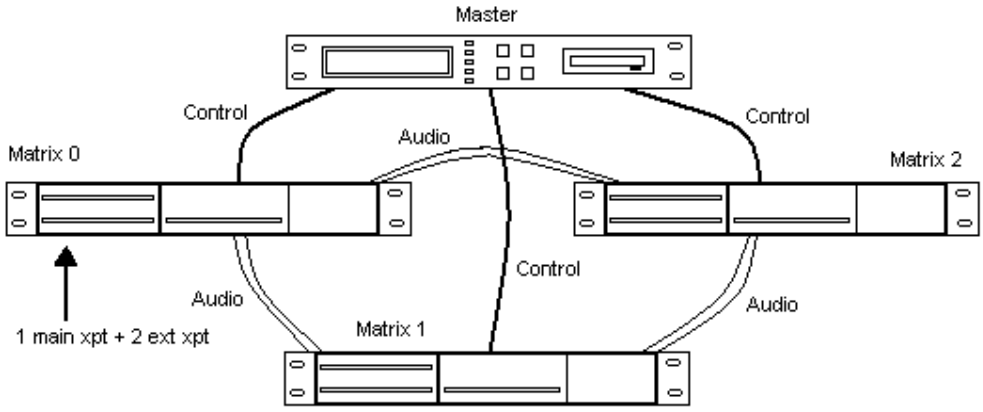
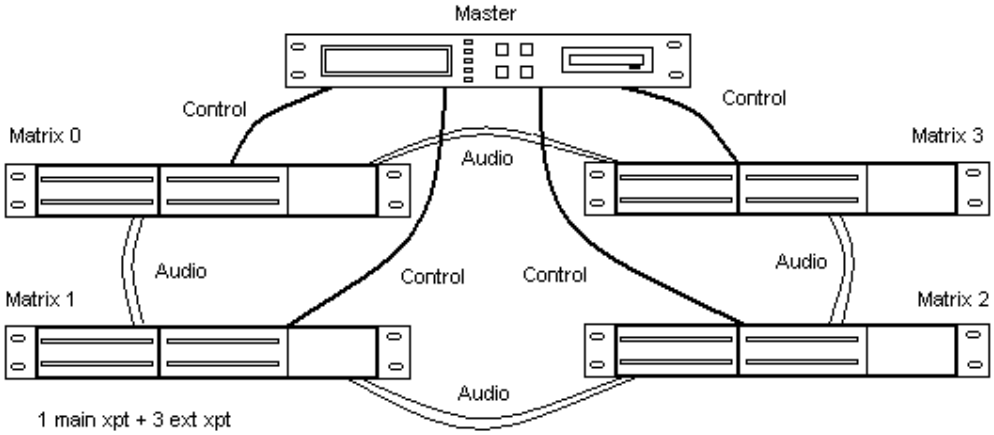


Figura 3.15 Tarjetas XPT's en Matriz TM7096.

A Matrix TM7128 consists of 128 ports with four 32x32 matrixes connected to a Master. Each matrix will have four crosspoint boards: the main one and three extensions.



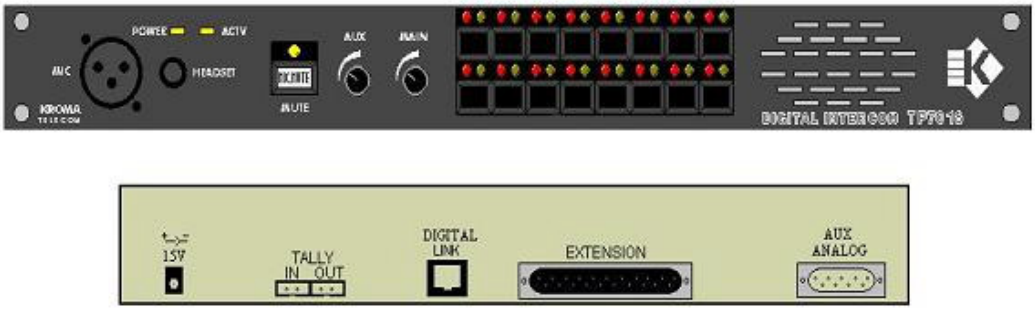
Picture 3.16 XPT Boards at Matrix TM7128.

For 128+ configurations, there are special groupings. There´s a router for connecting different matrixes. Ask for more info.

3.3 PANELS TP7000

3.3.1 BASIC TP7016

This is a 16-key panel, whose crosspoints and labels are configured thru INDICO software. User must print them to be inserted into the key.



Picture 3.17 Front View TP7016.

On the left side we may find the analogue audio controls: a mic XLR input, a headset jack connector, a mute key (with led) and two potentiometers (main audio, aux audio). The two leds indicate power and matrix communication. The last one must be flickering.

The microphone might be dynamic or electrect (switchable by jumper hardware, see page 58). Polarization voltage is changeable (by default, it´s +10v).

Keys are configurable to activate the crosspoints with the following functions:

- Talk Only ➔ Audio is sent from the panel to the destinastions (one way only).
- Listen Only ➔ Audio is received from the source (one way only).
- Talk & Listen ➔ Audio is sent and received. It´s a two-way communication.
- Remote One Way ➔ The crosspoint is activated at a panel but is produced between third parties (example: one user panel may activate the communication between a beltpack and the CCUs). One way only.
- Remote Both Ways ➔ The crosspoint is activated at a panel but is produced between third parties. Talk & Listen.
- Remote Volume ➔ It allows level changes (between –12dB and +12dB) at a remote crosspoint.
- Volume + ➔ To increase the volume of a local crosspoint (up to +12dB on a +1dB basis on the incoming audio).

- Volume - ➔ To decrease the volume of a local crosspoint (up to -12dB on a -1dB basis on the incoming audio).

These volume keys will vary the volume of all the activated crosspoints at that moment. This new level will be kept unless varied later. This command is de-activated if not used in four seconds. Note that as this panel is not provide with bar graphs, audio adjustment must be made “by ear”.

Crosspoint keys may work in three ways (software programmable):

- PTT ➔ *Push to Talk*, The assigned command will be activated only when the key is kept pushed.

- Latch ➔ Just pressing once, command is activated. Press again for de-activation.

- Default mode ➔ Both ways at the same time. The command (crosspoint) will be active by pressing once or keeping it pressed.

Each crosspoint key is provided with two leds (green and red):

- Lit green ➔ the command assigned to that key has been activated.

- Lit red ➔ it shows that another terminal has established communication with this user panel (talk & listen).

- Flickering green ➔ It shows that the assigned command is being activated (it might be a telephone call being established).

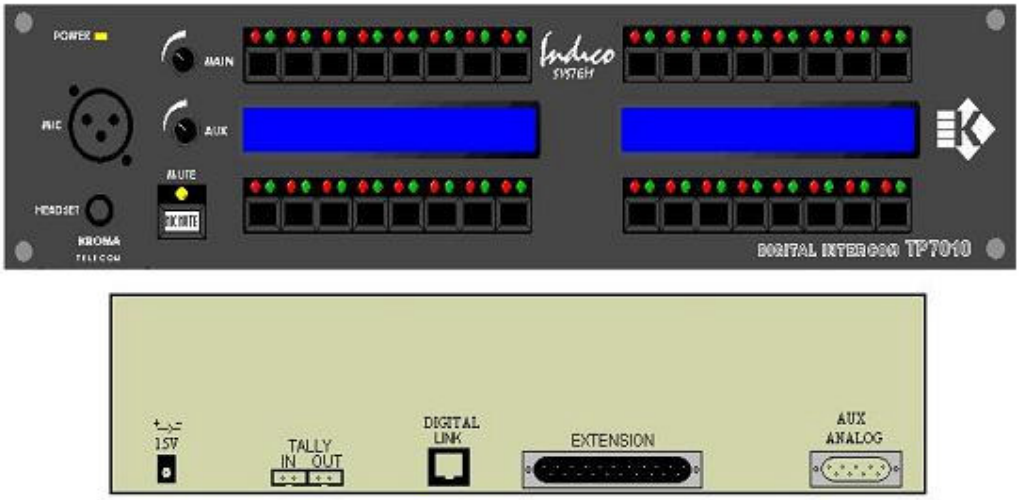
- Flickering red ➔ it shows that another terminal has established communication with this user panel (listen only: we cannot talk until we activate the command by pressing the key).

TECH SPECS:

Dimensions	1 unit high/19”, 150 mm deep
Weight	2,5 Kg
Power supply	+15v, 500mA external PS
Number of XPT keys	16
Mic preamplifier	+50dB to +75 dB (input –63dB)
Speaker preamplifier	10w at 4Ω
Signal format	44,1Khz sampling, 16 audio bits + 8 data bits
Connections	RJ45 (digital) SUBD9M (analogue)
Aux analogue I/O	nominal level 4 dBv Max level 12dBv Bandwidth 150Hz-10kHz SNR > 80 dB THD < 0.2% a 4 dB

3.3.2 LCD TP7010

This is a 32-key user panel with double LCD for 4-character labels (configured by Indico software). It allows local crosspoint management, so new commands can be established in real time and saved onto the active map.



Picture 3.18 TP7010.

On the left side we may find the analogue audio controls: a mic XLR input, a headset jack connector, a mute key (with led) and two potentiometers (main audio, aux audio). One led indicates power.

The microphone might be dynamic or electrect (switchable by jumper hardware, see page 58). Polarization voltage is changeable (by default, it´s +10v).

For label & command assignments, this user panel is provided with 31 crosspoint keys and one page-shifting key (totalling up to 124 assigned commands).

Keys are configurable to activate the crosspoints with the following functions:

- Talk Only ➔ Audio is sent from the panel to the destinastions (one way only).
- Listen Only ➔ Audio is received from the source (one way only).
- Talk & Listen ➔ Audio is sent and received. It´s a two-way communication.
- Remote One Way ➔ The crosspoint is activated at a panel but is produced between third parties (example: one user panel may activate the communication between a beltpack and the CCUs). One way only.

- Remote Both Ways ➔ The crosspoint is activated at a panel but is produced between third parties. Talk & Listen.

- Remote Volume ➔ It allows level changes (between –12dB and +12dB) at a remote crosspoint.

- Volume + ➔ To increase the volume of a local crosspoint (up to +12dB on a +1dB basis on the incoming audio).

- Volume - ➔ To decrease the volume of a local crosspoint (up to -12dB on a -1dB basis on the incoming audio).

These volume keys will vary the volume of all the activated crosspoints at that moment. This new level will be kept unless varied later. This command is de-activated if not used in four seconds. Note that as this panel is not provide with bar graphs, audio adjustment must be made “by ear”.

- Prog ➔ For local programming (crosspoint changes). Permanent saving (onto permanent memory ROM) is available.

- Pág. ➔ For shifting between pages, so the phisical 31 crosspoint keys become 124 virtual keys. Pag key is programmable so the user may have 32 phisical crosspoint keys when a Pag key is not programmed.

Crosspoint keys may work in three ways (software programmable):

- PTT ➔ *Push to Talk*, The assigned command will be activated only when the key is kept pushed.

- Latch ➔ Just pressing once, command is activated. Press again for de-activation.

- Default mode ➔ Both ways at the same time. The command (crosspoint) will be active by pressing once or keeping it pressed.

Each crosspoint key is provided with two leds (green and red):

- Lit green ➔ the command assigned to that key has been activated.

- Lit red ➔ it shows that another terminal has established communication with this user panel (talk & listen).

- Flickering green ➔ It shows that the assigned command is being activated (it might be a telephone call being established).

- Flickering red ➔ it shows that another terminal has established communication with this user panel (listen only: we cannot talk until we activate the command by pressing the key).

NB*: For local programming, assign a PROG command to a key.*

Crosspoint changes are done easily from Indico software, so local programming is advised when only a few new crosspoints must be created.

After pressing PROG, a menu will appear:

Picture 3.19 Programming menu TP7010.

- REPR ➔ For key reprogramming. After pressin this key, the following menu appears:

Picture 3.20 Reprogramming Menu.

Press any key and then choose the key for the new assignment. Next, the comand must be selected.

Picture 3.21 Command selection.

Press any key and choose the command (Talk&Listen (T&L), Talk, Listen (LSTN), Remote one way, (ROW), Remote both ways (RBW) and remote level variation (RVL). Press the needed key to assign such command.

Picture 3.22 Command Selection menu.

Then choose the source and press any key:

Picture 3.23 Source selection.

Then the destination (if needed):

Picture 3.24 Destination selection.

Press any key, then the key that shows the desired destination so as to programme the new crosspoint:

Picture 3.25 Programming Menu TP7010.

- DEL ➔ Used for deleting command assignments. If pressed, the following menu appears.

Figura 3.26 Vista panel TP7010.

Press any key to see all the assignments. Then delete the chosen one.

- SAVE ➔ It saves the changes to the active map (ROM) of the Master. If changes have been done and this option is not activated, the new crosspoints wouldn´t be kept when switched off the equipment.

- EXIT ➔ To exit the menu and make the panel operational again.

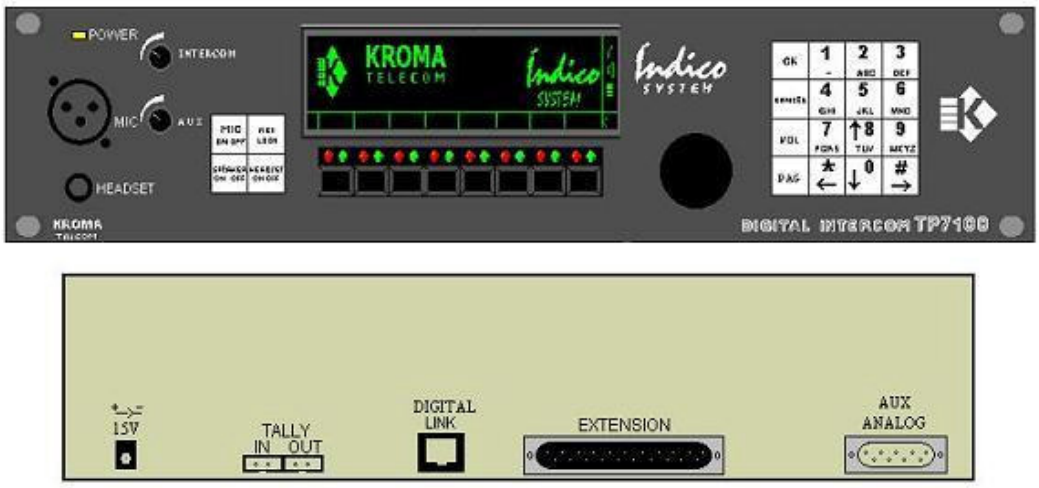
TECH SPECS:

Dimensions	2 units high/19”, 150 mm deep
Weight	3,4 Kg
Power supply	+15v, 500mA external PS
Number of XPT keys	32 (direct), 124 (when page-shifting)
Mic preamplifier	+50dB to +75 dB (input –63dB)
Speaker preamplifier	10w at 4Ω
Signal format	44,1Khz sampling, 16 audio bits + 8 data bits
Connections	RJ45 (digital) SUBD9M (analogue)
Aux analogue I/O	nominal level 4 dBv

Max level 12dBv
Bandwidth 150Hz-10kHz
SNR > 80 dB
THD < 0.2% a 4 dB

3.3.3 GRAPHIC TP7100

This is an advanced master panel that allows total control of the intercom system in real time and thru a graphic display.



Picture 3.27 Panel TP7100.

It is provided with 8 keys for direct commanding and ten pages to shift among. So user may have 80 virtual crosspoint keys. It also has a dialling keypad.

On the left side we may find the analogue audio controls: a mic XLR input, a headset jack connector, a mute key (with led) and two potentiometers (main audio, aux audio). One green led indicates power.

The microphone might be dynamic or electrect (switchable by jumper hardware, see page 58). Polarization voltage is changeable (by default, it´s +10v).

Keys are configurable to activate the crosspoints with the following functions:

- Talk Only ➔ Audio is sent from the panel to the destinastions (one way only).
- Listen Only ➔ Audio is received from the source (one way only).
- Talk & Listen ➔ Audio is sent and received. It´s a two-way communication.

- Remote One Way ➔ The crosspoint is activated at a panel but is produced between third parties (example: one user panel may activate the communication between a beltpack and the CCUs). One way only.

- Remote Both Ways ➔ The crosspoint is activated at a panel but is produced between third parties. Talk & Listen.

- Remote Volume ➔ It allows level changes (between –12dB and +12dB) at a remote crosspoint.

- Volume + ➔ To increase the volume of a local crosspoint (up to +12dB on a +1dB basis on the incoming audio).

- Volume - ➔ To decrease the volume of a local crosspoint (up to -12dB on a -1dB basis on the incoming audio).

These volume keys will vary the volume of all the activated crosspoints at that moment. This new level will be kept unless varied later. This command is de-activated if not used in four seconds. Note that as this panel is not provide with bar graphs, audio adjustment must be made “by ear”.

Crosspoint keys may work in three ways (software programmable):

- PTT ➔ *Push to Talk*, The assigned command will be activated only when the key is kept pushed.

- Latch ➔ Just pressing once, command is activated. Press again for de-activation.

- Default mode ➔ Both ways at the same time. The command (crosspoint) will be active by pressing once or keeping it pressed.

Each crosspoint key is provided with two leds (green and red):

- Lit green ➔ the command assigned to that key has been activated.

- Lit red ➔ it shows that another terminal has established communication with this user panel (talk & listen).

- Flickering green ➔ It shows that the assigned command is being activated (it might be a telephone call being established).

- Flickering red ➔ it shows that another terminal has established communication with this user panel (listen only: we cannot talk until we activate the command by pressing the key).

It´s the most advanced user panel because it allows a total control of the intercom system in real time and thru a graphic display. It´s like a master panel.

The dialling keypad is provided with control keys for the main menu (use the optcal encoder to move between the different options):

- OK ➔ It activates the selected option.
- CANCEL ➔ It de-activates the selected option or go back to the previous menu.
- VOL ➔ For level variations of local crosspoints.
- PAG ➔ For page-shifting.

Picture 3.28 Homepage TP7100.

It is provided with 3 control keys for local audio:

- Mic ON/OFF ➔ A mute-in key for the mic.
- Headset ON/OFF ➔ Choose whether you want to use the headset or the mic & built-in speaker.
- Speaker ON/OFF ➔ A mute-out for the speaker.

Picture 3.29 Audio Icons.

And one key for locking the keyboard:

- KEY LOCK ➔ It blocks all the keys of the user panel for safety reasons.

Without using Indico software, this panel can change the crosspoint configuration of the whole system (including level variations). For the main menu, press 'OK' and then enter the 'Security PIN' (by default: **'0000'**). This authorized access might ne de-activated as well.

Picture 3.30 Access to Menus.

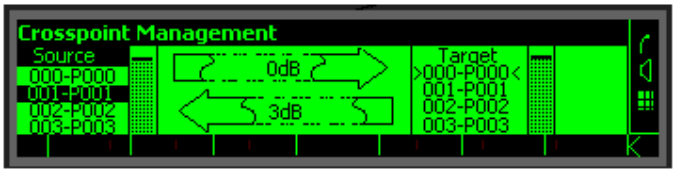
Main menu consists of:

- **Crosspoint Management ➔** For creating & deleting crosspoints.

Picture 3.31 Main menu.

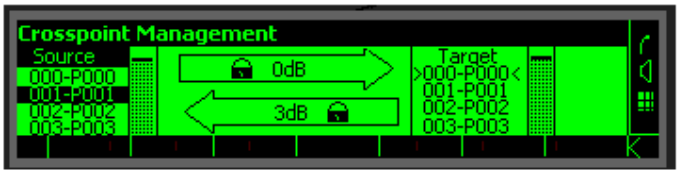
After pressing it, the screen presents three distinct vertical sections: source, type of crosspoint (plus its dB level) and destination. Use arrows (or optical encoder) to move between options and press OK to select them. The types of crosspoints are:

a) Not done. See below a crosspoint between Port1 and Port0 not done:



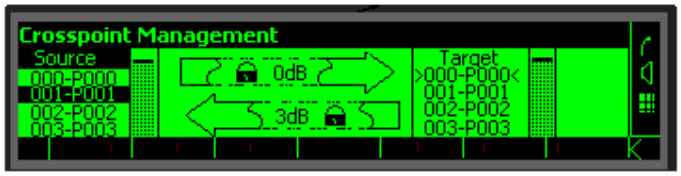
Picture 3.32 Crosspoint not done.

b) Done. See below a crosspoint between Port1 and Port0 done:



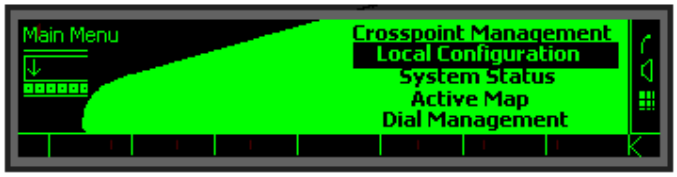
Picture 3.33 Crosspoint done.

c) Blocked. See below a crosspoint between Port1 and Port0 done and blocked (it can be deleted only from this specific panel):



Picture 3.34 Crosspoint blocked.

- **Local Configuration ➔** It allows the user to change the crosspoints of the local panel, chage or activate the PIN function or save audio levels onto the map.



Picture 3.35 Local configuration menu.

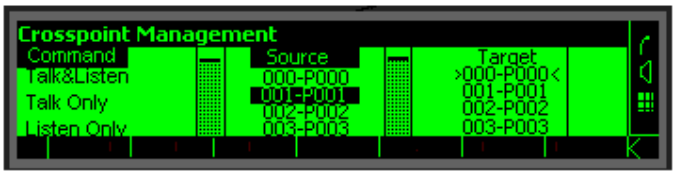
Press OK for having access to the submenus:

Picture 3.36 Config submenus.

a) XPT Key Config: for assigning crosspoints to the keys (each one of the eight keys might have a different command according to the page the user is at the moment). Press OK to proceed with the chosen key to be reprogrammed.

Picture 3.37 XPT key configuration.

Then select the assigned command, the source and the destination:



Picture 3.38 Command assigning to XPT keys.

b) PIN Options: It allows the user to change the security options (at the time of switching on the panel). We have two options at “PIN request”: NEVER or ALWAYS. User might also want to change the PIN number (which is “0000” by default).

Picture 3.39 Security Options.

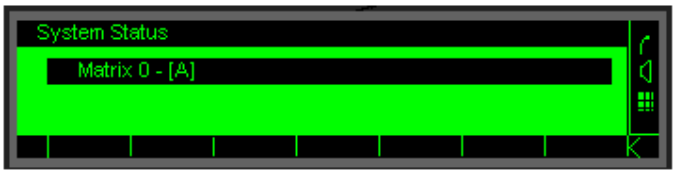
c) Save Keys to map: for saving the new assignments to the keys reconfigured from the panel into the active crosspoint map (into ROM memory).

d) Save Audio Levels to map: for saving audio level assigned to crosspoints reconfigured from the panel into the active crosspoint map (into ROM memory).

