



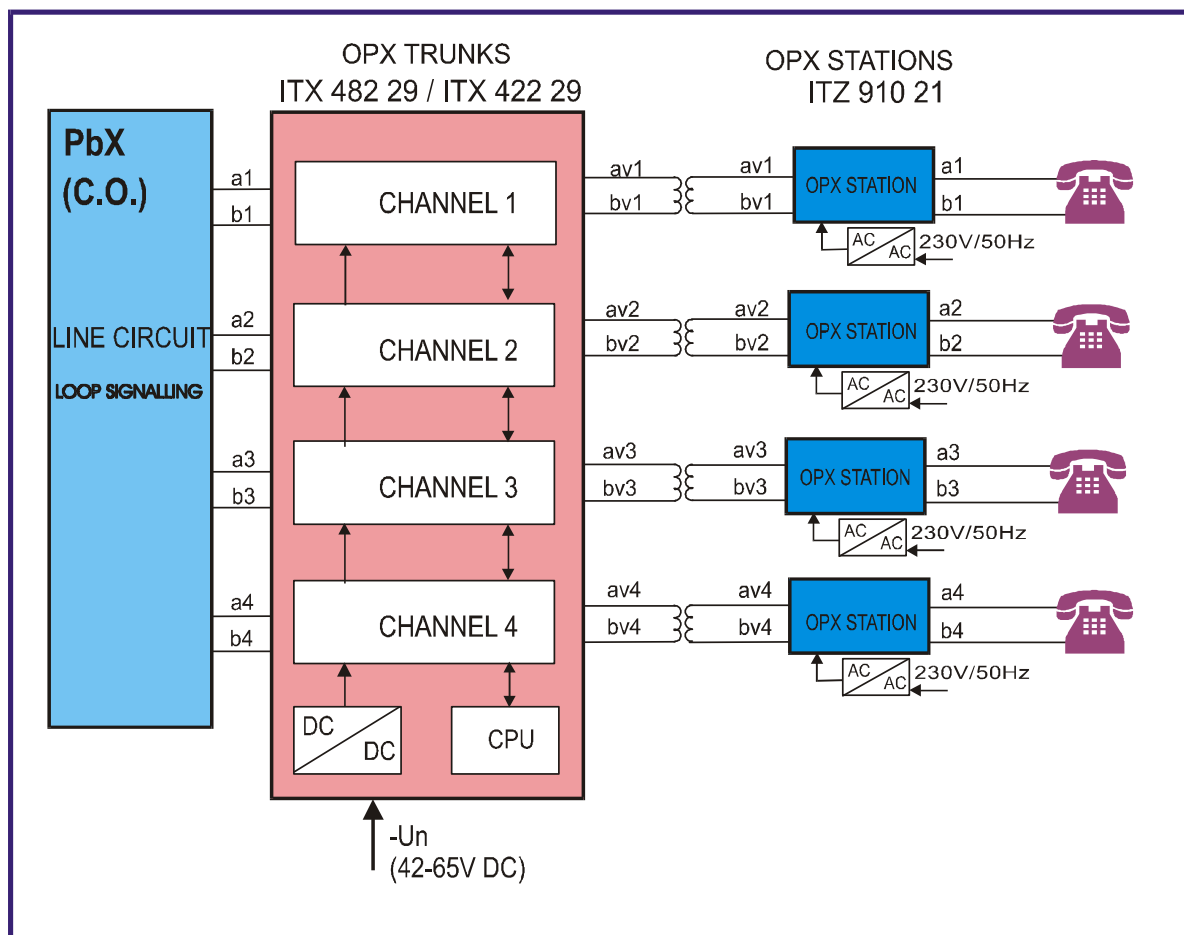
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DOCUMENTATION

OFF-PREMISE EXTENSION

INT 910 01



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1. TECHNICAL SPECIFICATION

1.1 General

1.1.1 Connection of the terminal equipment

The OPX Station provides universal interface for connection of the terminal equipment with loop signalling. It allows connecting the telephone with rotary or DTMF dialling, modem, FAX and C.O. trunk with loop signalling.