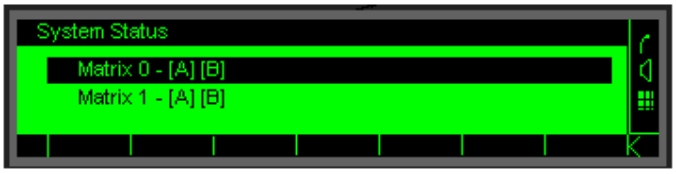
- **System Status ➔** For checking the status of matrixes and activated ports in real time. It´s useful for knowing which panel is connected to which port, how each terminal and XPT board is working.

Picture 3.40 System Status Menu.

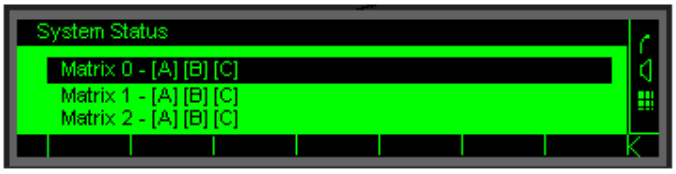
a) Matrix Status: For checking the functioning of each matrix and XPT board, according to the matrix config (32x32, 64x64, 96x96 or 128x128). See below the different possibilities:



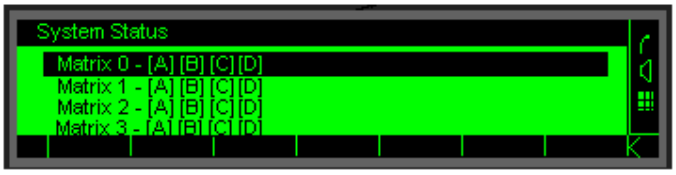
Picture 3.41 Status Matrix TM7032.



Picture 3.42 Status Matrix TM7064.



Picture 3.43 Status Matrix TM7096.



Picture 3.44 Status Matrix TM7128.

b) Port Status: it shows the functioning of each assigned port in real time: 'OK' means proper functioning. 'ERROR' means that the panel is not connected or is switched off. 'WARNING' means that the connected equipment is not the assigned one by the Config programme Indico. In this last case, check configuration and installation.

Picture 3.45 Port Status.

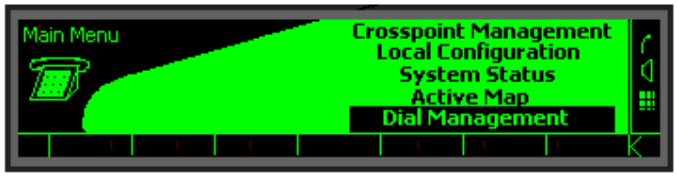
- **Active Map➔** For activating one of the eight maps saved at the master unit.

Picture 3.46 Map activation menu.

Select the map to activate and press OK:

Picture 3.47 Selection of XPT map.

- **Dial Management** ➔ For making phone calls thru the available interfaces (GSM, ISDN, PSTN...).



Picture 3.48 Status Matrix TM7128.

Press OK to access dialling menus. User´ll be able to manage external phone calls (to receive them or to finish them) and modify phone numbers assigned to certain keys with Indico software.

Picture 3.49 Dialling Menu.

a) Call Management: For establishing/finishing telephone calls. To make a call, select the interface to establish the communication. It´ll be as 'IDLE'. And then press OK.

Picture 3.50 Selection of dialling interface.

If the interface is being used by any other phone call, it´ll be indicated with BUSY. If IDLE, it can be used for a new communcation. Press OK to start a new phone call.

Picture 3.51 Starting a call.

Press OK again and New Call Menu will appear. Then we must select the type of codec (G.711 for PSTN and GSM, G.722 or G.711 for ISDN).

Picture 3.52 Destination number.

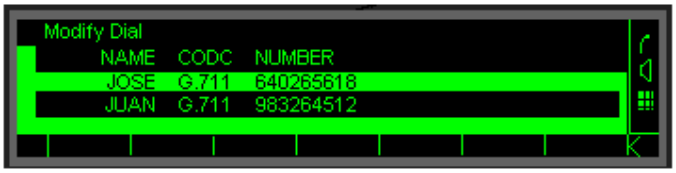
Select the number window and press OK. Then enter the destination telephone number and press OK. Select “OK-Call” and press OK to start dialling.

Picture 3.53 Dialling.

To end a call, select the communication to interrupt (it must be in STBL status). When shaded, press OK. It´ll appear a “Finish Call” message. Press OK again.

Picture 3.54 Hanging up a call.

b) Modify Dial Entry: For modifying a number already assigned to a label (directory). Press OK to enter the agenda. Select to number to modify:



Picture 3.55 Number modification.

Press OK and change the number.

Picture 3.56 Destination number modifying.

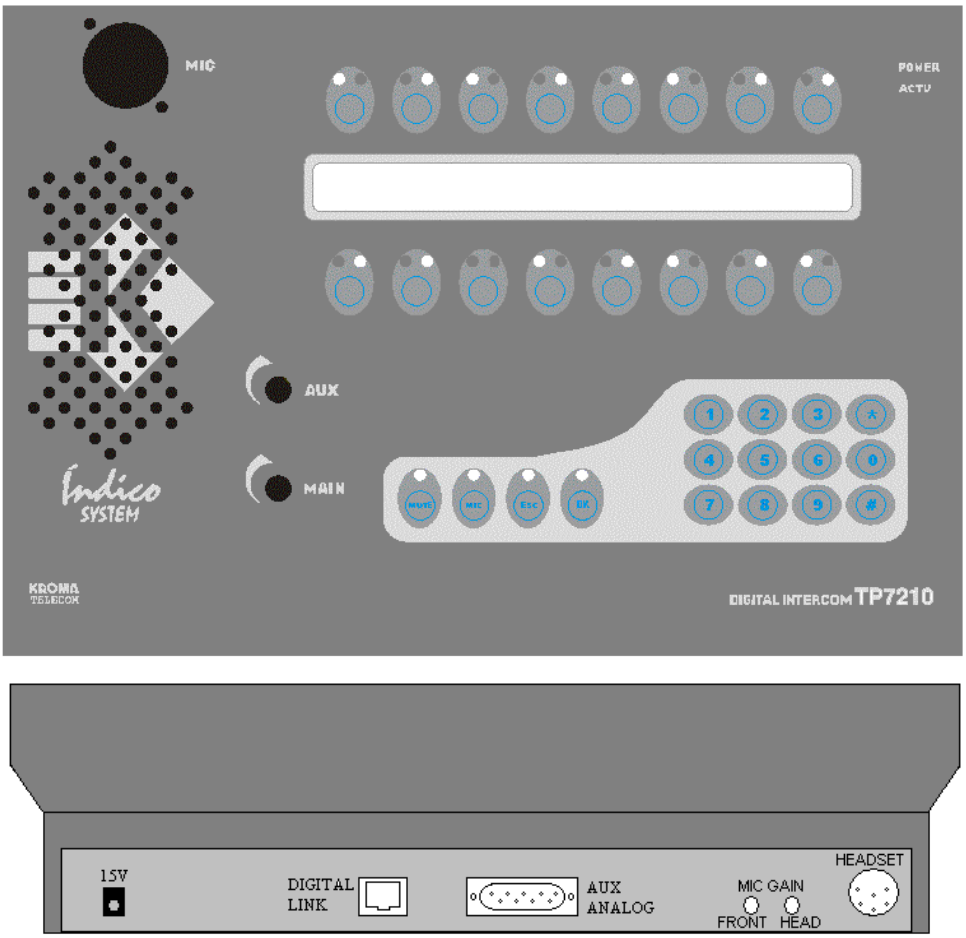
TECH SPECS:

Dimensions	2RU/19", 150 mm deep
Weight	3,4 Kg
Power	+15v, 500mA external PS
Number of XPT keys	8 XPT keys (80 if page-shifting), 20 control keys
Mic amplifier	+50dB to +75 dB (Input –63dB)
Speaker amplifier	10w at 4Ω
Signal format I	44,1Khz sampling, 16 bits audio + 8 bits data
Connection	RJ45 in digital SUBD9M in analogue
Analogue I/O	Nominal level 4 dBv Max level 12dBv Bandwidth 150Hz-10kHz SNR > 80 dB THD < 0.2% at 4 dB

3.3.4 DESKTOP TP7210

It´s a desktop user panel with 16 XPT keys and LCD for label viewing (max 4 characters per key). It allows the user to repogramme local crosspoints in real time, which can be saved into the active map.

User can page-shift in four pages, totalling 60 XPT virtual keys (with one for changing the page). It can also manage phone calls thru the available interfaces. It has a dialling keypad for direct dialling.



Picture 3.57 Panel TP7210.

On the left side we may find the analogue audio controls: a mic XLR input, a headset jack connector (at the rear), a mute key (with led) and two potentiometers (main audio, aux audio). One green led indicates power. Another shows proper matrix communication (if flickering).

The microphone might be dynamic or electrect (switchable by jumper hardware, see page 58). Polarization voltage is changeable (by default, it´s +10v).

Rear connector for headset is of Tiny Q-G type. By default a electrect mic is provided (it´s changeable thru jumper hardware though).

Rear panel is provided with potentiometers to headset & front mic gain adjustment.

For switching between headset and local speaker, use the MIC key. When using the headset, the MIC led will be on. MUTE can be used for “muting” both microphones.

Keys are configurable to activate the crosspoints with the following functions:

- Talk Only ➔ Audio is sent from the panel to the destinastions (one way only).
- Listen Only ➔ Audio is received from the source (one way only).
- Talk & Listen ➔ Audio is sent and received. It´s a two-way communication.
- Remote One Way ➔ The crosspoint is activated at a panel but is produced between third parties (example: one user panel may activate the communication between a beltpack and the CCUs). One way only.
- Remote Both Ways ➔ The crosspoint is activated at a panel but is produced between third parties. Talk & Listen.
- Remote Volume ➔ It allows level changes (between –12dB and +12dB) at a remote crosspoint.
- Volume + ➔ To increase the volume of a local crosspoint (up to +12dB on a +1dB basis on the incoming audio).
- Volume - ➔ To decrease the volume of a local crosspoint (up to -12dB on a -1dB basis on the incoming audio).
- Pág. ➔ For page-shifting.

These volume keys will vary the volume of all the activated crosspoints at that moment. This new level will be kept unless varied later. This command is de-activated if not used in four seconds.

Crosspoint keys may work in three ways (software programmable):

- PTT ➔ *Push to Talk*, The assigned command will be activated only when the key is kept pushed.
- Latch ➔ Just pressing once, command is activated. Press again for de-activation.
- Default mode ➔ Both ways at the same time. The command (crosspoint) will be active by pressing once or keeping it pressed.

Each crosspoint key is provided with two leds (green and red):

- Lit green ➔ the command assigned to that key has been activated.

- Lit red ➔ it shows that another terminal has established communication with this user panel (talk & listen).

- Flickering green ➔ It shows that the assigned command is being activated (it might be a telephone call being established).

- Flickering red ➔ it shows that another terminal has established communication with this user panel (listen only: we cannot talk until we activate the command by pressing the key).

For entering menus and dialling, use the following keys:

- ESC → it cancels the selected option or moves backwards in the menu tree.

- OK → it validates the action or moves forward in the menu tree.

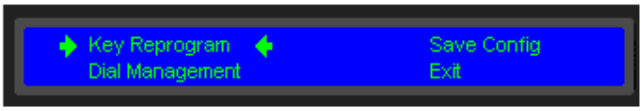
- '2' → Digit 2 and up arrow.

- '8' → Digit 8 and down arrow.

- '6' → Digit 6 and right arrow.

- '4' → Digit 4 and left arrow.

Press OK for entering config and dialling menus:



Picture 3.58 Menu TP7210.

- Key Reprogram ➔ For reprogramming local crosspoints: press OK to enter. Then choose the key to reassign.

Picture 3.59 XPT reprogramming.

Select the needed command and press OK:

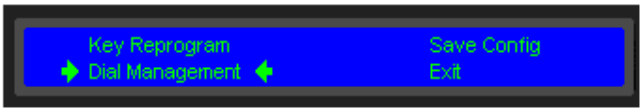
Picture 3.60 Command Selection.

Press any key to go further. Now select destination port (if needed):

Picture 3.61 Destination selection.

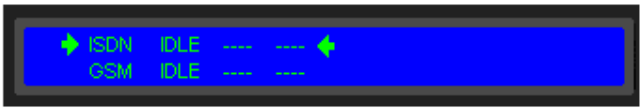
If many crosspoint changes must be made, user may prefer Indico software instead of local reprogramming.

- Dial Management → For dialling management thru the available interfaces:



Picture 3.62 Dialling menu.

Press OK and select the interface:



Picture 3.63 Interface selection.

Press OK to start a call:

Picture 3.64 Start a call

Then enter the destination phone number:

Picture 3.65 Destination number.

Then select the audiocodec: G.711 for GSM, PSTN and ISDN, G.722 for ISDN only:

Picture 3.66 Codec Selection.

Press OK to start the call (dialling status will appear):

Picture 3.67 Start a call.

If user wants to hang up, select the interface in use and press OK. A “Finish Call” message will appear: press OK again:

Picture 3.68 End a call.

- Save Config ➔ It saves the changed crosspoints into the active map. If modifications are temporary, user may prefer not to alter the active map.

- Exit ➔ TO leave config menu and make the panel operative.

NB: It´s advised that talk&listen keys are assigned to the telephone interfaces (with no number assigned) so that they can be pressed when establishing the communication. That way the person at the other side of the line will listen to and will not be confused.

TECH SPECS:

Dimensions	265mm wide, 80mm high, 180mm deep
Weight	1,5 Kg
Power	+12v, -12v, +5v 500mA external PS
Number of XPT keys	16 direct (60 if page-shiftig), 20 control
Mic amplifier	+50dB at +75 dB (Input –63dB)
Speaker amplifier	10w at 4Ω
Signal Format	44,1Khz sampling, 16 bits audio + 8 bits data
Connection	RJ45 in digital SUBD9M in analogue
Analogue I/O	Nominal level 4 dBv Max level 12dBv Bandwidth 150Hz-10kHz SNR > 80 dB THD < 0.2% at 4 dB

3.7 INTERFACE BOARDS

These boards are plugged into the interface rack frame TR7000 and are designed to proveide access to externals systems.

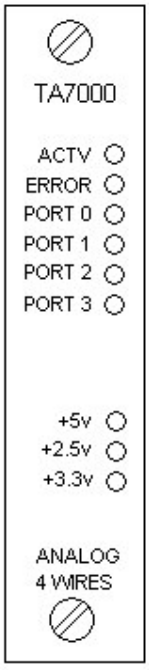
3.7.1 ANALOGUE TA7000, TA7003

They convert external analogue sources into digital signals compatible with Kroma digital Intercom. TA7000 is for 4 wires. TA7003 is for two wires. They are provided with four ports **(transformed isolated)**.

They can be used for adapting Kroma analogue intercom equipments to the digital matrix (such as Beltpacks BP6000, concentrators CE6000, user panels TP6000, radio base stations, talent earpieces, etc).

User must assing matrix ports to the 4 different sources independently thru Indico software.

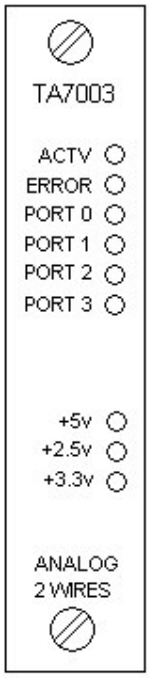
Front leds of TA7000 indicate digital port status. Have in mind that they inform only about digital, not analogue ports.



Picture 3.69 Front TA7000.

4-wire signal level can be adjusted individually thru 4 potentiometers in the board.

Front leds of TA7003 indicate digital port status. Have in mind that they inform only about digital, not analogue ports.



Picture 3.70 Front TA7003.

For both boards, the information shown is as follows:

- ACTV ➔ Green Led for checking the control side of the board. If flickering, functioning is OK.

- ERROR ➔ Red Led for checking configuration errors when switching on the system. If on, board becomes non-operative.

- PORT 0 ➔ Red Led for checking connection between digital port 0 to matrix. If flickering, functioning is OK. If on, communication with matrix does not exist.

- PORT 1 ➔ Red Led for checking connection between digital port 1 to matrix. If flickering, functioning is OK. If on, communication with matrix does not exist.

- PORT 2 ➔ Red Led for checking connection between digital port 2 to matrix. If flickering, functioning is OK. If on, communication with matrix does not exist.

- PORT 3 ➔ Red Led for checking connection between digital port 3 to matrix. If flickering, functioning is OK. If on, communication with matrix does not exist.

- +5v ➔ Green Led for +5v power supply for the control side of the board.

- +2.5v ➔ Green Led for +2.5v power supply for the comunication-to-matrix side of the board.

- +3.3v ➔ Green Led for +3.3v power supply for the audio conversion side of the board.

If one of the three voltage leds fails, board becomes non-operative.

Form Indico config programme, user might adjust the level gain between -12dB and +12dB, with 6dB steps. This procedure can be done with the input and output of every port (useful for external sources which commonly carry different volume levels).

TECH SPECS:

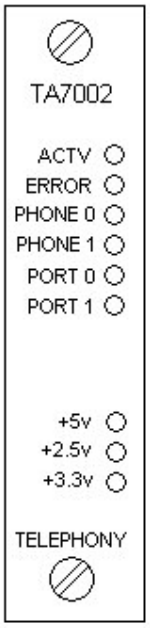
Dimensions	3RU/19”, 360 mm deep with mechanical
Weight	920g with rear
Power	+20v, -20v external PS
Signal format	Codec 44,1Khz sampling, 24bits audio
Digital Connection	RJ45 in digital
Analogue Connection	SUBD9H in single rear, SUBD62H in double rear
analogue I/O	max level 12dBv bandwidth 100Hz-10kHz SNR > 80 dB THD < 0.15% at 4 dB

3.7.2 INTERFACE FOR PSTN LINES TA7002

This board adapts PSTN signals (analogue telephone lines) to the digital protocol of the intercom. It is provided with two digital ports (two FXO-type interfaces), so two telephone lines can be connected.

User must indicate TA7002 board when assigning the matrix ports thru Indico software. Also it must be declared: telephone numbers, call management...

For checking the status between the digital port of the board and the matrix, there are two leds (one per each line):



Picture 3.71 Front TA7002.

The board is also provided with two aux analogue Input/output (one per channel) for outputting & monitoring the telephone signal.

Front leds indicate the following:

- ACTV ➔ Green Led for checking the control side of the board. If flickering, functioning is OK.

- ERROR ➔ Red Led for checking configuration errors when switching on the system. If on, board becomes non-operative.

- PHONE 0 ➔ Red led for checking the status of the connection of Phone port 0 to the telephone network. When there´s a call, it remains on. When the user hang s up, the led switches off.

- PHONE 1 ➔ Red led for checking the status of the connection of Phone Port 1 to the telephone network. When there´s a call, it remains on. When the user hang s up, the led switches off.

- PORT 0 ➔ Red Led for checking connection between digital port 0 to matrix. If flickering, functioning is OK. If on, communication with matrix does not exist.

- PORT 1 ➔ Red Led for checking connection between digital port 1 to matrix. If flickering, functioning is OK. If on, communication with matrix does not exist.

- +5v ➔ Green Led for +5v power supply for the control side of the board.

- +2.5v ➔ Green Led for +2.5v power supply for the comunication-to-matrix side of the board.

- +3.3v ➔ Green Led for +3.3v power supply for the audio conversion side of the board.

If one of the three voltage leds fails, board becomes non-operative.

TECH SPECS:

Dimensions	3RU/19", 360 mm deep with mechanical
Weight	870g with rear
Power Supply	+20v, -20v external PS
Signal format	Codec 44,1Khz sampling, 24bits audio
Digital Conneciton	RJ45 in digital
Analogue Connection	SUBD9H in single rear, SUBD62H in double rear
Telephone Connection	RJ11 Connectors Bandwidth 150Hz-3kHz
Aux Analogue I/O	Max level 12dBv Bandwidth 150Hz-10kHz SNR > 70 dB THD < 3% at 4 dBv

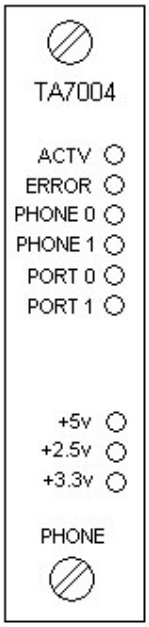
3.7.3 INTERFACE FOR TELEPHONE SET TA7004

It adapts the digital intercom protocol to a telephone set. With two digital ports (two FXS-type interfaces), so two telephone sets can be converted into user intercom panels. They can be use the dialling keypad as the keyboard of a panel (apart from a normal dialling keypad to make/receive calls). Interface act as a local exchange of the intercom system.

It can interface with DECT wireless terminals so users that carry them can be located at all times.

User must indicate TA7002 board when assigning the matrix ports thru Indico software. Also it must be declared: telephone number configuration, call management, DTMF call selection...

For checking the status between the digital port of the board and the matrix, there are two leds (one per each line):



Picture 3.72 Front TA7004.

The board is also provided with two aux analogue Input/output (one per channel) for outputting & monitoring the telephone signal.

Front leds indicate the following:

- ACTV ➔ Green Led for checking the control side of the board. If flickering, functioning is OK.
- ERROR ➔ Red Led for checking configuration errors when switching on the system. If on, board becomes non-operative.

- PHONE 0 ➔ Red led for checking the status of the connection of Phone port 0 to the telephone network. When there´s a call, it remains on. When the user hang s up, the led switches off.

- PHONE 1 ➔ Red led for checking the status of the connection of Phone Port 1 to the telephone network. When there´s a call, it remains on. When the user hang s up, the led switches off.

- PORT 0 ➔ Red Led for checking connection between digital port 0 to matrix. If flickering, functioning is OK. If on, communication with matrix does not exist.

- PORT 1 ➔ Red Led for checking connection between digital port 1 to matrix. If flickering, functioning is OK. If on, communication with matrix does not exist.

- +5v ➔ Green Led for +5v power supply for the control side of the board.

- +2.5v ➔ Green Led for +2.5v power supply for the comunication-to-matrix side of the board.

- +3.3v ➔ Green Led for +3.3v power supply for the audio conversion side of the board.

If one of the three voltage leds fails, board becomes non-operative.

For starting a call addressing a certain user panel, wait for the tone and enter the destination port. Then press '*' (asterisk) to activate the communication. For hanging up, enter the port number whose call we want to stop and press '#'. previously to this, user must have configured the assignments and gone thru the call management menus at Indico config programme.

TECH SPECS:

Dimensions	3RU/19", 360 mm deep with mechanical
Weight	870g with rear
Power Supply	+20v, -20v external PS
Signal Format	Codec 44,1Khz sampling, 24bits audio
Digital Connection	RJ45 in digital
Analogue Connection	SUBD9H in single rear, SUBD62H in double rear
Telephone Connection	RJ11 connectors Bandwidth 150Hz-3kHz
Aux Analogue I/O	Max level 12dBv Bandwidth 150Hz-10kHz SNR > 70 dB THD < 3% at 4 dB

3.7.4 INTERFACE FOR ISDN LINES (G.722 PRONTO2) TA7001

This interface is used for ISDN lines (G.722 and G.711 protocols). It remotely controls Pronto2 Audiocodec (which establishes the communication with the ISDN network). User will be able to manage this equipment from the user panel and also manually from the keyboard of the equipment itself.

Each board is provided with four digital ports, so it can keep up to four different communications (so it can handle up to two Pronto2 equipments: remember that each physical ISDN line carries two B channels). Each ISDN line must be connected to its Pronto2 equipment thru the RJ45 connector labelled as 'ISDN S/T'.

Thru Indico config programme, user must assign each used port from the TA7001 to the matrix, define the type of communication protocol (if it´s G.722), ISDN number, allowed incoming calls, call management to user panels, etc.

From the Pronto2 menu (LCD+ front keyboard), user must select "manual response" for the incoming calls to be routed to the intercom.

Front leds indicate the following:

- ACTV ➔ Green Led for checking the control side of the board. If flickering, functioning is OK.

- ERROR ➔ Red Led for checking configuration errors when switching on the system. If on, board becomes non-operative.

- ISDN 0-1 ➔ Red led for checking the status of the connection with ISDN network/Pronto2. When there´s a call from any of the B channels, it remains flickering.

- ISDN 2-3 ➔ Red led for checking the status of the connection with ISDN network/Pronto2. When there´s a call from any of the B channels, it remains flickering.

- PORT 0-1 ➔ Red Led for checking connection between digital port 0-1 to matrix. If flickering, functioning is OK. If on, communication with matrix does not exist.

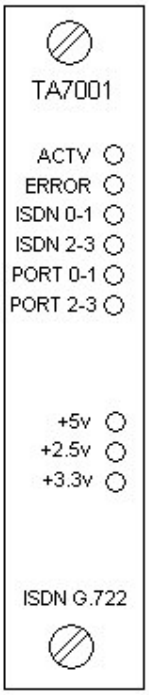
- PORT 2-3 ➔ Red Led for checking connection between digital port 2-3 to matrix. If flickering, functioning is OK. If on, communication with matrix does not exist.

- +5v ➔ Green Led for +5v power supply for the control side of the board.

- +2.5v ➔ Green Led for +2.5v power supply for the comunication-to-matrix side of the board.

- +3.3v ➔ Green Led for +3.3v power supply for the audio conversion side of the board.

If one of the three voltage leds fails, board becomes non-operative.



Picture 3.73 Front TA7001.

TECH SPECS:

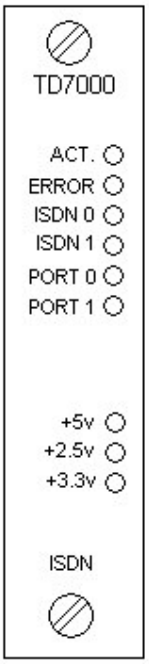
Dimensions	2RU/19”, 360 mm deep with mechanical
Weight	920g with rear
Power supply	+20v, -20v external PS
Signal format	Codec 44,1Khz sampling, 24bits audio
Digital Connection	RJ45 in digital
Analogue Connection	SUBD9H in single rear, SUBD62H in double rear
Analogue I/O	Max level 12dBv Bandwidth 100Hz-10kHz SNR > 80 dB THD < 0.15% at 4 dB

3.7.5 INTERFACE TO ISDN LINES (G.711) TD7000

They interface with ISDN lines thru G.711 protocol. They receive the audio coming from the intercom system and integrate it with the ISDN line and also they extract the audio (B channel) from the ISDN line and integrate into the intercom. At the same time these boards adapt the audio to the digital protocol of the intercom.

Thru Indico config programme, user must assign each used port from the TD7000 to the matrix, telephone number per port, allowed incoming calls, call management to user panels, etc.

For checking the status between the digital port of the board and the matrix, there are several leds:



Picture 3.74 Front TD7000.

- ACTV ➔ Green Led for checking the control side of the board. If flickering, functioning is OK.

- ERROR ➔ Red Led for checking configuration errors when switching on the system. If on, board becomes non-operative.

- ISDN 0 ➔ Red led for checking the status of the connection with ISDN network. When there´s a call from any of the B channels, it remains flickering.

- ISDN 1 ➔ Red led for checking the status of the connection with ISDN network. When there´s a call from any of the B channels, it remains flickering.

- PORT 0 ➔ Red Led for checking connection between digital port 0 to matrix. If flickering, functioning is OK. If on, communication with matrix does not exist. Note that it indicates digital communication, not analogue.

- PORT 1 ➔ Red Led for checking connection between digital port 2-3 to matrix. If flickering, functioning is OK. If on, communication with matrix does not exist.

- +5v ➔ Green Led for +5v power supply for the control side of the board.

- +2.5v ➔ Green Led for +2.5v power supply for the comunication-to-matrix side of the board.

- +3.3v ➔ Green Led for +3.3v power supply for the audio conversion side of the board.

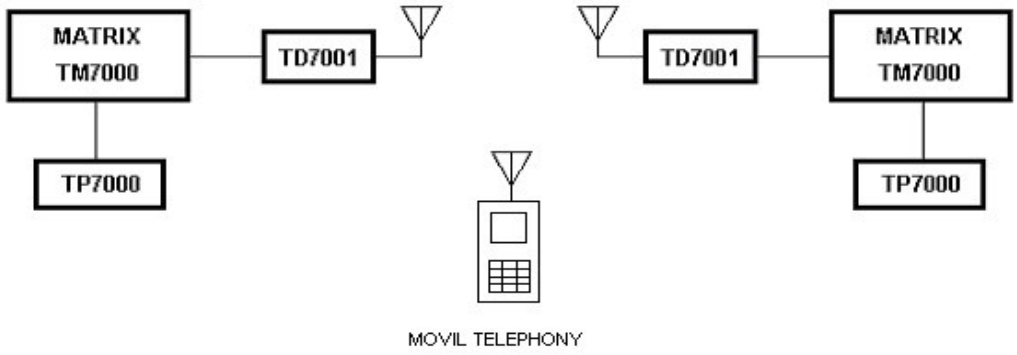
If one of the three voltage leds fails, board becomes non-operative.

TECH SPECS:

Dimensions	3RU/19”, 360 mm deep with mechanical
Weight	620g with rear
Power supply	+20v, -20v external PS
Signal format I	Codec 44,1Khz sampling, 24bits audio
Digital Connection	RJ45 in digital
Analogue Connection	SUBD9H in single rear, SUBD62H in double rear
Analogue I/O	Max level 12dBV Bandwidth 100Hz-10kHz SNR > 80 dB THD < 0.1% at 4 dB

3.7.6 GSM TD7001

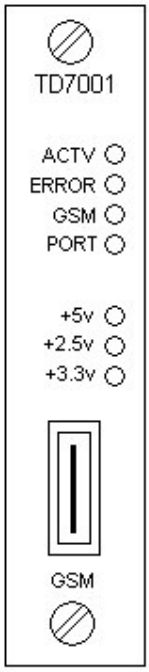
It interfaces between the digital protocol of the matrix and the GSM network. It works at 900Mhz and 1800Mhz frequencies (it´s dual band so the final frequency will depend on the SIM card inserted).



Picture 3.75 GSM TD7001.

Any user will be able to contact with a mobile phone or a GSM interface of another network (so one channel communication between matrixes can be established thru GSM network).

Thru Indico config programme, user must assign each used port from the TD7001 to the matrix, telephone number, allowed incoming calls, call management to user panels, etc.



Picture 3.76 Front GSM TD7001.

For checking the status between the digital port of the board and the matrix, there are several leds:

- ACTV ➔ Green Led for checking the control side of the board. If flickering, functioning is OK.
- ERROR ➔ Red Led for checking configuration errors when switching on the system. If on, board becomes non-operative.
- GSM ➔ When the red led flickers, communication with GSM network has been properly established.
- PORT ➔ When the red led flickers, communication with matrix has been properly established.
- +5v ➔ Green Led for +5v power supply for the control side of the board.
- +2.5v ➔ Green Led for +2.5v power supply for the comunication-to-matrix side of the board.
- +3.3v ➔ Green Led for +3.3v power supply for the audio conversion side of the board.

If one of the three voltage leds fails, board becomes non-operative.

User must insert the SIM (smart card) thru the front slot so that the GSM module inside starts working. Have in mind that it cannot request a PIN (security number) to avoid accidental system blockings.

TECH SPECS:

Dimensions	3RU/19”, 360 mm deep with mechanical
Weight	660g with rear
Power supply	+20v, -20v external PS
Siganl format	Codec 44,1Khz sampling, 24bits audio
Digital Connection	RJ45 in digital
Analogue Connection	SUBD9H in single rear, SUBD62H in double rear
Antenna	External, thru rear BNC
Analogue I/O	Max level 12dBv Bandwidth 100Hz-7kHz SNR > 70 dB THD < 0.3% at 4 dB

3.8 AUTONOMOUS UNITS

These interfaces are not inserted as boards but rack-mounted. They integrate Kroma digital intercom with external systems.

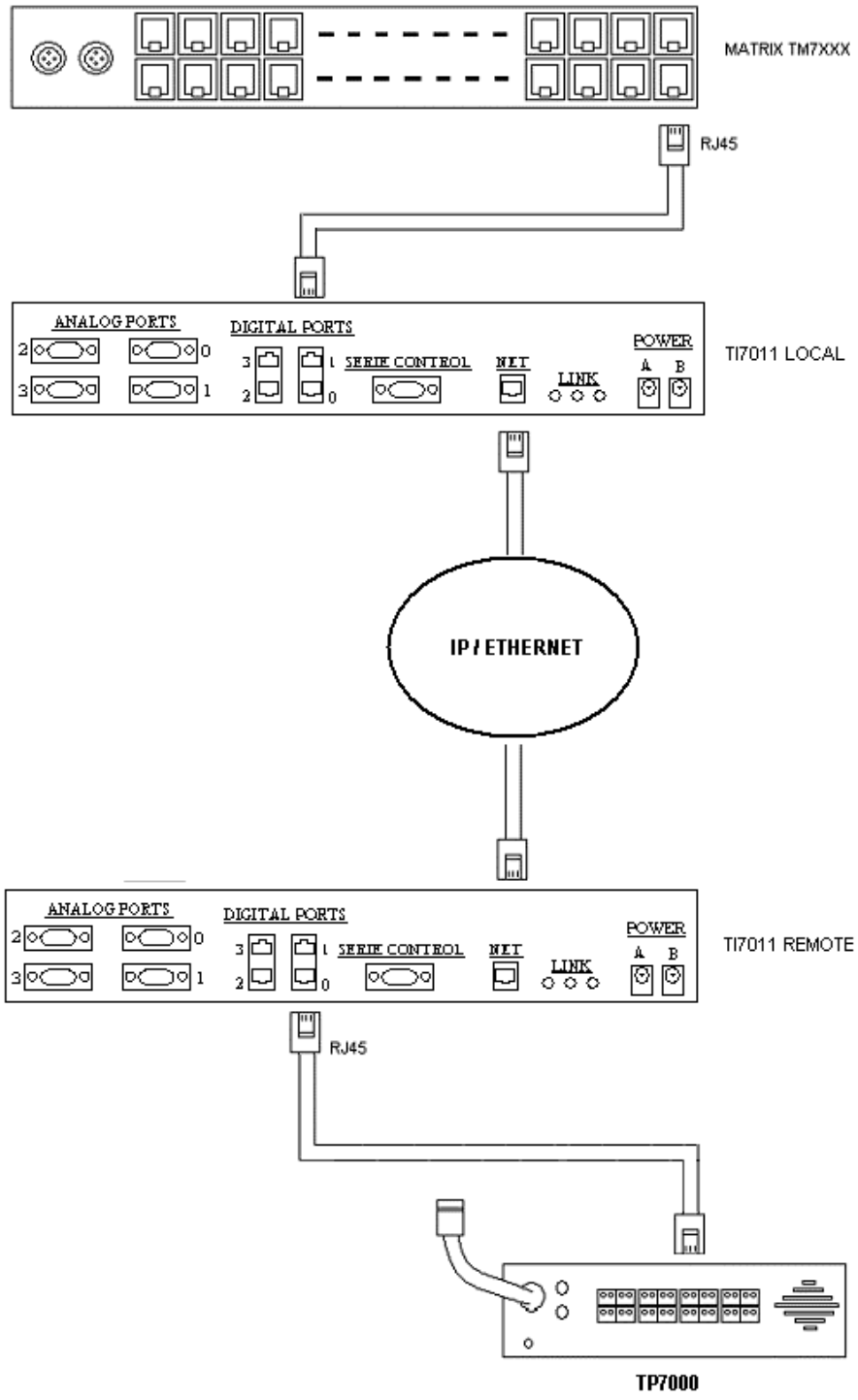
3.8.1 VoIP TI7011

This interface thru IP Protocol can work independently of the system connected to it. For the communication, there must be two equipments: the local one (usually an interface of the intercom matrix that send the data packages) and the remote one (in charge of receiving them and synchronizing).

It is user transparent as it acts in “tunnel mode” between external systems and allows a full duplex communication (audi with aux data) between source and destination.

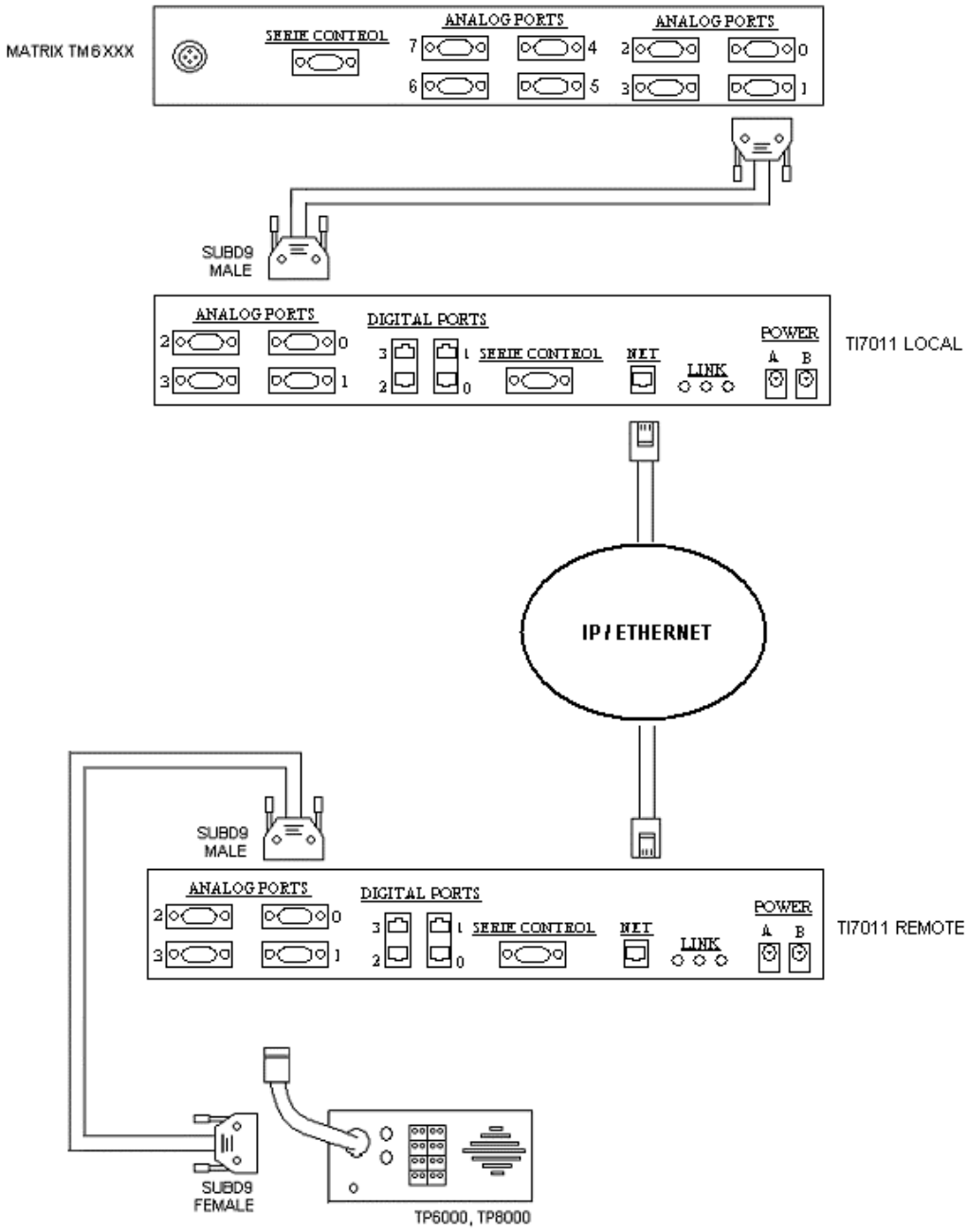
Depending on the system to interconnect, there are several ways of functioning:

a) **Interface connected to TB7000** ➔ The local interface is connected to the digital intercom thru a matrix port (audio and data communication). With Indico config programme, user will declare its matrix ports and assign panel keys to the TI7011. See below:



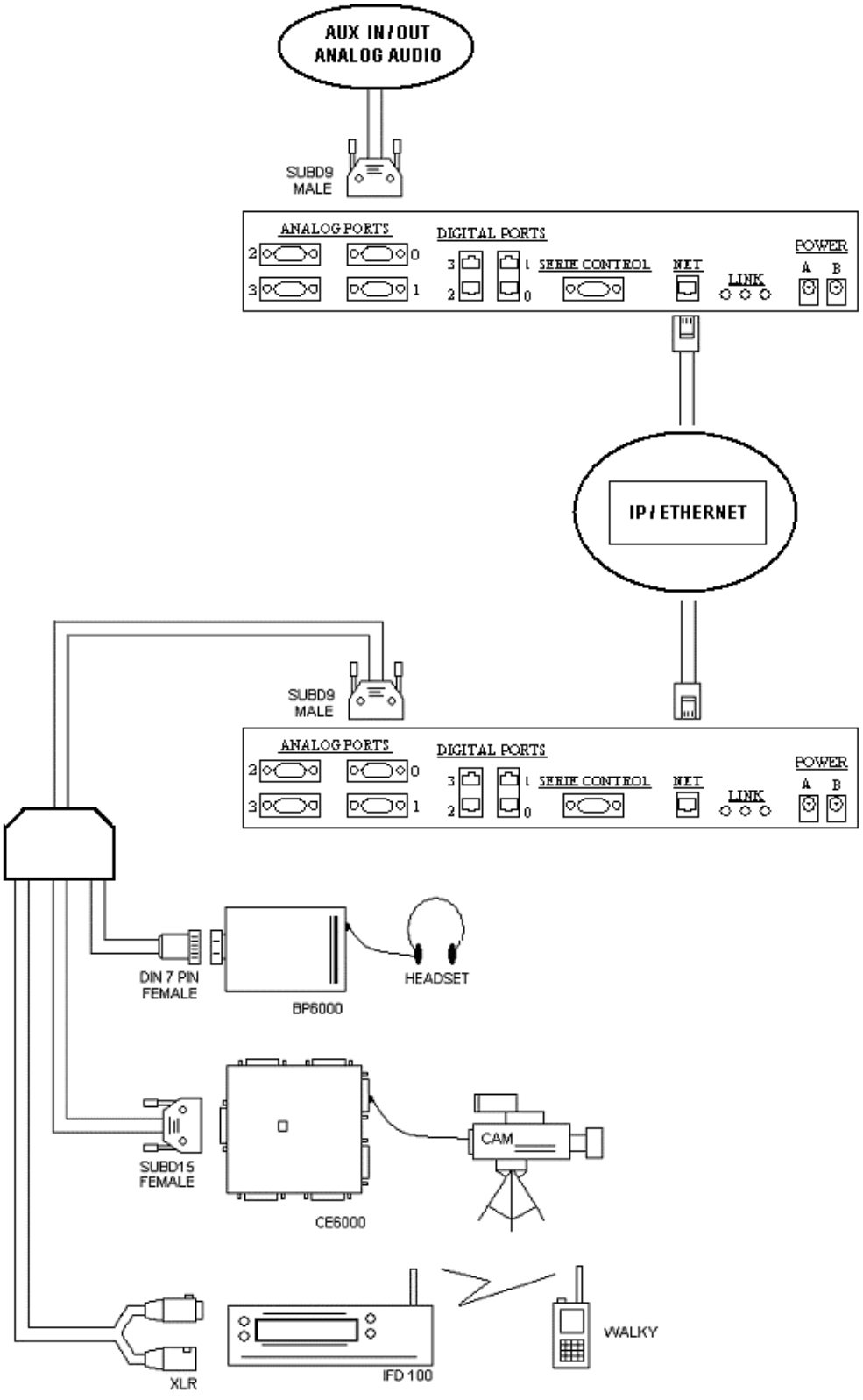
Picture 3.77 Interconnection with TB700 thru VOIP

b) **Interface connected to TB6000 ➔** Local interface is connected to the analogue intercom thru a matrix port (audio and data communication). With MAP config programme, user will declare its matrix ports and assign panel keys to the TI7011. See below:



Picture 3.78 Interconnection with TB600 thru VOIP

c) **Interface connected to a generic system** ➔ Local and remote equipments are connected to any generic system. Configuration is done thru serial RS232 (in future upgrades, config will be done thru the web browser of the equipment/interface).



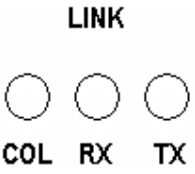
Picture 3.79 Interconnection thru VOIP

In the last case, use only the analogue port (SUBD9) for the input/output of IP communication, apart from controlling the system thru RS232.

In the digital interconnection, “Analogue Port 0” becomes an aux analogue port, which can be used for sending audio signals (in addition to the one coming from the digital matrix).

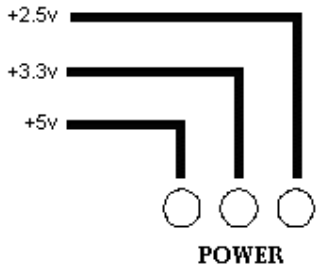
For checking the status between the digital port of the board and the matrix, there are several leds:

- Ethernet ➔ 3 green leds on the rear panel indicate the status of:
    - TX → Transmission to the Ethernet network.
    - RX → Data reception from the network.
    - COL → Physical collusion of RX and TX.



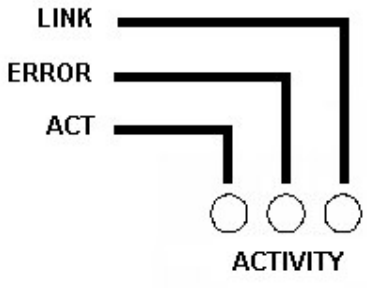
Picture 3.80 Ethernet Leds.