1.1.2 Automatic Diagnostics

The OPX Trunk and OPX Station are tested during idle state. The diagnostics digits are transmitting from ITX 482 29 / ITX 422 29 to ITZ 910 21 at about every 30 seconds and ITZ 910 21 must answer to this digits. If there are any errors, then they will be optically signalised.

Activation or deactivation of the diagnostics is set up by the switch on the board of the OPX Trunk ITX 482 29 / ITX 422 29.

1.1.3 Using the Modem

Due to good frequency response characteristic and the other transmission parameters, INT 910 01 allows transmitting data by a modem or by a fax with high baud rate. Line is usually a limiting part of transmission.

1.2 Technical Information

1.2.1 Transmission and Electrical Information

- Frequency Response	300 - 3400 Hz
- Input Impedance	600 Ω (@ 40 mA, 300 - 3400 Hz)
- DC Loop Resistance	max. 300 Ω (in ITX 482 29 / ITX 422 29)
- Ringing voltage	min. 50 V ef. (50 Hz)
- Longitudinal Balance	
50 - 300 Hz	26 dB
300 - 600 Hz	40 dB
600 - 3400 Hz	46 dB
- Levels -	PBX interface
Transmitting	0 dBm
Receiving	0 dBm
	Subscriber Interface
Transmitting	0 dBm
Receiving	0 dBm

1.2.2 Signalling Digits

There is an AC signalling between ITX 482 29 / ITX 422 29 and ITZ 910 21 using DTMF digits. The level of the DTMF signalling and sensitivity of the DTMF receiver enables to transmit digits through the line with max. 22dB attenuation. In case of pulse dialling, OPX Trunk converts it in to the DTMF digits.

Dialling Parameters:

a) Pulse Dialling

- Frequency of Dialling Pulses	10Hz \pm 0,5 Hz
- Pulses Proportion	(1,5 \pm 0,1): 1
- Interdigit Time	1000 ms
- Flash ($I_{max}=15$ mA)	100 \pm 20 ms

b) DTMF Dialling

- DTMF Signals frequency	by CCITT Q.23
- Deviation of DTMF frequency	+ 1,5 %
- Time of Mark Transmission	min 100 ms
- Signal's Level - Upper Group	
Transmitting	-6 \pm 2 dBm
Receiving	min -25 dBm
Lower group	
Transmission	-8 \pm 2 dBm
Receiving	min -25 dBm

1.2.3 Power Supply

The OPX Station is powered from the adapter 18V. If there is an out of power, then the OPX Station ITZ 910 21 is powered from internal battery 12V/0,6Ah. The battery is supplying OPX Station for about 2 hours. The special circuitry disables the battery to be totally discharged. If there is an out of power, then it is signalled by optical and acoustic signals. It is not possible to switch on the OPX S ITZ 910 21 powered from internal battery.

The OPX Trunk ITX 482 29 / ITX 422 29 is powered usually from the PBX. It needs 40 V to 65 V DC.

2. GENERAL DESCRIPTION

Off Premise Extension INT 910 01 is usually used for galvanic separation of the subscriber line. There is an AC signalling, which enables to increase distance of the PBX part (OPX Trunk) from the OPX Station or the OPX line circuit. In case of an amplified line, it is possible to get an unlimited distance.

It is composed of two parts:

- **OPX Trunk OPX T** **ITX 482 29 / ITX 422 29 on PbX side**
- **OPX Station OPX S** **ITZ 910 21 on Subscriber side**

2.1 ITX 482 29 / ITX 422 29

OPX T ITX 482 29 / ITX 422 29 is connected to the subscriber line circuit of the PBX or C.O.. The OPX S ITZ 910 21 is connected to OPX Trunk ITX 482 29 / ITX 422 29 by line. Loop signalling from the PBX is changed in the ITX 482 29 / ITX 422 29 into the DTMF signalling.