- Power Supply ➔ There are three front green leds that tell about board voltages (+2.5v, +3.3v, +5v). There must be on.



Picture 3.81 Power Leds.

- Control ➔ Three front leds indicate the following:



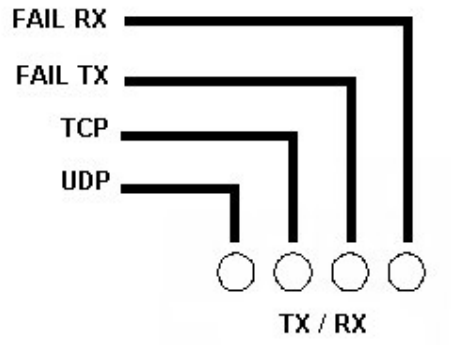
Picture 3.82 Control Leds.

- ACT→ Green led that shows that micro-controller is working properly (if flickering).

- ERROR→ Red led that shows some configuration error when switching on the system (if on). Reboot if necesary.

- LINK → Green led that indicates Ethernet connection. If off, cable is unplugged and interface non-operative.

- Data Communication ➔ There are front leds that inform about the following:



Picture 3.83 Data Leds.

- FAIL_RX→ Red led that tells about a failure at the received data. If flickering, buffer is overload.

- FAIL_TX→ Red led that tells about a failure at the sent data. If flickering, buffer is overload.

- TCP → Red led that tells about TCP. If flickering, data packages are being sent properly with this protocol. If off, there´s saturation problem.

- UDP → Red led that tells about UDP. If flickering, audio packages with UDP protocol are being properly received. If off during an established communication, there are “silent” packages that shouldn´t be treated.

TECH SPECS:

Dimensions	1RU, 320 mm deep
Weight	4,7kg
Power Supply	+12v, -12v, +5v external PS, redundant
Signal Format	Codec 44,1Khz sampling, 24bits audio
Digital Connection	RJ45 in digital intercom, CAT 5
Ethernet connection	RJ45 with B=100Kb/s, minimum
Analogue Connection	SUBD9H in rear panel
Analogue I/O	Max level 12dBv Bandwidth 100Hz-7kHz SNR > 70 dB THD < 0.3% at 4 dB
Firmware	Upgrade thru RS-232 and SUBD-9

3.8.2 GPIO TALLYS GP7020

This is an interface for Kroma Digital Intercom TB7000 and Analogue TB6100, with 20 optoisoated inputs for tallys and 20 relay outputs (by contact closure).

Input/Outputs can be configured as a panel thru Indico (TB7000) and MAP (TB6000) config programmes, with different commands assigned as if they were keys.

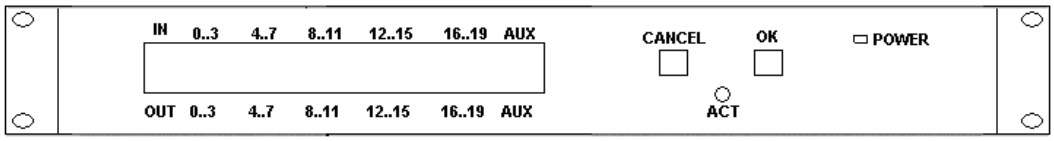
Inputs are optoisolated and are activated by tension (from +5v to +48v). It offers +15v in its tally input in case it must be used with an external equipment with a tally output by contact closure (e.g. a video switcher). Ground of the own equipment is applied.

Outputs are activated by internal contact closure, which can be selected from the config programme. Thru front LCD user can see the active inputs and outputs.

Firmware upgrades are done thru RS232 (serial COM port of a PC). Power supply is external (+15v) with redundancy available.

The equipment send commands to the panels when its inputs are activated.

See below the front panel:



Picture 3.84 Front Panel GP7020.

User must declare the matrix port connected to the I/O Interface and assign commands to inputs and outputs as if an user panel.

A front led tells about power supply. The LCD informs on matrix connection and each of the 20 I/Os status.

Picture 3.85 Main menu GP7020.

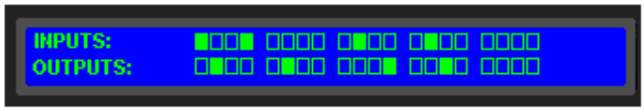
User has two keys to browse at the menu: OK, for entering the status menu and CANCEL, for escaping to the main menu.

Press OK to know about I/Os status:

- Inputs → If shadowed, input has been activated by tension.
- Outputs → If shadowed, output is activated by contact closure.

There´s a red led to inform about activation.

See below that inputs 0, 3, 9 & 13 and outputs 1,5,11 &14 are activated. Press CANCEL to return to the main menu.



Picture 3.86 Status Menu I/O.

TECH SPECS:

Dimensions	1RU, 180 mm deep
Weight	2,250kg
Power Supply	+15v external PS, redundant
Signal Format	Codec 44,1Khz sampling, 24bits audio
Digital Connection	RJ45 in digital intercom, CAT 5
Analogue Connection	SUBD9H in rear, only data
Tally-IN Connection	SUBD-62 female in rear
Tally-OUT Connection	SUBD-62 male in rear
GPIO-Tallys	20 inputs and 20 outputs.

Optoisolated inputs with functioning tension between 5v and 48v. Electrical isolation of 230v DC max. Outpiuts by contact closure with isolation of 1000v DC.

Firmware	Upgrade thru RS-232 and SUBD-25

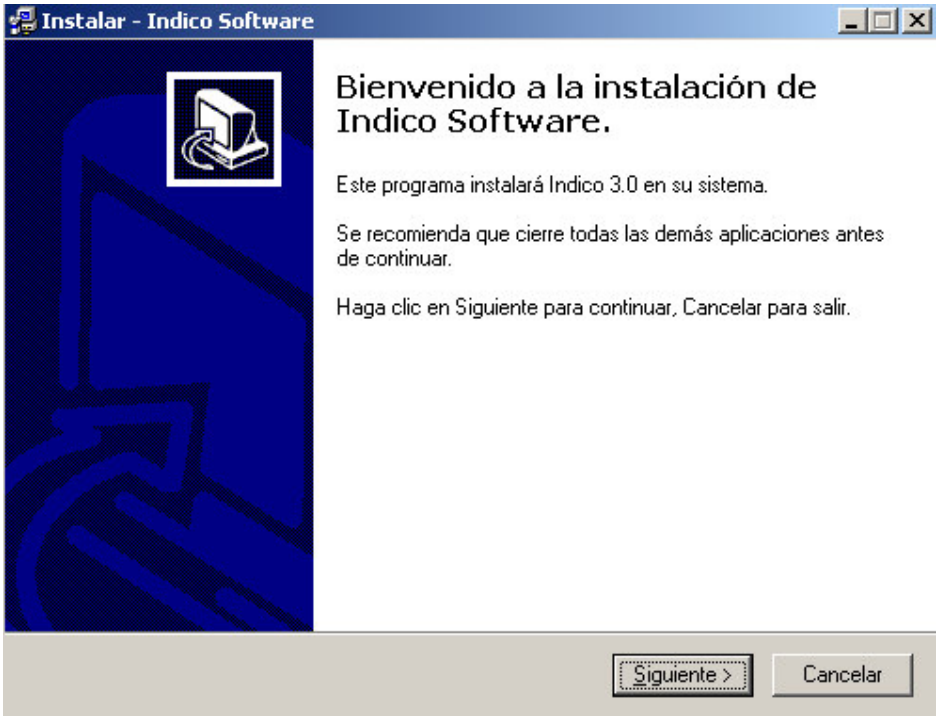
4 CONFIG SOFTWARE

Indico is the programme for creating and editing crosspoint maps. User declares which equipments (matrix, panels, interfaces) are using which ports and assigns commands to the different crosspoints.

This config programme is provided with Kroma intercom free of charge. It´s Windows-run.

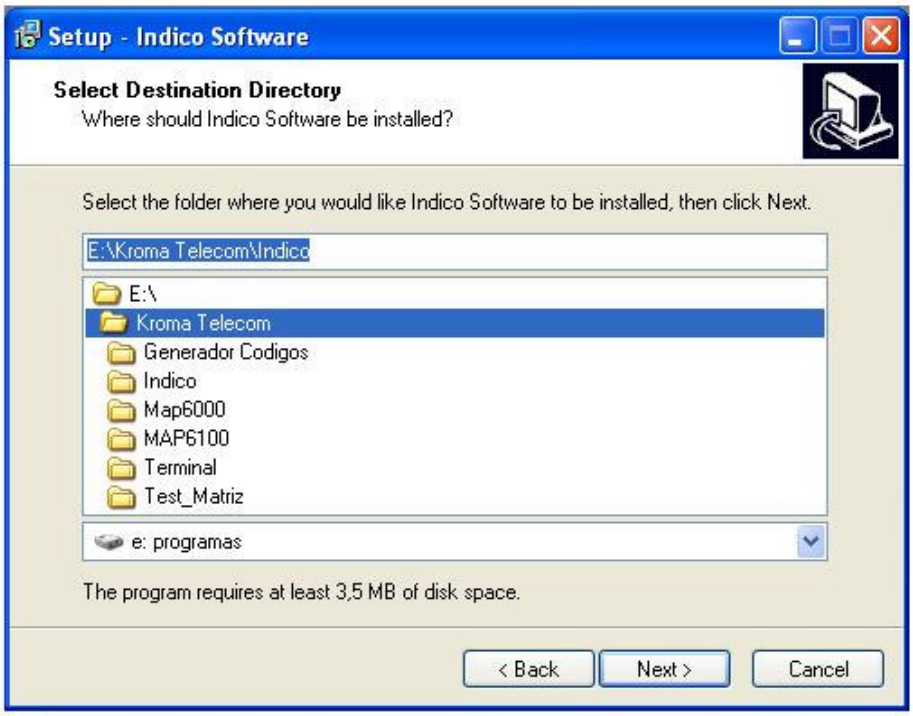
4.1 SET UP

Insert the CD-ROM, go to \\TB7000\Software\Setup.exe and double-click on the icon.



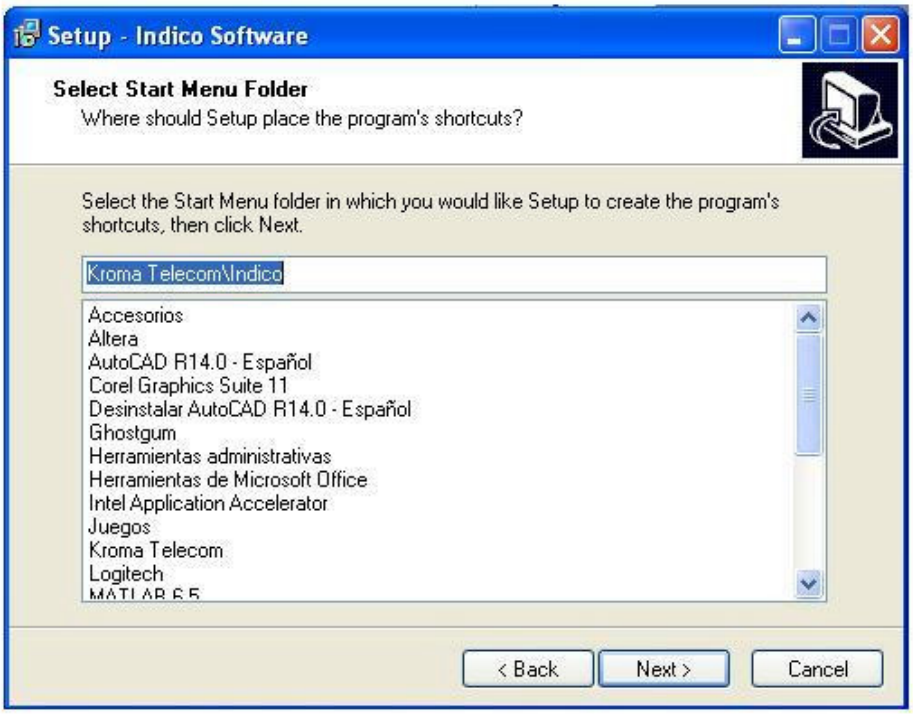
Piture 4.1 Set up menu.

Press ‘siguiente’ (next) and choose the directory to save the programme. By default, it´ll be saved at ‘Archivos de Programa’ (program files) of Windows.



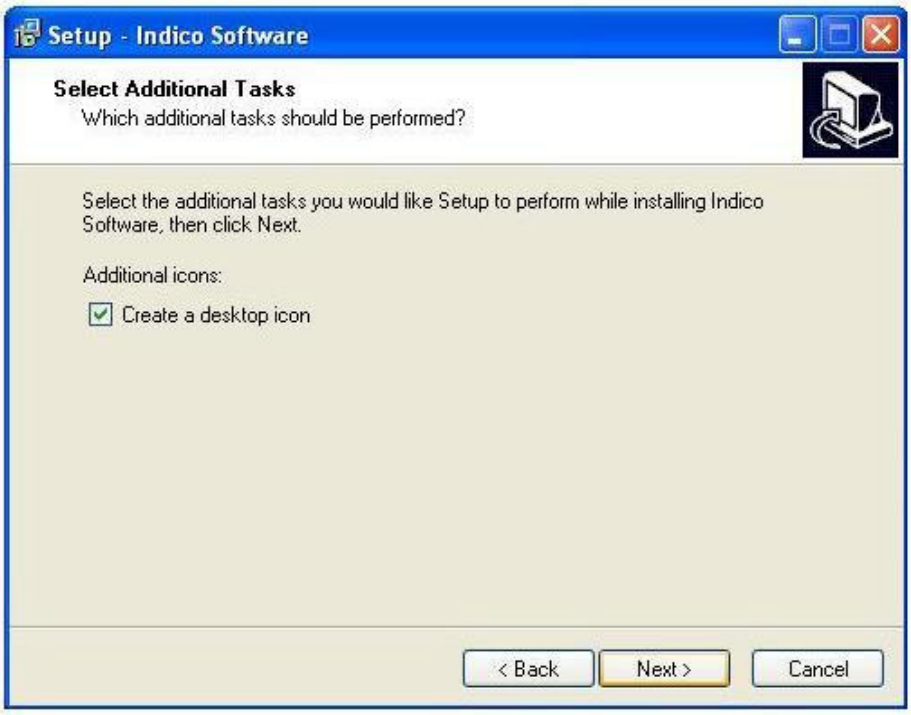
Picture 4.2 Selecting the Directory.

Next step is to select the program menu for the software to appear. By default, the name chosen is 'kroma Telecom' (group of programmes).



Picture 4.3 Group of programmes name.

Press Next so as to have the option of creating a desktop icon. It´s advised for quicker access to Indico.



Picture 4.4 Group of programs name

Press 'Next' and it´ll appear a set up summary and a request for beginning to install.

Picture 4.5 Set up summary

Once the files have been copied, set up is finished. So we might begin to use the programme.

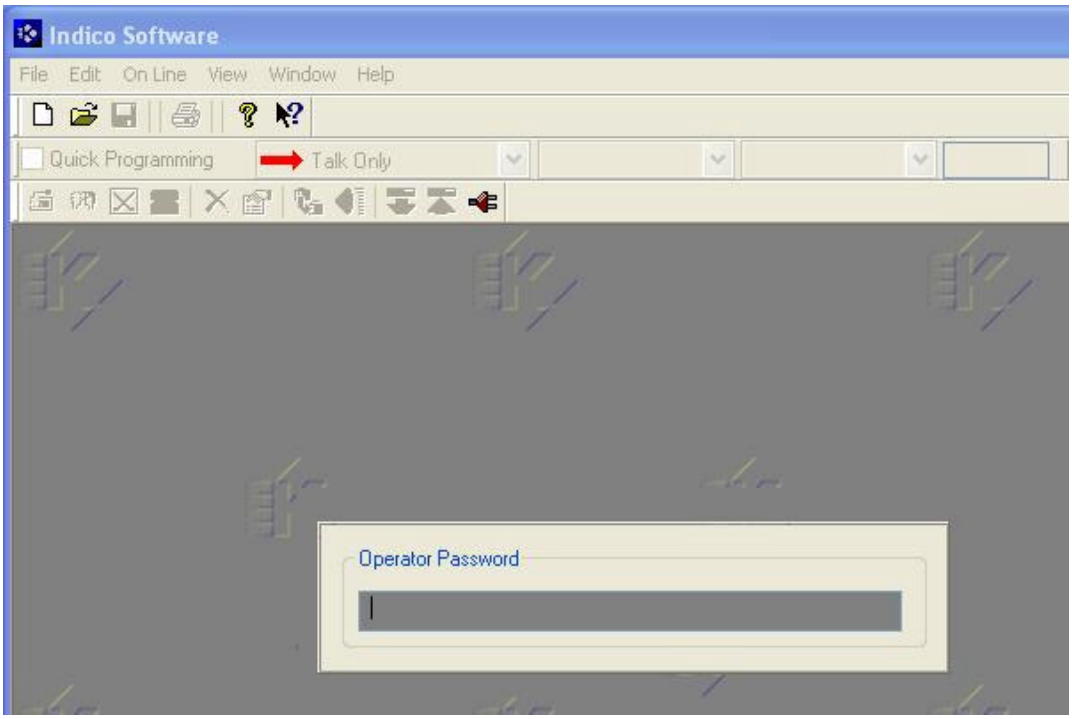
Picture 4.6 Successfully installed

Desktop icon opens *'Indico.exe*'. New version deletes old Indico versions.

If an online communication is needed, connect a computer to the Master unit thru a serial RS232 cable (see chapter 2.1).

4.2 MENU OPTIONS

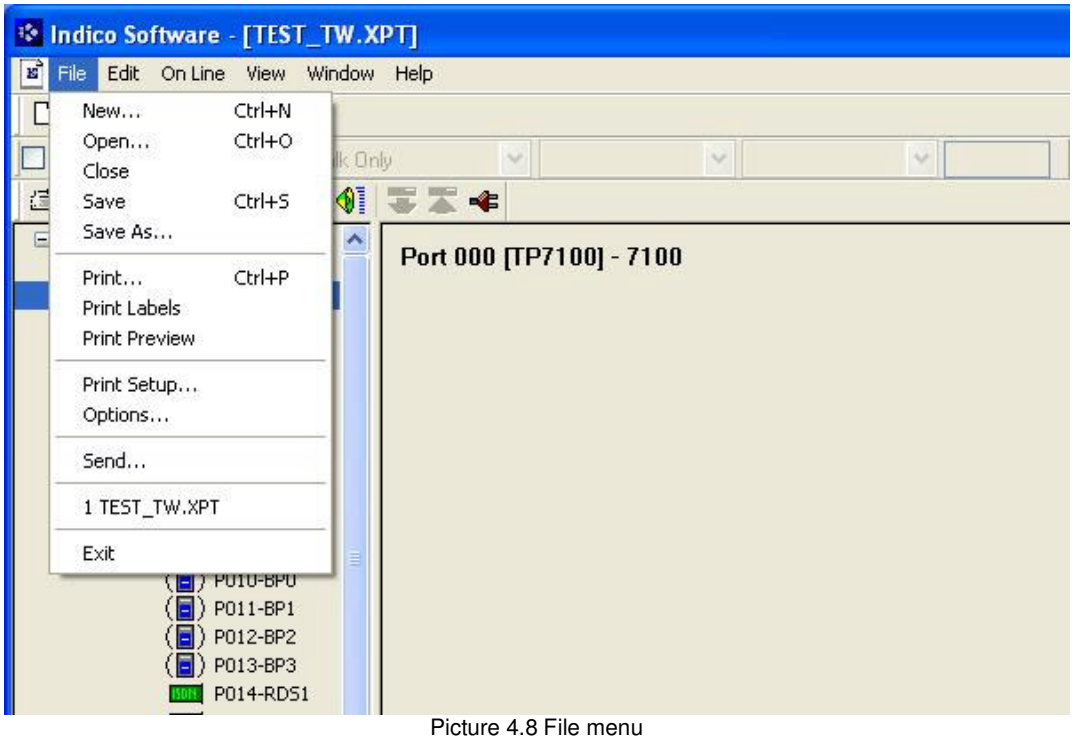
Double-click on the desktop icon or on Indico.exe at the chosen directory to have access to the main menu. Enter the password (KROMA in capital letters by default), which is possible to be changed or not requested.



Picture 4.7 Entering password

Tree-menus, direct-access icons and map information will appear as follows:

- File Menu ➔ for creating new maps, saving and opening them, printing configurations and labels, emailing maps or selecting a new password:



Picture 4.8 File menu

- New -> for creating new crosspoint maps.
- Open -> for opening a *.xpt file (an existing map).
- Close -> for closing the active map.
- Save -> for saving the active map (with the already chosen name).
- Save As -> for saving the active map (with a different name).
- Print -> for printing the active map in text format.
- Print Labels -> for printing labels of chosen panels for being cut and posted at the transparent keys.
- Print Preview -> for having a previous image of the active map to be printed.
- Print Setup -> for setting up the printing values.
- Options -> for selecting options such as setting up the COM port of the computer or modifying security access.
- Send -> for emailing the active map.
- Exit -> for exiting config software.

For modifying access password, choose ‘Options’ and click on ‘Change Password’ label. Enter active password, new password and confirm. Then Accept.

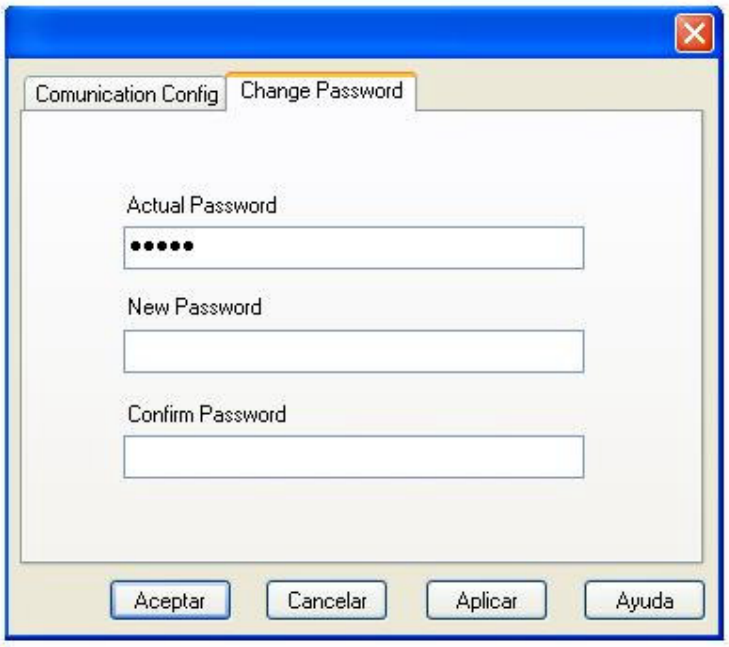


Figure 4.9 Access password Modification

***NOTE**: If user wants no password at all, enter active password and leave others blank.*

- Edit Menu ➔ for editing new ports, groups, telephone numbers, IFBs, parameters and crosspoint audio levels. It also allows to copy configuration between similar panels or activate quick programming option.