The speech circuitry uses active termination with 0-dB insertion loss. The speech path is divided into the incoming and outgoing part. The CPU through registers separately controls each part. The board contains also DTMF receiver and transmitter used for signalling and dialling.

2.2 ITZ 910 21

OPX S ITZ 910 21 allows to connect telephone with pulse or DTMF dialling, or another terminal equipment with loop signalling (modem, FAX, C.O. Trunk).

OPX Station is powered from the AC adapter 230V/50Hz. Power supply on the OPX S generates necessary voltage for its operation. OPX Station has a battery, which allows operating without the main power for about 2 hours. The battery is automatically recharging and if the battery's power is under 10.8V, then the battery is disconnected and OPX Station is not working, unless the main power is on again.

LED diodes on the OPX S signalise the battery operation (BAT), power supply (PWR), disconnected line (LINE) and loop status (LOOP). Battery operation and/or line failure is also signalised acoustically.

2.3 Outgoing Call

When an off hook condition on the OPX S is detected, station sends DTMF digit to the OPX T. The OPX T then places load over the tip and ring wire, causes an off hook in the PBX. Dial tone is transferred to the telephone. In case of the DTMF dialling, digits are transferred directly to the PBX. Rotary dialling is changed to the DTMF digits and transferred directly to the PBX or changed again in the OPX T to the rotary dialling, depending on the PBX type. When the on hook is detected on the telephone, OPX goes idle.

Table of the DTMF Tones:

	1209 Hz	1336 Hz	1477 Hz	1633 Hz
697 Hz	1	2	3	A
770 Hz	4	5	6	B
852 Hz	7	8	9	C
941 Hz	*	0	#	D

A - on hook
B - ringing
C - off hook
D, * - diagnostics marks

2.4 Incoming Call

When the OPX T detects ringing from the PBX ,sends the appropriate DTMF digits to the OPX S . The OPX S sends ringing to the telephone. An off hook condition is signalled to the OPX T, which answers the call to the PBX by placing the load over tip and ring wire. An on hook on the telephone causes the OPX goes idle.

3. SYSTEM DIAGNOSTICS

Purpose of the diagnostic is to identify line errors, a power-down condition or other errors of some key parts of the device. It is using the DTMF digits for it and it is activated by switch No. 2 in DIP 8 switch bank on the board of the OPX T ITX 482 29 / ITX 422 29.

If the OPX is idle line to PbX is powered, then about every 30s the OPX T ITX 482 29 / ITX 422 29 transmits digit “ * “ to the OPX S . The OPX S then transmits the same digit back to the OPX S. If there are 3 unsuccessful attempts, the OPX T transmits the digit “D” - the condition request. (This digit is transmitted also at power up or reset condition on the OPX T). If there is no answer within 3 intervals - 1.5 minutes - then the OPX T is signalling the line error or the OPX Station error. Depending on the switch No. 3 in the DIP 8 switch bank, the OPX T can also place the load over the tip and ring wire, which causes lock out condition in the PBX. The appropriate LED diode is lit at about every 1s and the trunk is transmitting digit “0” in the 2 sec. period. This signal is useful for the line checking. After fixing up an error, when the OPX T ITX 482 29 / ITX 422 29 receives the diagnostic digit again, it removes the load from the tip and ring wire.

If there is not a loop current from the PBX, then the OPX T transmits digit “C” to OPX S. The appropriate LED diode on the T and the LED diode SPV on the OPX Station flashes with 0.5s period.

If there is not a loop current from the PBX and the OPX T does not receive the diagnostics digits, then the line is considered as unconnected and error is signalled depending on the switch No. 4 in the DIP 8 switch bank.

The OPX T contains the error acoustic signalling, which is activated by switch No. 3 in the DIP 4-switch bank on the board of the OPX T.