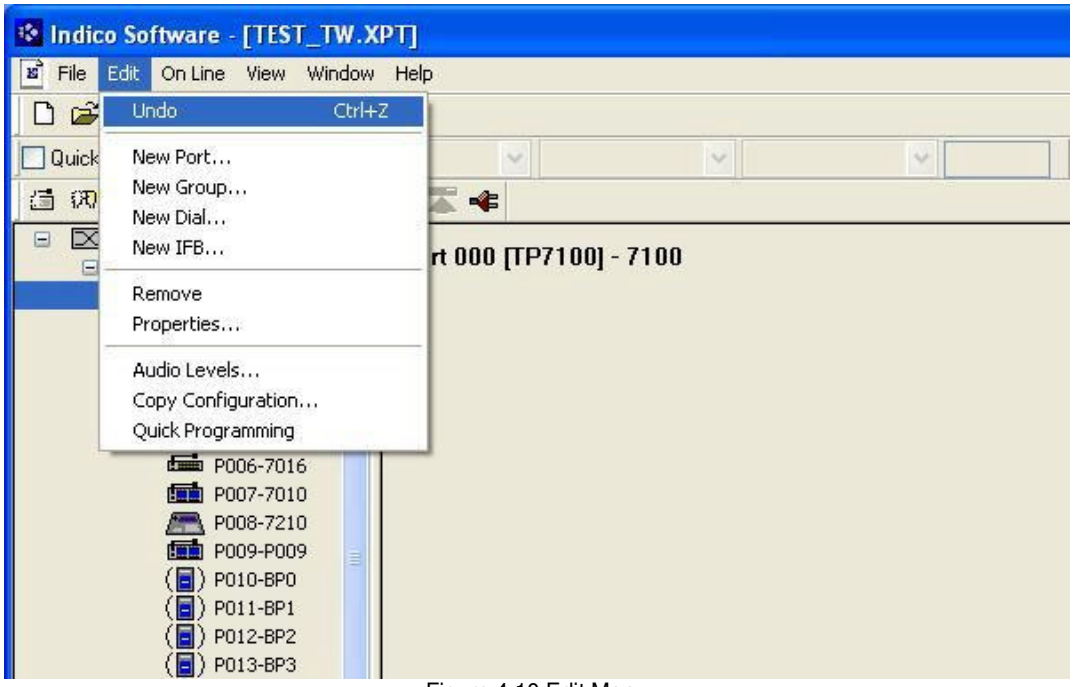


Figure 4.10 Edit Menu

Options are as follows:

- Undo -> for going backwards in the last actions introduced.
- New Port -> for assigning new ports.
- New Group -> for creating port groups.
- New Dial -> for entering new telephone numbers.
- New IFB (Interrupt FoldBack) -> for creating new IFBS. It creates a new crosspoint that can be interrupted (foe example, orders from director to talent).
- Remove -> for deleting ports of the XPT map.
- Properties -> for editing the port parameters of the left window.
- Audio Levels -> for editing audio level of crosspoints (from source to target).
- Copy Configuration -> for copying the configuration of a panel keys into a similar terminal (so as to avoid delaying in system set up).

- Quick Programming -> for creating crosspoint maps in a faster way.

- Online Menu ➔ for conecting with Master unit of Intercom for editing maps, activating crosspoints, etc. Options are as follows:

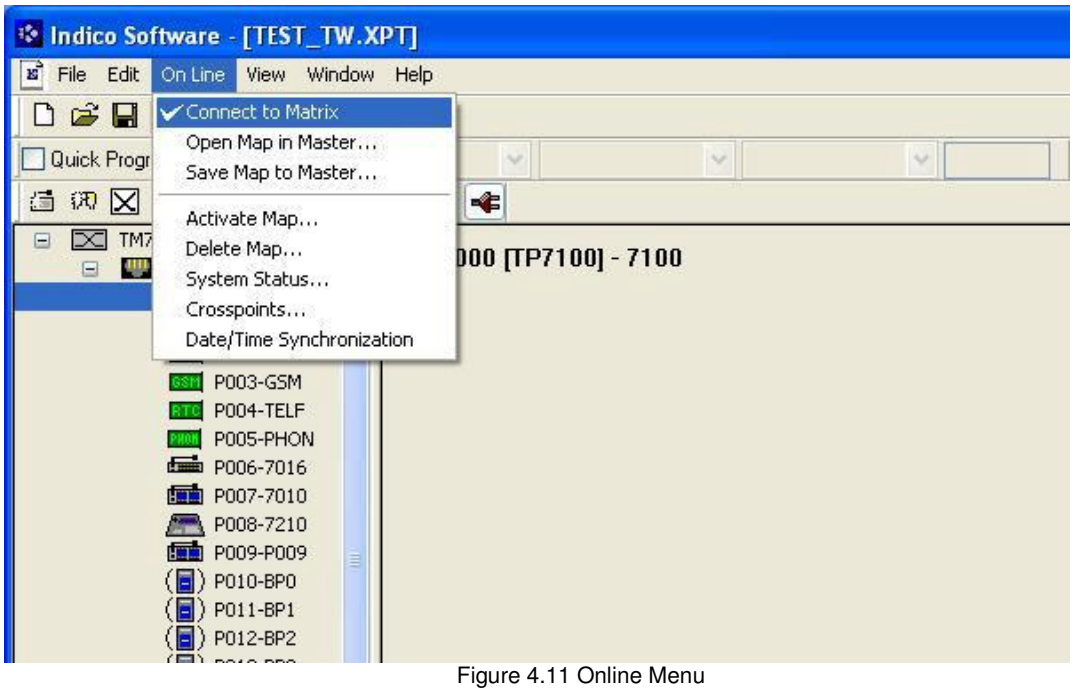


Figure 4.11 Online Menu

- Connect to Matrix -> for connecting to the Master. Do this first before considering other options.

- Open Map in Master -> for loading a map from Master to Computer. Choose among the eight available to modify its parameters.

- Save Map to Master -> for saving a map from Computer to Master in one of the eight available banks.

- Activate Map -> for activating one of the eight maps of the Master unit.

- Delete Map -> for deleting one of the eight maps of the Master unit.

- System Status -> for status checking of active map.

- Crosspoint -> for monitoring, activating and de-activating crossopints. It has priority over panel keys.

- Date/Time Synchronization -> fod time synchronizing between Master and Computer.

- View Menu ➔ for viewing the different tool bars.

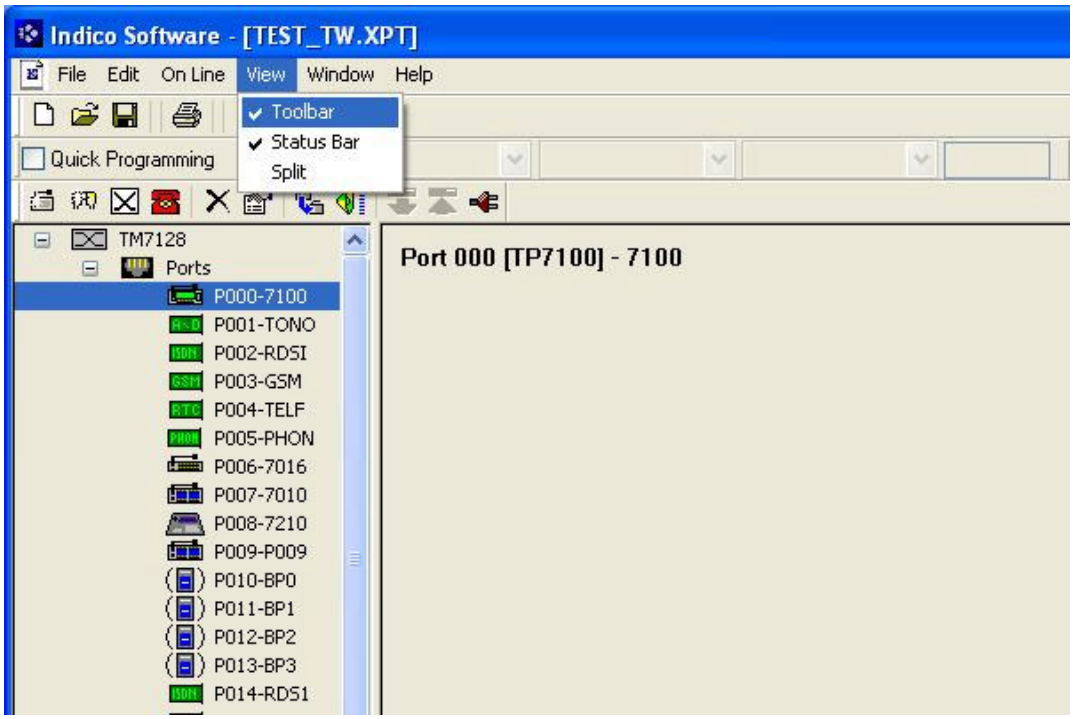


Figure 4.12 Toolbar menu

- Window Menu ➔ for viewing the map in a different window configuration or generating a map in a new window. See below:

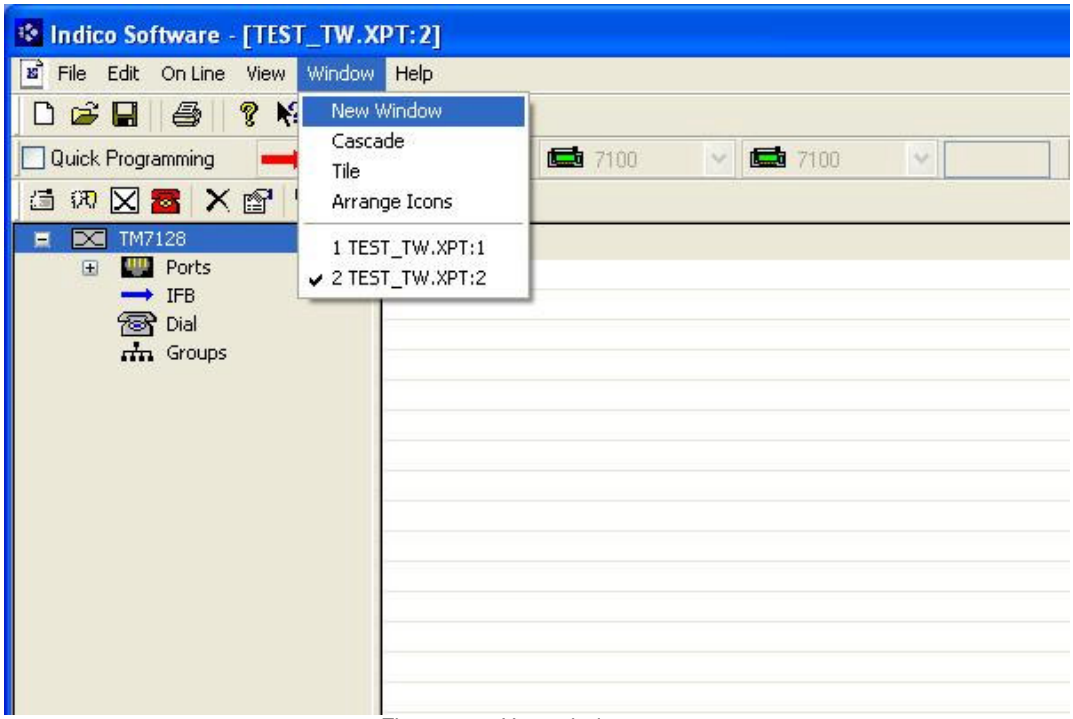


Figure 4.13 User window menu

- Help Menu ➔ for advising the user on the system commands.

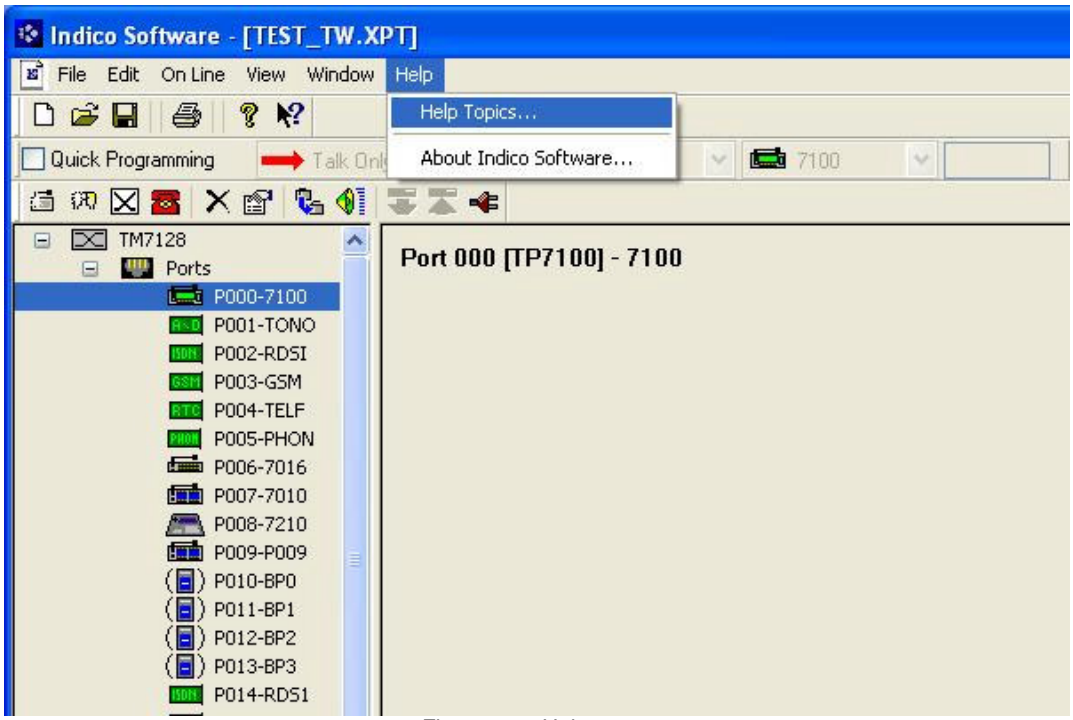


Figure 4.14 Help menu

There are also isons to have quick access to certain commands of the main menu: A toolbar keeps the map filing commands (open, save...). See below:

1. CREAR NUEVO MAPA
2. ABRIR MAPA ALAMACENADO
3. GUARDAR MAPA ACTUAL
4. IMPRIMIR MAPA ACTUAL
5. VERSION DE SOFTWARE
6. AYUDA GUIADA

Figure 4.15 File Icons

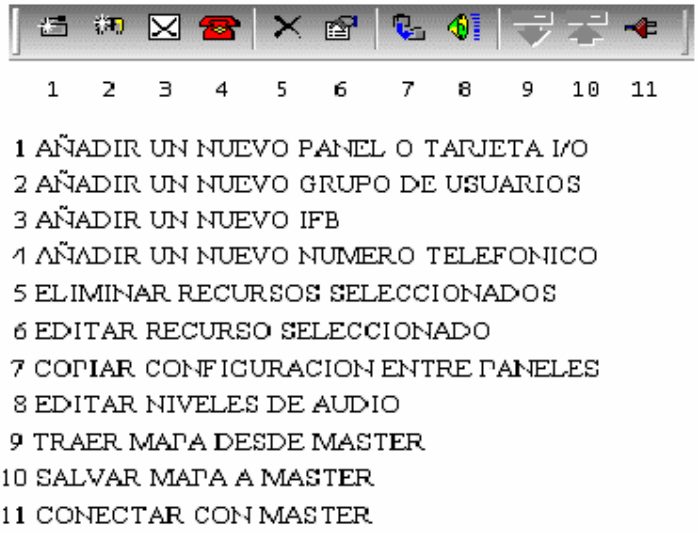


Figure 4.16 Map Icons

The last toolbar keeps the programming commands for key assignments (command, source, target). See below:

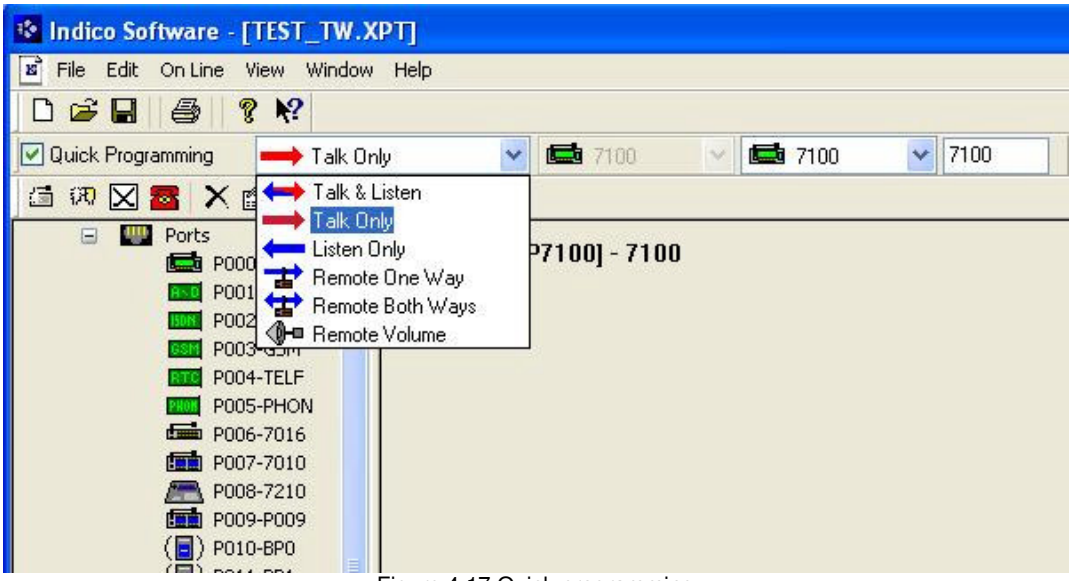


Figure 4.17 Quick programming

Quick programming is done only at the chosen panel. If quick programming is required for a second panel, de-activate this option, choose the panel and activate it again.

4.3 TERMINAL TYPES

Once a map is opened, each matrix port must be assigned to a type of panel/interface.

At the left window it appears the map with its ports and terminals assigned. An extended description appears at the right window.

Parameters that appear are port number, nemotecnic and type of terminal.

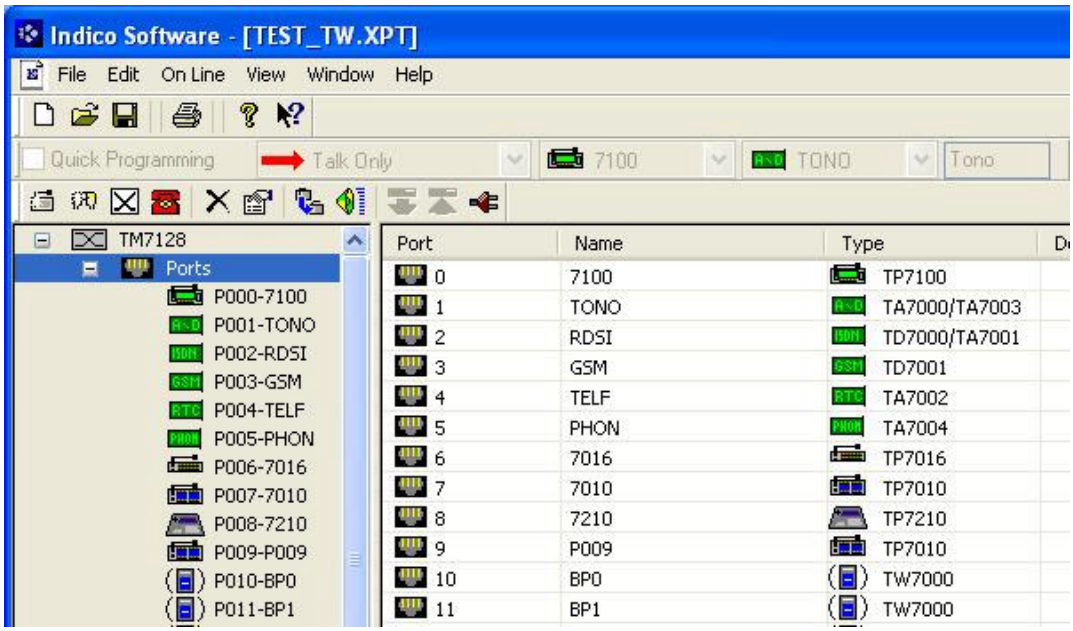


Figure 4.18 Assigned ports

For a new terminal to be assigned to a matrix port, go to '*Edit->New Port*' or click on the following icon:

For deleting a terminal, go to '*Edit->Remove*' or click on the following icon:

We must differentiate two types of terminals:

- User panels (rack, desktop, wireless beltpacks...).
- I/O Interfaces (boards for the rack frame TR7000 or rack units).

4.3.1 PANELS

See below the different panels to be assigne to matrix ports:

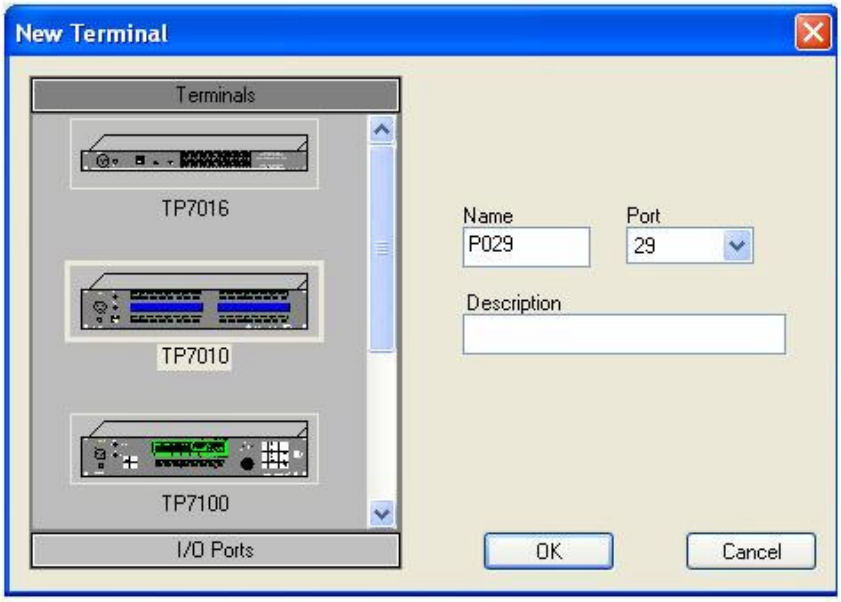


Figure 4.19 Assigning a new terminal

Figure 4.20 TP7016 (16 keys)

Figure 4.21 TP7010 (32 keys and 4 pages), with double LCD

Figure 4.22 TP7100 (8 keys and 10 pages), graphic LCD and dialling keypad

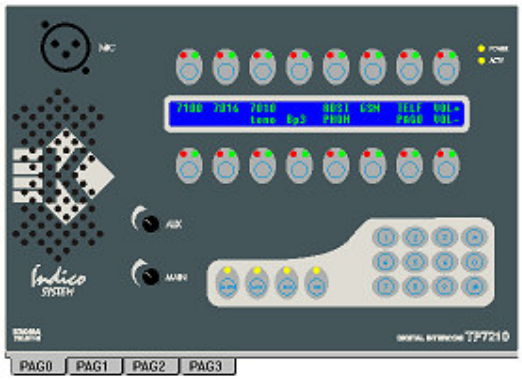


Figure 4.23 TP7210 (desktop, 16 keys, pages, LCD, dialling keypad)

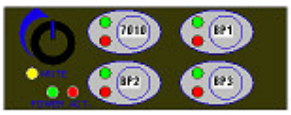


Figure 4.24 wireless beltpack TW7000 (4-key panel)

Each panel assigned to the matrix must receive its port number and a 4-character identifying label that will be used for key programming later on. There is an extended description option available.

For assigning commands to the different keys, choose the proper panel at the left window. At the right window, double-click on the key to be programmed, choose the command, target (if needed) and press 'Add'. Activate it and key has been configured. A label is generated as well. For more info, check 4.4.4.

4.3.2 I/O INTERFACES

Firstly interfaces must be assigned to matrix ports with Indico config programme. Choose among the available by clicking on "*I/O Ports*". See below:

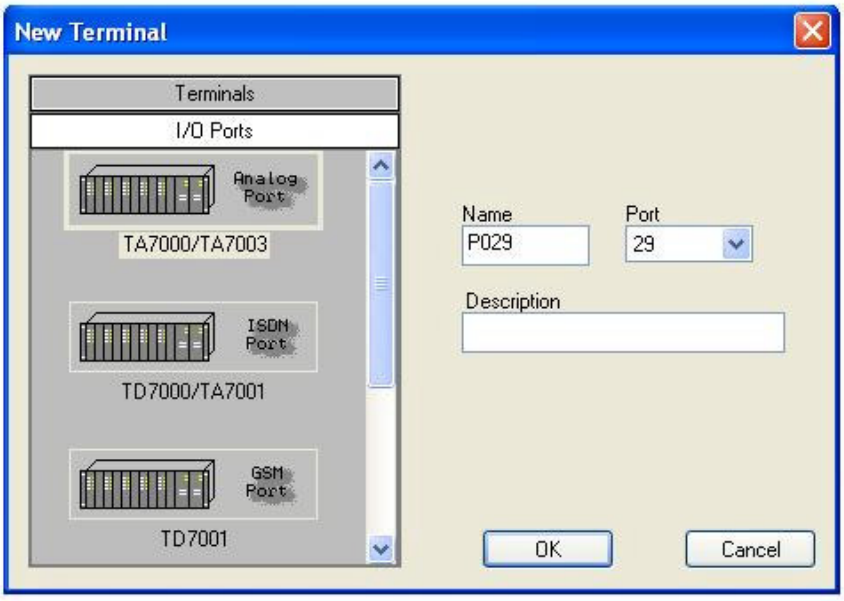


Figure 4.25 A new I/O Interface is assigned to a matrix port

Choose the availble interface and assign the used ports of them to the matrix ports. Each one is independent from the rest of the same board. Enter a 4-character mnemotecnic.

Then choose among the different I/O Interfaces:

- TA7000/TA7003 → 4-port Interface. Each of the digital ports must be assigned to the matrix ports independently.

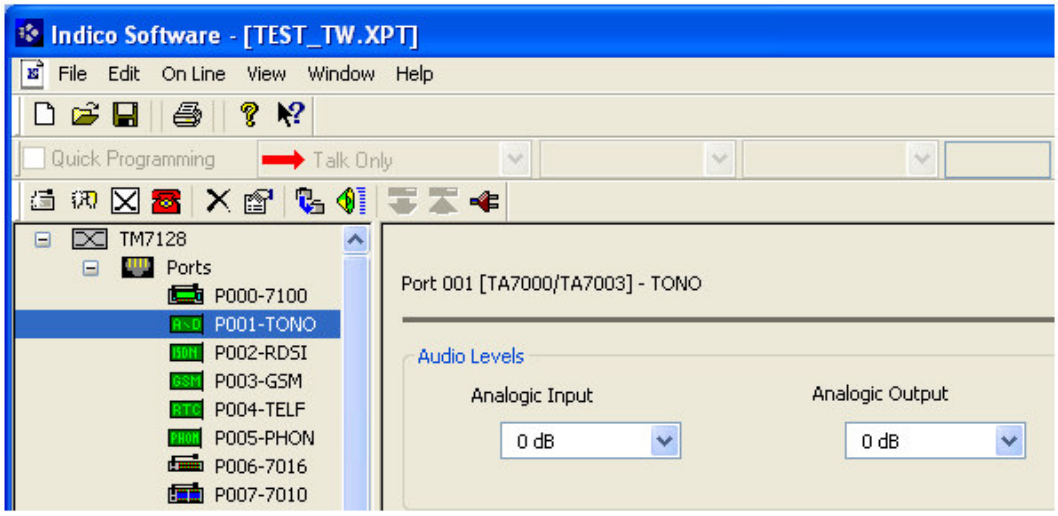


Figure 4.26 Audio Levels TA7000/TA7003

They convert from 4-wire and 2-wire analogue into digital audio. Input/Output audio levels can change from -12dB and +12dB in 6dB steps. This audio level works locally on the port, so it´s independent from the crosspoint audio level.

- TD7000/TA7001 → 2-port Interface for ISDN lines (G.711 protocol) and 4-port Interface for ISDN lines (G.722 protocol, to be connected to Audiocodec) respectively. Each used B channel (audio) must have assigned a port a the active map. Both interfaces are configured in the same way.

User must allow incoming calls into the system. For this, click on '*Answer Incoming Calls*', with two options:

- *Allow all calls* ➔ Any incoming calls is routed to the destination panel selected by the user. Chosee '*any*', the destination panel at '*Route to*' and Ok with '*Add*'.

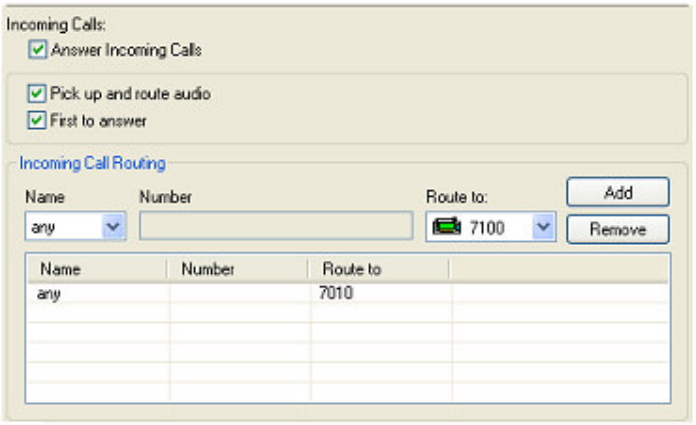


Figure 4.27 ISDN routing

Destination panel can be one or several, so any of them can answer. Communication will end when all had hung up (release the active crosspoint keys assigned to this communication). If one panel has this channel open, communication will be kept open.

- *Number selection* ➔ Choose the nemotecnic from the number agenda that´ll be allowed, destination panel at '*Route to*' and vaidate with '*Add*'.

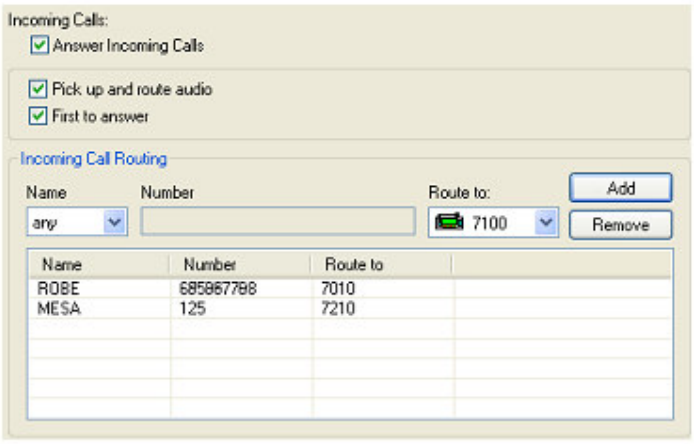


Figure 4.28 ISDN number selection routing

Up to 128 telephone numbers can be entered thru the destination ports. Any panel can enter a communication no matter if it was the one that started it with the incoming call.

It´s advised to assign the ISDN number to the physical line, because when it is provided with more than one number, the interface will interact with any of them.

DTMF menu is not available yet, foreseen for future upgrades.

- TD7001 → One-port interface for GSM lines. It works at 900Mhz and 1800Mhz (according to the SIM card inserted).

User must allow incoming calls into the system. For this, click on '*Answer Incoming Calls*', with two options:

- *Allow all calls* ➔ Any incoming calls is routed to the destination panel selected by the user. Chosee '*any*', the destination panel at '*Route to*' and Ok with '*Add*'.

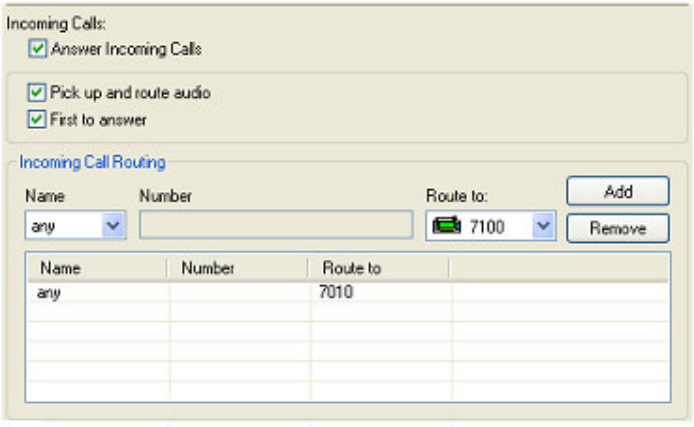


Figure 4.29 GSM routing

Destination panel can be one or several, so any of them can answer. Communication will end when all had hung up (release the active crosspoint keys assigned to this communication). If one panel has this channel open, communication will be kept open.

- *Number selection* ➔ Choose the nemotecnic from the number agenda that´ll be allowed, destination panel at '*Route to*' and vaidate with '*Add*'.

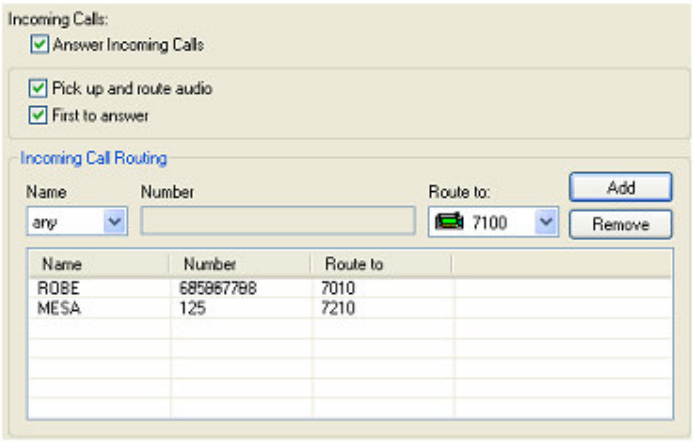


Figure 4.30 GSM number routing

Up to 128 telephone numbers can be entered thru the destination ports. Any panel can enter a communication no matter if it was the one that started it with the incoming call.

DTMF menu is not available yet, foreseen for future upgrades.

- TA7002 → 2-port interface for PSTN lines. User must allow incoming calls into the system. For this, click on '*Answer Incoming Calls*'. All calls are routed to the destination panels. There is no option available for selecting numbers as some exchanges do not send caller number. So choose '*any*', target panel at '*Route to*' and activate with '*Add*'.

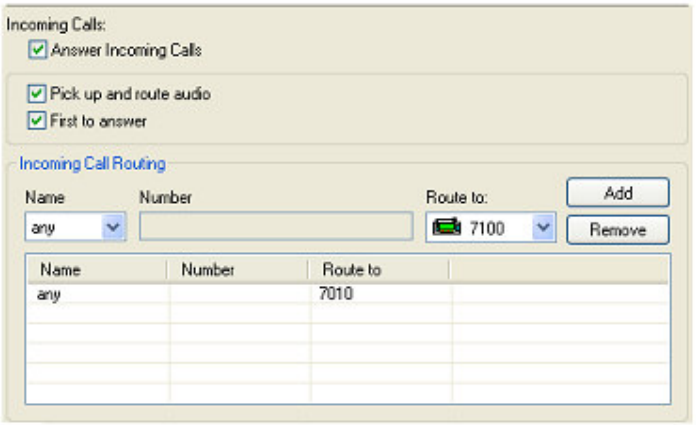


Figure 4.31 PSTN routing

Destination panel can be one or several, so any of them can answer. Communication will end when all had hung up (release the active crosspoint keys assigned to this communication). If one panel has this channel open, communication will be kept open.

This interface allows DTFM so user can create dynamic crosspoints from the calling telephone set to other panels (different from the one that started the communication).

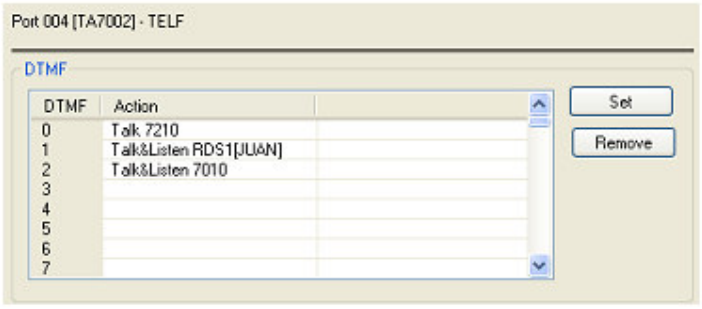


Figure 4.32 DTMF assignments to crosspoints

That way a telephone set becomes a remote panel just by using the dialling keypad and once the communication has been established.

For DTMF programming, double-click on the white column labeled as “Action”. There are 128 DTMF available. After that, command and target menus appear. For activating it, use ‘Add’. For exiting, ‘Close’.

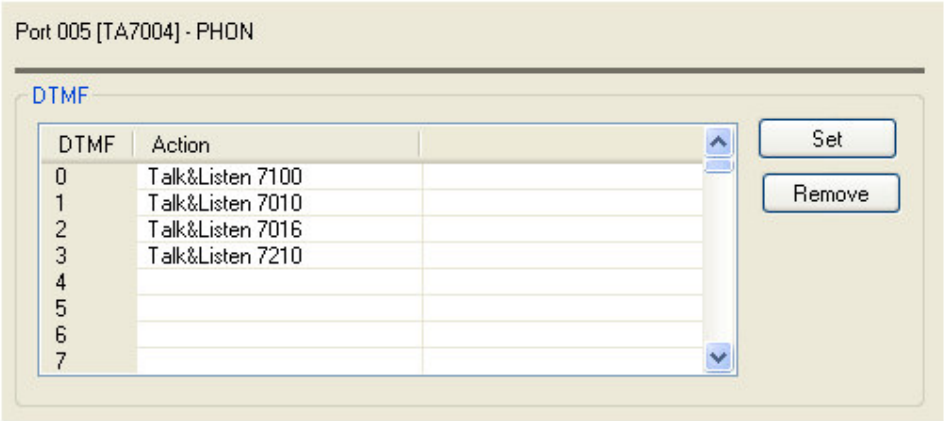
During the communication, telephone user will dial the preprogrammed DTMF sequence and then “*” (asterisk) for creating the crosspoint with another panel. For ending that XPT, press the same sequence and then **‘#’** (hash marks).

Example: See Picture 4.32 where it appears three programmed digits ‘0’, ‘1’ and ‘2’. If a communication thru ISDN line has been established, the

telephone user might also speak to TP7210 panel just by pressing '**0***'. If she presses '**2***' could talk&listen with TP7010 panel, so keeping multiple conversations with several panels, acting as if a remote. User can end each communication pressing the DTMF and "#" ('0#' and '2#') or simply hanging up.

- TA7004 → Interface for two telephone sets.

This interface allows the user to have a telephone set as if a user panel. (so it gets integrated into the intercom system). DTFM can be programmed to establish crosspoints.



Picture 4.33 DTMF assignments

For DTMF programming, double-click on the white column labeled as "Action". There are 128 DTMF available. After that, command and target menus appear. For activating it, use 'Add'. For exiting, 'Close'.

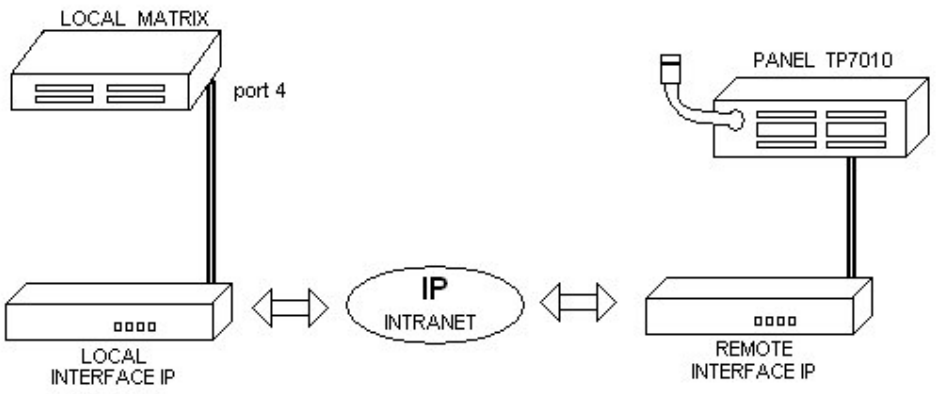
When user hears tone, she must press the DTMF and **'*'** (asterisk) to create a crosspoint with a panle. For de-activating it, enter the DTMF sequence and **'#'**.

Other panels can assign keys to that telephone set, which will normally ring and the user will be able to establish the communication.

Example: Picture 4.33 shows four DTMF digits ('0', '1' ,'2' and '3'). If telephone set user presses '**0***' she could speak to the TP7100 user. If pressed '**2***', communication will be established with TP7016 panel. Multiple communications can be established at the same time with different panels.

Any of the established conversations can be ended just by pressing DTMF and '#' ('0#' and '2#') or just by hanging up.

- TI7011 → One-port interface via IP. The terminal to be programmed is the remote panel that is connected to the interface, not the interface itself.



Picture 4.34 IP Interface Assignment

The picture above shows a TP7010 panel integrated remotely into an intercom system thru IP Interface. So port 4 of matrix must be assigned to TP7010 (remote panel) even though there is no phisical direct connection. That way user sees transparently the panels connection, no matter the interface used (local, remote).

If two matrixes need to be interconnected thru IP, one port per matrix must be assigned to this single communication channel. This port must be declared thru Indico like a TA7000 at each end so an audio&data communication can be established with remote signalling at each end.

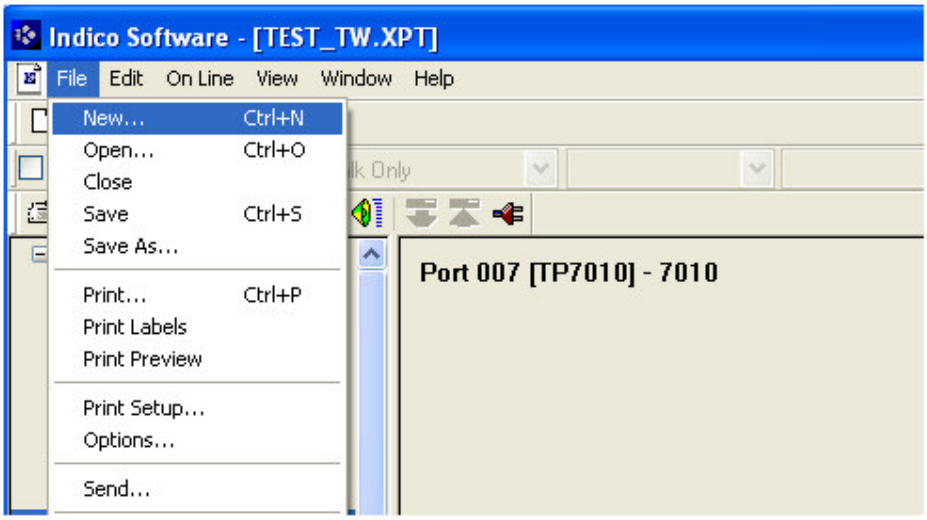
- GP7020 → 20 GPIO Tally Interface, which can be configured like keys (as if it was a panel).

  The assignment of commands to the inputs is done as I/O were keys. User must choose Input to configure, then double-click to assign a command and a target. Validate by pressing 'Add' and then 'Close' to exit. When the input is activated, the command will be executed.

  Outputs are also configured as keys. Have in mind that the same key must be assigned at the source panel and the target panel (because control signalling is used so when the key is pressed at the origin panel, the GP7020 Interface will receive the origin of the communication and will close the output relay (contact closure activation).

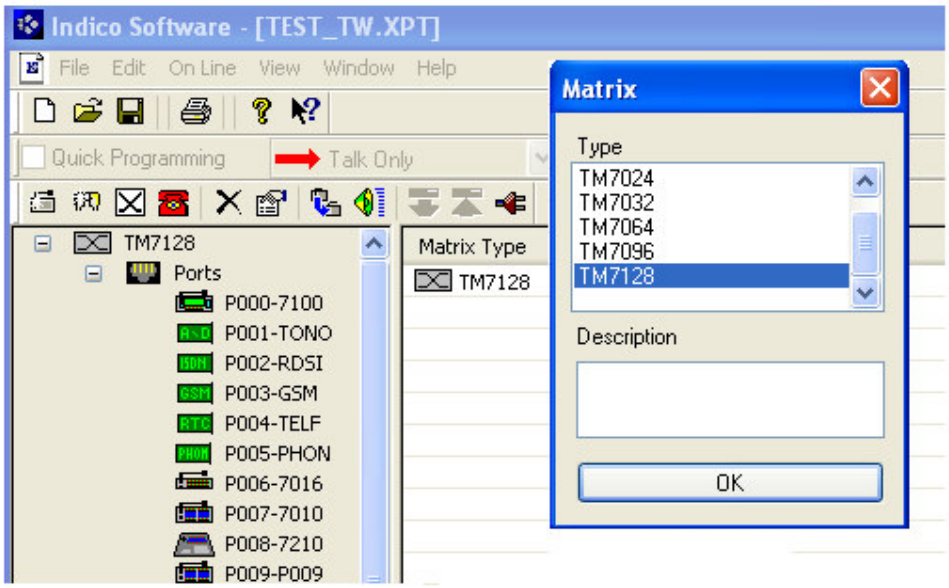
4.4 MAP CONFIG

For creating a new map, go to 'File->New' or click on the following icon:



Picture 4.35 New configuration map

Default map is for a 32-port matrix. Select a different one at '*Edit->Properties*' or click on Properties icon.