It is not possible to switch off the diagnostic on the OPX S. When the OPX S receives diagnostic digit “ * “, it sends it back to the OPX T.

If the OPX S does not receive any digit during 3 intervals, e. g. 1.5 min, it sends digit “A” (on hook) and LED SPV flashes with 1-sec. period. The OPX S also sends 770 Hz tone to line in 4-sec. period. This signal is useful for example to measure line from the OPX T's side. The level of the DTMF digits and also level of this signal is - 6dB. OPX S can signalise the error by LED diode.

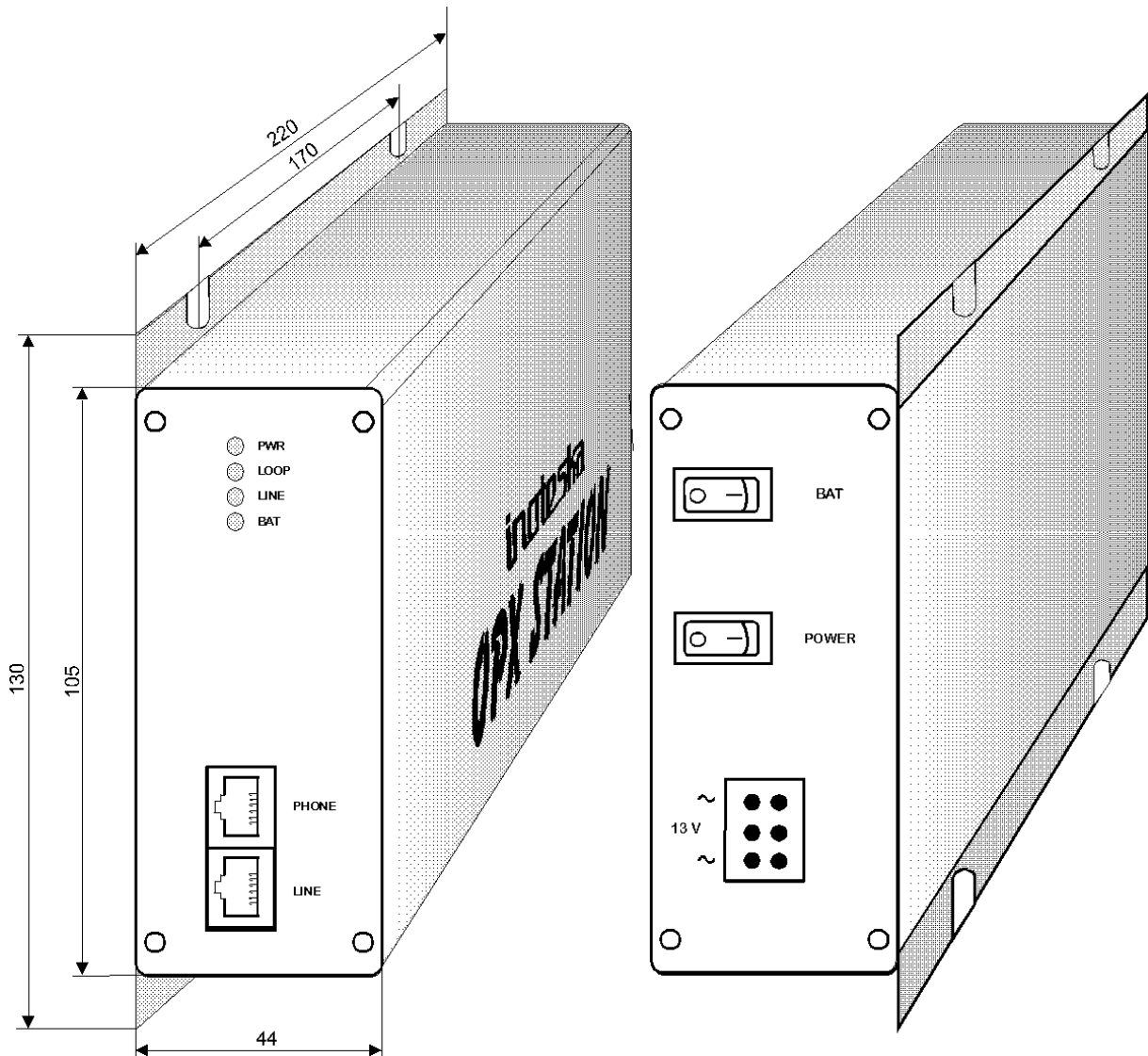
4. MECHANICAL ASSEMBLY

4.1 The OPX S ITZ 910 21

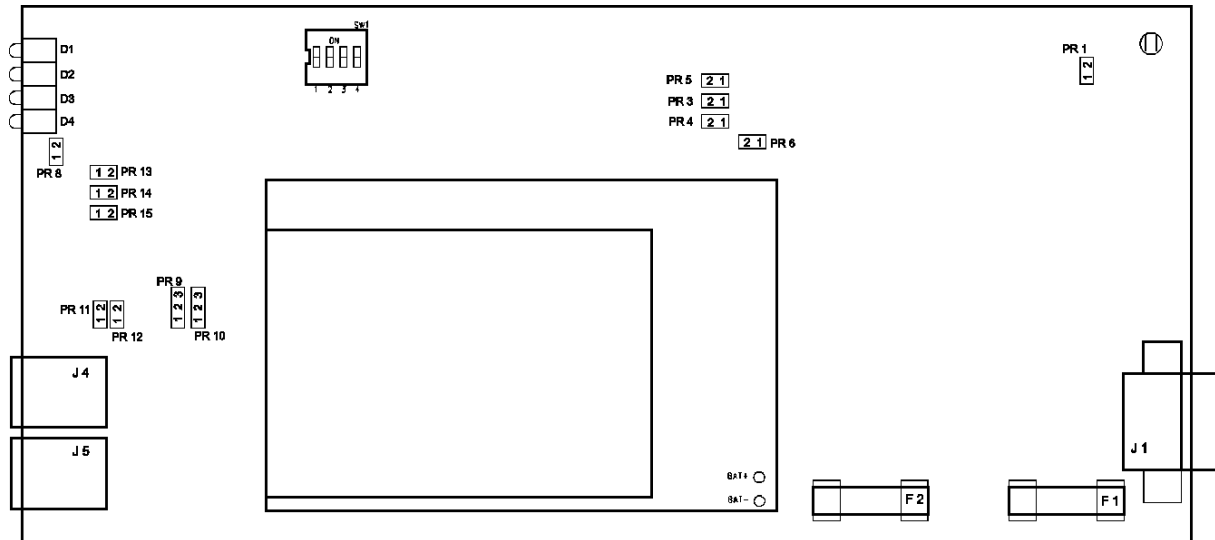
The OPX Station is placed in the individual box. 12V/2Ah battery is also in the box.

The LED's are signaling:
 PWR – power supply
 BAT - battery operation
 LINE - line error (found by diagnostics)
 LOOP – loop status

Dimension in mm:



Jumpers allocation on board ITZ 910 21



OPX station ITZ 910 21 consists of:

- AC adapter
- Assembly material for a wall mounting
- Template
- 2 fuses

Connectors connection on ITZ 910 21 :

PHONE	J4	LINE J5
1 -	1 -	
2 -	2 aiv	
3 a	3 av	
4 b	4 bv	
5 -	5 biv	
6 -	6 -	

where:

- a,b - a, b two-wire telephone
- av,bv - line – output from ITZ 910 21
- aiv, biv - line – input to ITZ 910 21

Switch SW 1

- 1 - reserve
- 2 - RESET - always OFF
- 3 - WD - always ON
- 4 - signalling* OFF – three-mark ON – one-mark

* Default setting of ITX 482 29 / ITX 422 29 and ITZ 910 21 is with three-mark signalling.