Picture 4.36 Matrix values

Select the proper matrix: TM7016 for 16x16 crosspoints, TM7024 for 24x24 crosspoints, TM7032 for 32x32 crosspoints, TM7064 for 64x64 crosspoints, TM7096 for 96x96 crosspoints and TM7128 for 128x128 crosspoints. At "Description", user may add a brief comment on this map.

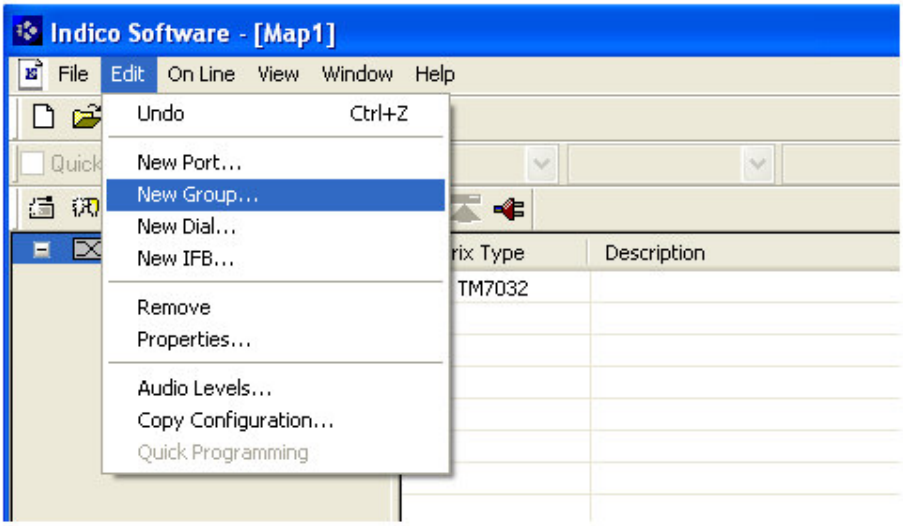
Once created, user must assign terminals to the different ports. For this, go to '*Edit->New Port*' or click on the following menu:

Note that terminals assigned must match the ones physically connected to the matrix ports.

4.4.1 GROUPS

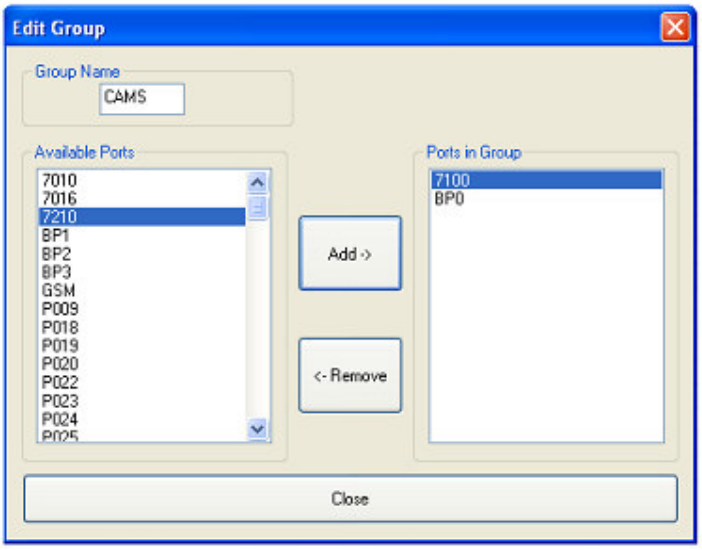
Indico programme allows the user to put several together so one source panel can communicate to different users at the same time just by pressing one key or even modify its audio level. For this, first create a group and then define its components.

For creating a new group, go to '*Edit->New Group*' and name the group or press the followin icon:



Picture 4.37 New group of users

Then assign the different matrix ports to the group by selecting the group name and going to "*Edit->Properties*'.



Picture 4.38 Members of a group

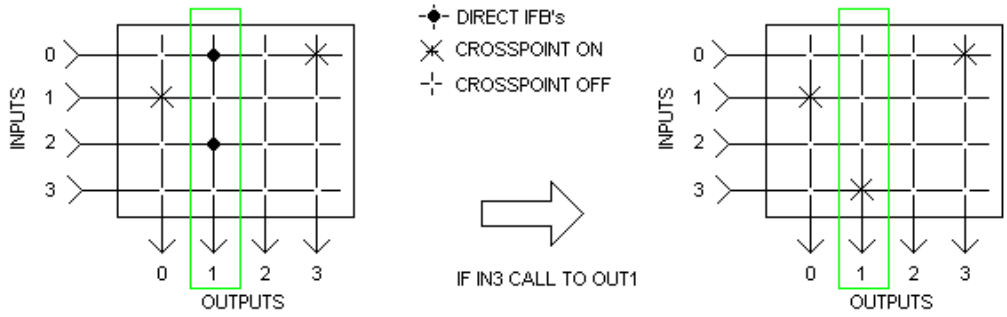
The picture above shows the group name, the available portsand the chosen ones in two different columns. For adding a new one, select one of the available ports at the left column and press '*Add*'. For removing a port out of a group, click on the chosen port at the right column and press '*Remove*'. For exiting, press '*Close*'.

When one user presses the key for that group, all the members of the group will listen to the source signal (like a '*party line*'). Groups are useful when we need to talk with many people at the same time just by pressing one key.

4.4.2 IFB's

IFB's (Interrupted Foldback) are crosspoint that is interrupted by a thrid party, with the possibility of audi olevel variations. Two opotions:

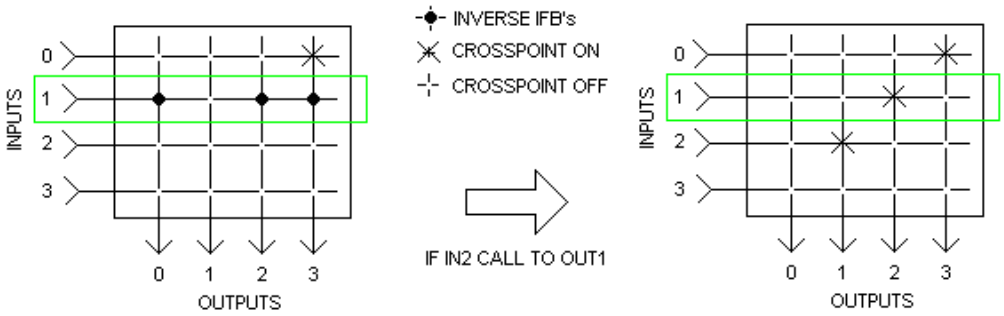
Direct IFB's ➔ When the signals from several sources to one destination can be interrupted by a different source to the same destination. When this interrupting input ends, the configured crosspoints to the destination are restablished.



Picture 4.39 Direct IFB

Picture above shows several direct IFB's between several inputs and one output. At left side, Output1 listens to Inputs 0 and 2. When Input3 wants to talk to Output1, Inputs 0 and 2 are temporarily interrupted (see picture above, right side). In this last case, output1 only listens to input3. When communication with Input3 ends, situation goes back to usual status (left side of the picture above), where Output1 listens to Input0 and 2.

Inverse IFB's ➔ When the signals from one source to several destinations can be interrupted by the reply of one of the destinations. In this case, the replying answers of these destinations are cut. When this interrupting communication ends, the configured crosspoints to the destinations are restablished.



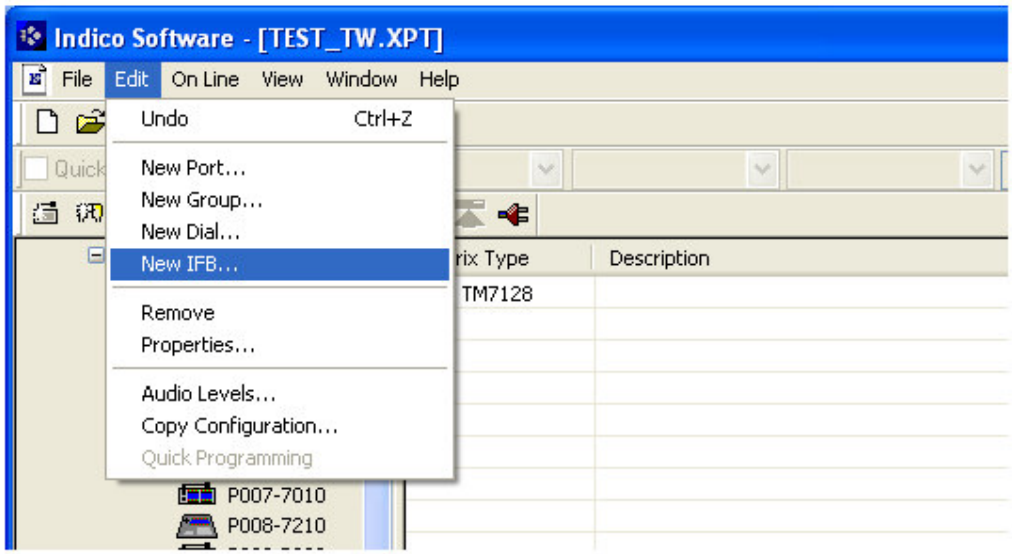
Picture 4.40 Inverse IFB

se comprueba como en el estado normal de funcionamiento, la salidas 0, 2 y 3 escuchan a la entrada 1 (figura izquierda), ya que tienen asignado un IFB inverso. Pero cuando la entrada 2 quiere hablar con la salida 1 (se fuerza por ejemplo una llamada), las salidas 0 y 3 se interrumpen temporalmente (figura derecha), escuchando únicamente a la entrada 1 la salida 2, hasta que la comunicación con la entrada 2 finaliza y se vuelve al estado de reposo inicial (figura izquierda), donde las salidas vuelven a escuchar a la entrada 1.

Picture above shows several inverse IFB's between one input and several outputs. At left side,

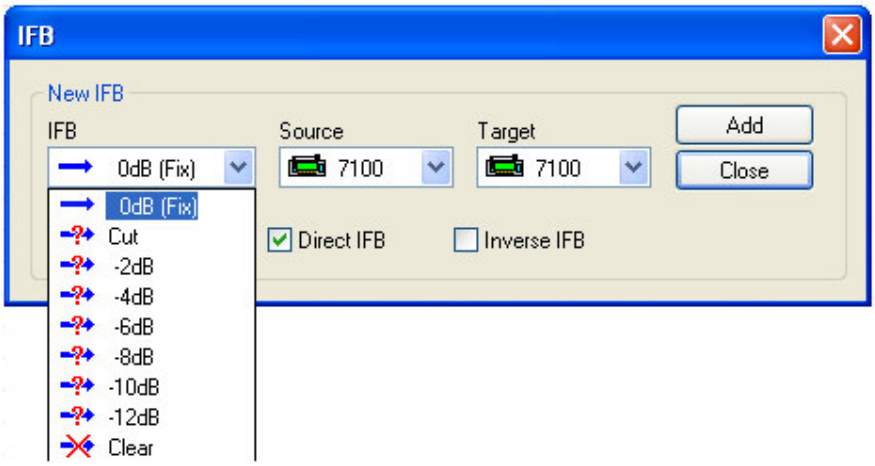
Output1 listens to Inputs 0 and 2. When Input3 wants to talk to Output1, Inputs 0 and 2 are temporarily interrupted (see picture above, right side). In this last case, output1 only listens to input3. When communication with Input3 ends, situation goes back to usual status (left side of the picture above), where Output1 listens to Input0 and 2.

A new IFB can be added by 'Edit->New IFB' or clicking on the following icon:



Picture 4.41 New IFB

Select Source and target at the IFB window that will appear.



Picture 4.42 IFB assignment

User can choose between Direct IFB or Inverse IFB. Only with “Fix” or “Clear”, these options are not available as these types of crosspoints are, respectively, unchangeable or cannot be created. Types of IFBs are:

Fix ➔ Fixed crosspoints that cannot be interrupted.

Cut ➔ Crosspoints that can be interrupted by a thrid party. These direct IFBs are also known as **‘standby’**, as Inputs are temporarily cut towards an output. Inverse IFB’s are usually called ‘inverse standby’, as outputs are temporarily cut towards one input.

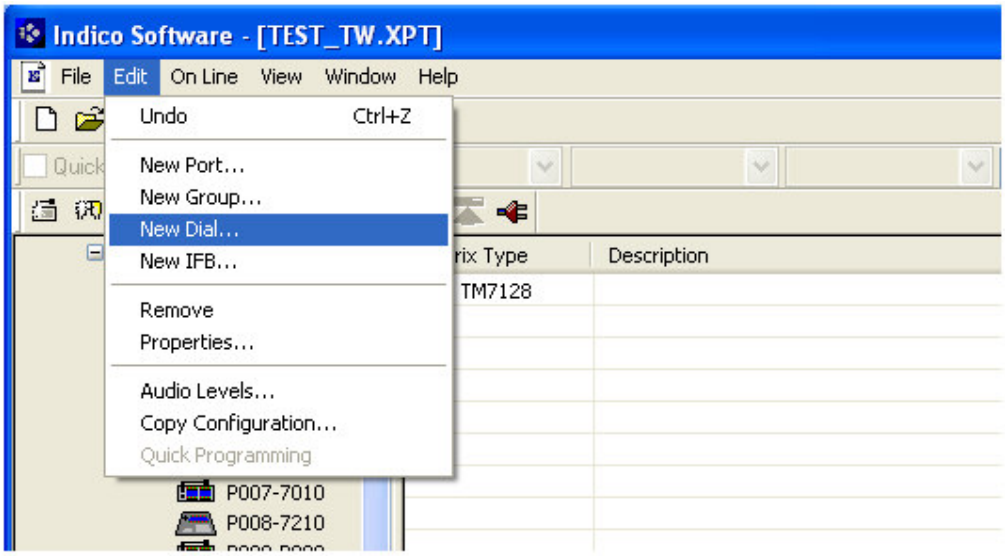
Dimmed Cut ➔ As before except for there is no cut but its volume lowered. User can choose the dB level.

Clear ➔ Banned crosspoints. Source and target cannot establish communication.

For deleting an IFB, select this option at the left column, then choose the IFRB to be deleted and go to ‘*Edit->Remove*’ o just click on the following icon:

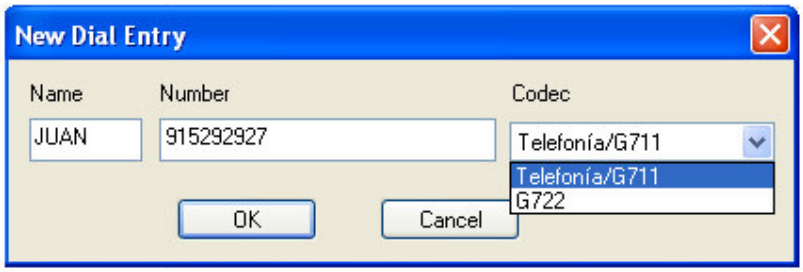
4.4.3 DIALLING

Telephone numbers can be assigned to labels to as to integrate them in the intercom system and send/receive phone calls. It´s an agenda/directory that will be used when assigning the different commands to the keys. A new number can be added at ‘Edit->New Dial’ or clicking on the following icon:



Picture 4.43 Creating a new telephone number

At the window that appears, enter the number, a label (identifying name) and the communication protocol that will be used.



Picture 4.44 Creating a new telephone number

See below the different protocols used depending on the telecommunication channel:

	G.711	G.722
PSTN	Yes	NO
GSM	Yes	NO
ISDN	Yes	Yes

Chart 4.1 Codec Selection

By default use G.711. Only when a G.722 ISDN connection is needed, change to that protocol.

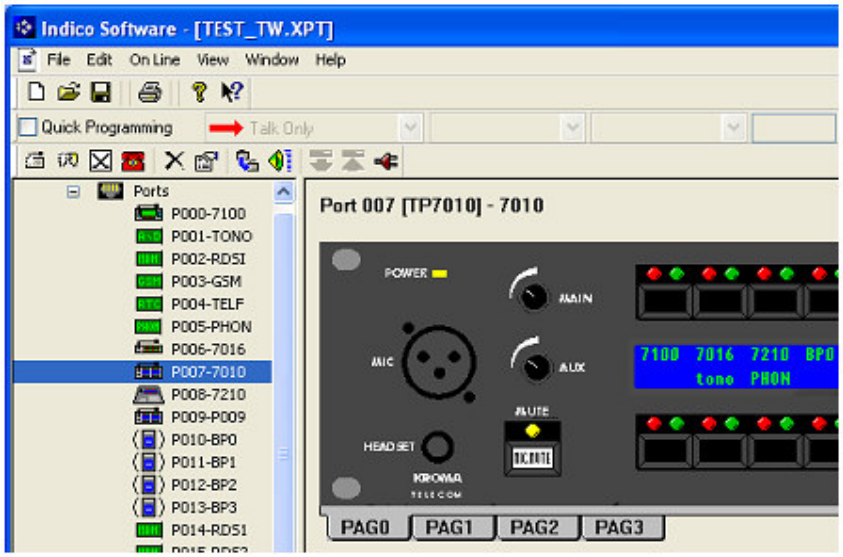
4.4.4 KEYS

Once matrix ports have been assigned to the different types of terminals (panels, interfaces), user must configure which command will be assigned to each panel key. This procedure can be done in two ways:

Noraml way ➔ Double-click on the key to programme and fill the window. Parameters and audio levels can be also chosen.

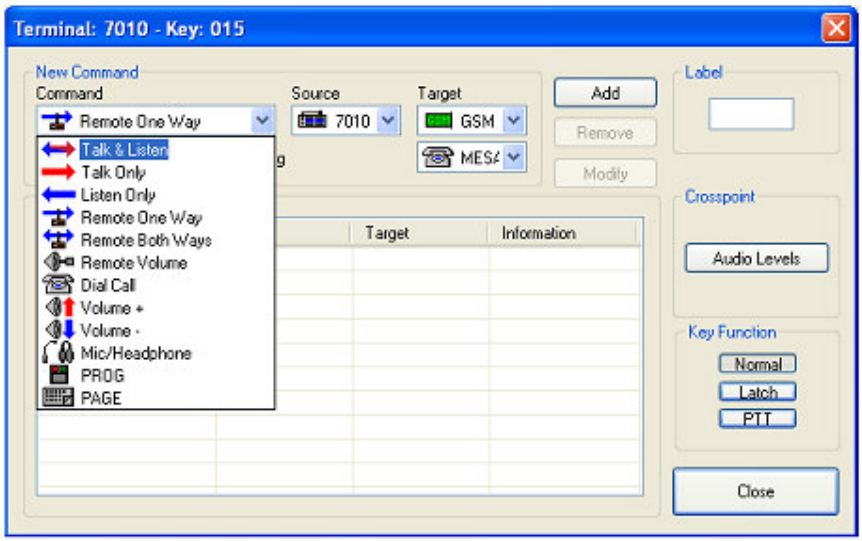
Quick way ➔ From the main window, user can assign commands to keys. It´s the best option if no special parameters are being entered.

See below the normal way of configuring the panels: Choose the panel to configure by clicking on it at the left window. At the right side of the screen its front picture will appear.



Picture 4.45 Panel selection

Double-click on the key to be programmed. See below the options:



Picture 4.46 Command assignment to keys

- **Command** ➔ Action to be done when key is pressed. More than one command (max 128) can be assigned to a key, but only the first in the list will be signalled. See below the available commands:

    - Talk & Listen ➔ Source and target panels can talk & listen to each other (both ways communication).

    - Talk Only ➔ One way communication. Source talks to Target.

    - Listen Only ➔ One way communication. Target listens to Source.

    - Remote One Way ➔ A crosspoint between two terminals is created by a third party panel. This time is one way communication.

    - Remote Both Ways ➔ A crosspoint between two terminals is created by a third party panel. This time is two waya communication (talk&listen).

    - Remote Volume ➔ For crosspoint level changes between two terminals done by a third party (between –12dB and +12dB). It´ll be necessary to assign Volume+ to a key and Volume- to another (see below).

    - Dial Call ➔ For dialling thru the available telephone interfaces and assigned telephone numbers.

    - Volume + ➔ For increasing a crosspoint audio level in a local way (max +12dB in +1dB steps) on the incoming audio. It´s assigned to one key that remains the same at the different pages.

    - Volume - ➔ For decreasing a crosspoint audio level in a local way (max -12dB in -1dB steps) on the incoming audio. It´s assigned to one key that remains the same at the different pages.

    - Mic/Headphone ➔ It switches between headset and local mic and speaker (this option will be implemented in future upgrades).

    - PROG ➔ For local crosspoint re-programming. user will be able to save the changes onto the active map. It´s assigned to one key that remains the same at the different pages.

    - PAGE ➔ For page-shifting (it scrolls thru the available virtual pages to create new crosspoints apart from the ones done by direct keys). This command must be firstly assigned to a key to create commands in the virtual pages.

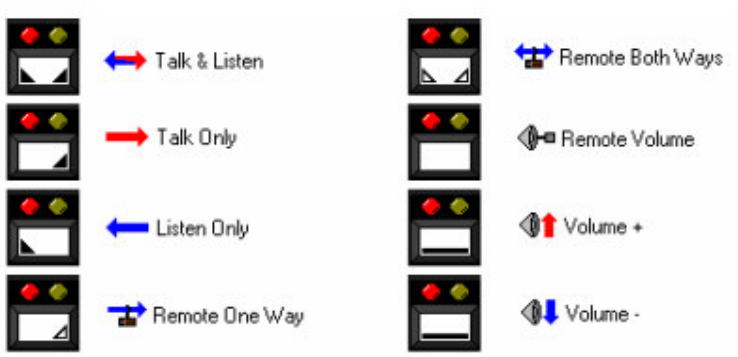
- **Source** ➔ It´s the origin port of the command to be done.

- **Target** ➔ It´s the destination port of the command to be done. If the destination were an interface for PSTN, GSM or ISDN lines, a telephone number can be chosen.

- **Label** ➔ For easy identification of the command. If left blank, programme will fill it in automatically. Per the way it´s written, user will know about the command. See below:

- Talk & Listen **->** All the characters in capital letters.
- Talk **->** Only the first character in capital letters.
- Listen **->** All the characters in small letters.

TP7016 panel has also a symbolic nomenclature for the lower part of the key. See below:



Picture 4.47 Key labelling

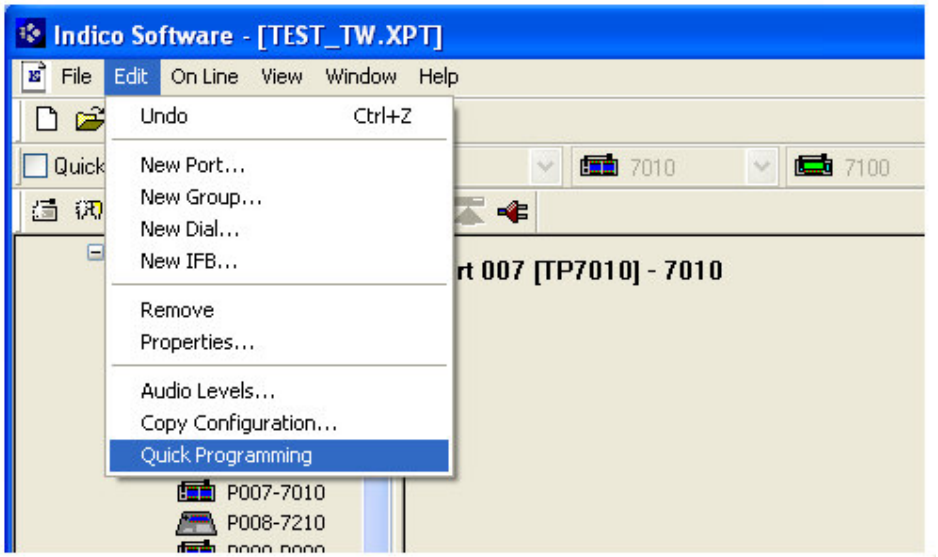
- **Key function** ➔ The way the key is used. Three options can be selected per each key:
  - Latch **->** Just one light keystroke and the command is activated. For de-activating, press again.
  - PTT (Push To Talk) **->** Keep pressing for the crosspoint to be done.
  - Normal **->** Both ways at the same time. Set by default.

- **Private** ➔ Privacy with a destination panel. All crosspoints will remain cut when this private crosspoint is executed. Nobody could listen to what is being talked to the "private" counterpart. Example: User programmes a Talk command with a target panel and assign the privacy option. No matter that this user has several communications established. If he presses the "private" key, only this crosspoint will be done and only its destination panel could listen to him.

- **Audio level** ➔ for audio volume level variations. Per crosspoint and from -12dB and +12dB. Set by default: 0dB.

Once all the parameters have been entered, click on 'Add'. One key can support up to 128 commands (but only the first of the list is signalled). For exiting, click on 'Close'. Repeat this procedure per key to be configured.

If no special parameters need to be entered, it´s advised to use the quick programming way. Select the panel at the left window and go to 'Edit->Quick Programming' (or just click on the following icon):



Picture 4.48 Quick programming

Before quick-programming, choose the panel and then activate thru the quick-programming icon. Deactivate this before programming a different panel. The programming bar will be active for allowing user to quick-programme the panel.

Choose command and destination, and label assigned to the key. Then click on the key to be programmed.

Source panel cannot be modified as user is programming the chosen panel. For chosing a different origin, deactivate quick-programming and choose a different panel.

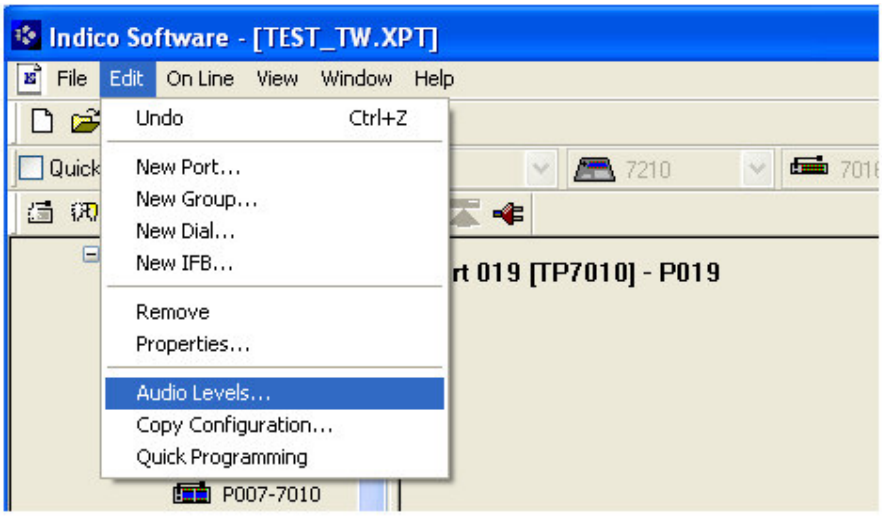
Another option is copying the configuration of one panel into another similar one. It speeds up the process. Click on the following icon and then the destination panel.

4.4.5 LEVEL VARIATION

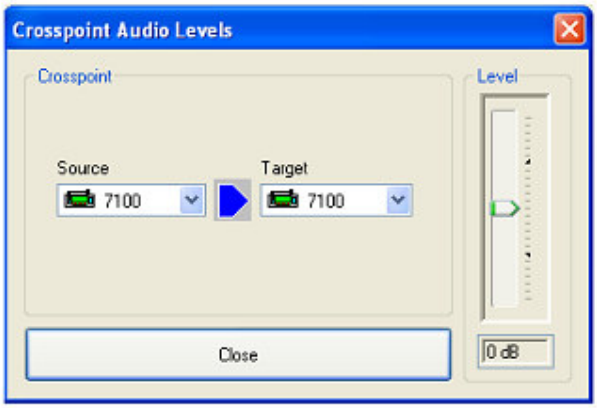
Kroma Digital Intercom allows level variation per crosspoint between –12dB and +12dB. Have in mind that max volume is 12dBv, so if an audio signal enters into the matrix at 7dBu and we increase the level +8dB of that crosspoint, the output audio level will be 12dBv, not 15dB as you might think.

TA7000/TA7003 interface for convertir external analogue audio signals support audio level variation as well (input and output). This is very useful for level adapting at the previous stage, so no need to modify the level of crosspoints.

From “Edit->Audio Levels” menu, any crosspoint level can be changed. Also user can click on the following icon:



Picture 4.49 Level variation



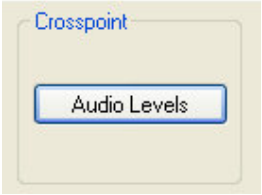
Picture 4.50 Level variation per crosspoint

The menu tree of the left side offers the terminals available while the right menu is for the target terminals. Move the right leveller upwards or downwards for audio volume adjustment (in 1dB steps).

By default, each crosspoint is established at 0dB. Limits are –12dB and +12dB. If one signal enters at 1dB and user wants a 6dB output, the increase should be +5dB.

If Origin Signal is a group and Destination is one panel, then level variation will affect all members of the group. The opposite situation is similar: If Origin is a panel and Destinatio is a group, level variation will apply to every member of the group.

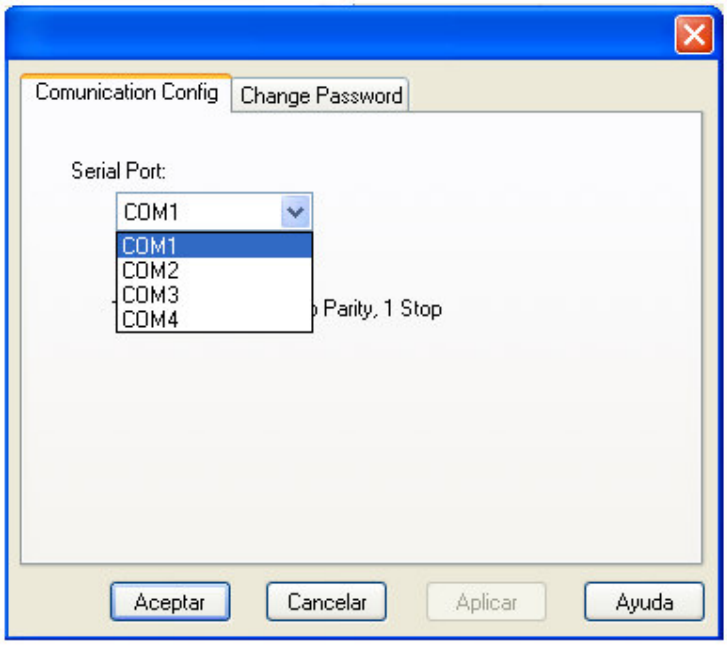
From the key configuration of panels, audio level from source and target can be changed as well.



4.5 ONLINE CONNECTION

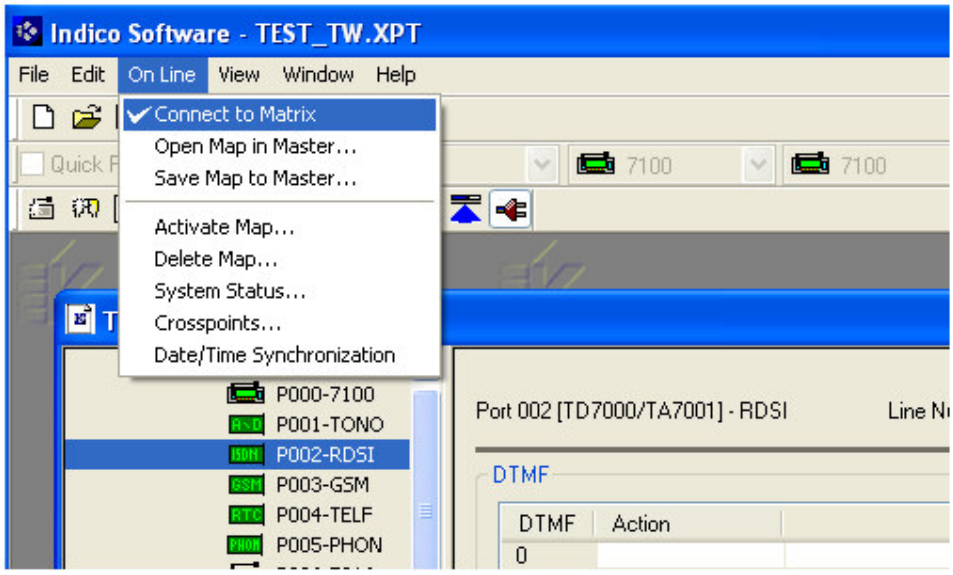
Thru RS232 protocol, Indico can interact with Master Unit so user can remotely control the different maps. Master can save up to 8 maps in its ROM memory, which can be handled anytime (load, activate, delete...) and its status checked.

Serial COM port of the computer must be configured to connect both equipments (computer, master) thru twisted cable. Go to 'File->Options', where user will be able to select the serial port of the computer (COM). Frequency is set by default. There´s no need to configure it unless it is being used by other application.



Picture 4.51 Serial port selection at computer

Once PC and Master are connected and COM port chosen, go to 'On line->Connect to Matrix' as shown below (or just click on the following icon):



Picture 4.52 Connect to matrix

At the lower right side of the screen, there is status information. If COM port couldn´t be opened by OS or physical connection problems appeared, a picture as below will be shown:

Picture 4.53 Master connection failure

If there weren´t connection problems, status will be active and Send & Load icons at the icon tool bar will be shown active as well:

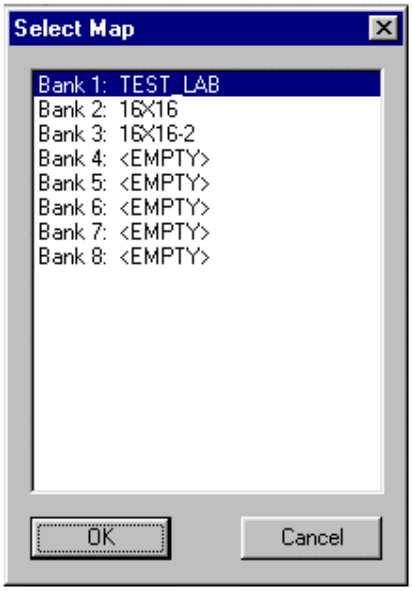
User will be able to:

- **Open Map in Master** ➔  It brings a map into the computer for editing. User should select among the available maps. .

- **Save Map to Master** ➔  To be used when saving a map permanently is needed. Choose the bank of the master to save the map. If the chosen map is full, the new map will delete the previous one.

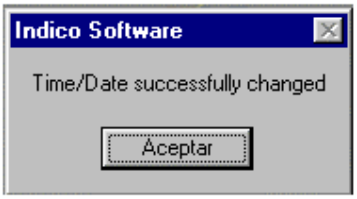
- **Activate Map** ➔ User will be able to activate one of the banks of the Master.

- **Delete Map** ➔ For deleting one of the eight available maps of the Master Unit. Bank will be blank for future uses. It´ll appear as '<EMPTY>'.



Picture 4.54 Bank selection

- **Date/Time Synchronization** ➔ For synchronizing date and time of computer into the Master. An indicating window informs user.



Picture 4.55 Time assignment

- **System Status** ➔ For system checking in real time and thru equipment connections, serial numbers and firmware versions. It tells on matrix type, that should be the same that the declared at Indico´s configuration map. The models or matrix to configure are:

  TM7016 -> Matrix 0 with one A board. It´s a 32-port equipment with one 16x16 XPT board.

  TM7024 -> Matrix 0 with one A board. It´s a 32-port equipment with one 24x24 XPT board..

  TM7032 -> Matrix 0 with one A board. It´s a 32-port equipment with one 32x32 XPT board.

TM7064 -> Matrix 0 and matrix 1 with two boards (A, B) in each of the two matrixes. It´s a 64-port equipment (two 32-port equipments together). Each matrix consists of one main XPT board (A) and the extension one (B).

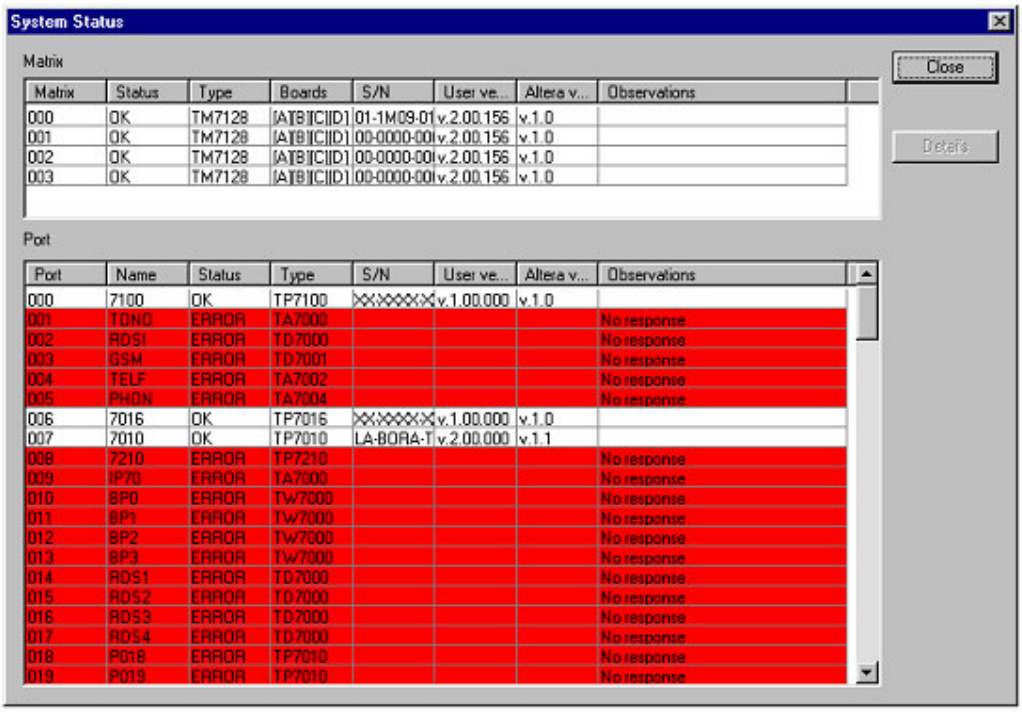
TM7096 -> Matrix 0, matrix 1 and matrix 2 with three boards (A, B, C) in each of the three matrixes. It´s a 96-port equipment (three 32-port equipments together). Each matrix consists of one main XPT board (A) and the extension ones (B, C).

TM7128 -> Matrix 0, matrix 1, matrix 2 and matrix 3 with four boards (A, B, C, D) in each of the four matrixes. It´s a 128-port equipment (four 32-port equipments together). Each matrix consists of one main XPT board (A) and the extension ones (B, C, D).

If one of the boards is missing or faulty, a green strip will indicate that as a '*Warning*'. This board will not appear in square brackets as operative ones: [A]

If Matrix isn´t connected or it doesn´t reply to Master orders, a red strip will appear informing about an '*Error*'. Check connections, power supply...

See below a 128-port matrix, equipped with four 32-port units. Note that each one has four XPT boards: [A], [B], [C] y [D]. Status is '*OK*'



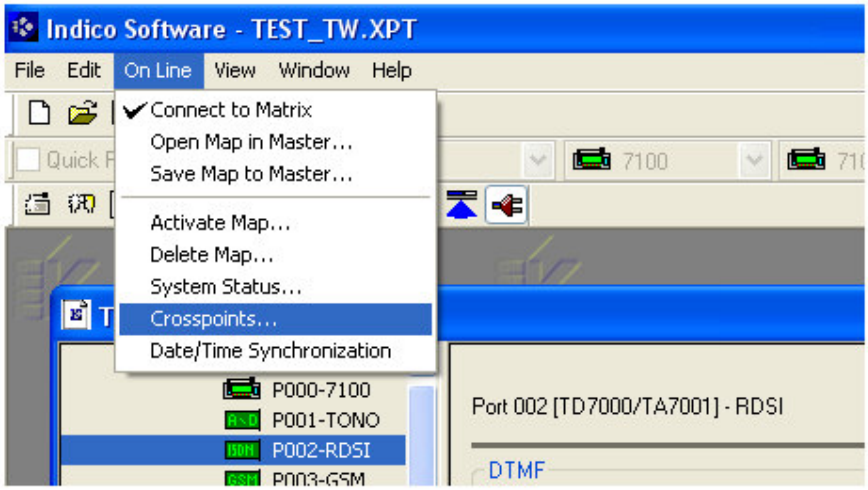
Picture 4.56 Status Checking

See above how port status is also checked. It indicates model, S/N and software version. If functioning is right, it´ll appear '*OK*' next to its description.

If the terminal assigned via Indico programme and physical terminal connected to the matrix doesn´t match, a '*Warning*' and a green strip will appear.

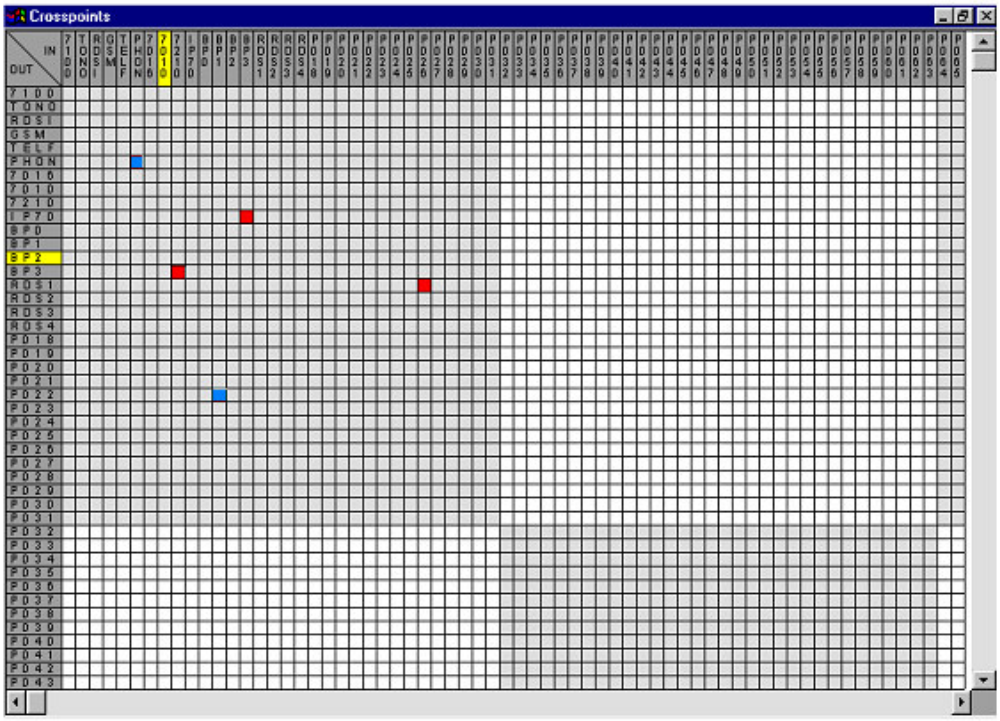
If terminal doesn´t reply properly because a lack of connection (or a faulty terminal), an '*Error*' message and a red strip will appear. At the picture above, only ports 0, 6 and 7 are working. The rest offers sme kind of error. This menu is very useful for the setting up of the intercom system for port checking of every connected equipment.

- **Crosspoints ➔** This option of the Online Menu allows the user to view and modify each crosspoint of the system in real time thru a graphic interactive screen. Each XPT can be created, edited or deleted. For de-activating this option, connection to master must be active.



Picture 4.57 XPT menu activation

All crosspoints of the system will appear: inputs at the upper side and outputs at the left part of the map. When moving the mouse, the input and output will be yellow-shadowed to let the user know which crosspoint can be created if left-clicking.



Picture 4.58 XPT activation window

This window is very useful for viewing in real time which crosspoints are being created. Each XPT can be:

- Not done → A white square will indicate that the audio input is not going to that output. There is no crosspoint there.

- Done → A blue square will indicate that the audio input is going to that output. Picture above tells that audi ofrom port labeled 'BP1' is addressed to port 'P022'.

- Forced XPT → A red square tell about a done XPT (by the user thru Indico, or a Master panel) or about an IFB.

For creating XPTs manually, click on the desired square (the intersection between the ports that we want to join). The square´ll fill in red (done & forced). For releasing the XPT, just click on it again.

User will be able to "force" a done crosspoint. Just click on a blue square. It´ll turn to red. For returning to blue, click on it again.

Note that this way is aimed at creating one way communication. Full duplex needs another steo. Once the XPT is done, just click on the right button of the mouse. A two-way channel will have been created. For returning to one-way, click on the right button again.

5 DOCUMENTATIÓN

With the Mantenance Manual, parts lists are enclosed (including electric schematics). Nomenclature for these parts are related to the equipment they belong to. The capital letter next to the code means as follows:

- 'R' → Product with all parts together, finished, completed.
- 'X' → Optional product.
- 'T' → Expansion product.
- 'P' → Part list for a Printed Circuit Board (PCB).
- 'W' → Parts schematics, diagram.
- 'E' → Electric schematics (parts interconnection).
- 'I' → PCB where parts will be soldered upon.
- 'K' → Mechanical kit (chassis of the equipment).
- 'Y' → Individual mechanical part.
- 'L' → Software kit (firmware).
- 'U' → Interconnection kit (cabling).
- 'M' → Interconnection cabling.
- 'V' → Diagram/Drawing of one part of the equipment.
- 'J' , 'C' → Different parts that put together conform a module inside the equipment.

More info can be found at the CDRom:

\\CD-ROM \ TB7000 \ ..
\Schematics
\Manual
\Firmware