In the case of any change it is necessary to set the same setting in ITX 482 29 / ITX 422 29 and ITZ 910 21!!!

Line: two-wire

PR 9 connect 2-3
PR 10 connect 2-3
PR 11 connect 1-2
PR 12 connect 1-2

four-wire

PR 9 connect 1-2
PR 10 connect 1-2
PR 11 not connected
PR 12 not connected

PR 8 connect 1-2 amplification from line to telephone +3 dB

Transmitted DTMF level

	Lower freq.	Higher freq.
PR 14 not con. PR 15 not con.	-6dB	-8dB
PR 14 1-2 PR 15 not con.	0dB	-2dB
PR 14 not con. PR 15 1-2	-12dB	-14dB

Received DTMF level

PR 13 connect 1-2 amplification +6 dB

Technological jumpers:

PR 1 1-2
PR 3 1-2
PR 4 1-2
PR 5 1-2
PR 6 1-2

It is possible to disconnect the standby battery during the transport, storage or long power failure by switch BAT. During the transport the switch is protected against the overvoltage.

ATTENTION!

The switch BAT must be in ON position during operation.

It is highly recommended to protect line on both sides with lightning arrests.

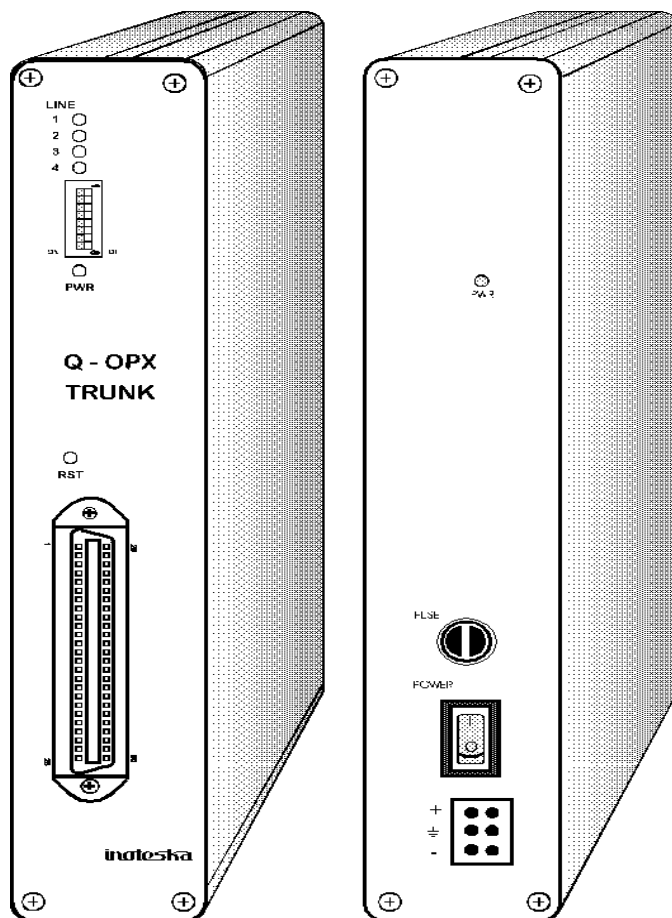
4.2 OPX Trunk

It is possible to place the OPX T ITX 482 29 / ITX 422 29 into different types of the mechanical assemblies:

1. Individual box ITX 482 29
4. 19" shelf 6U high ITX 422 29

4.2.1 ITX 482 29

- Speech circuits 2-wire or 4-wire
- Pulse or DTMF dial
- Automatic status diagnostics
- One-mark or three-mark signalling
- Power supply DC -48V



4.2.2 ITX 422 29

- connection of 4 analog interfaces to internal PCM bus
- Max. building-up of 10 cards ITX 422 29 – 40 OPX stations connected to one rack
- Speech circuits 2 – wire or 4 – wire
- Pulse or DTMF dial
- Automatic status diagnostics
- One-mark or three-mark signalling
- Power supply from the rack

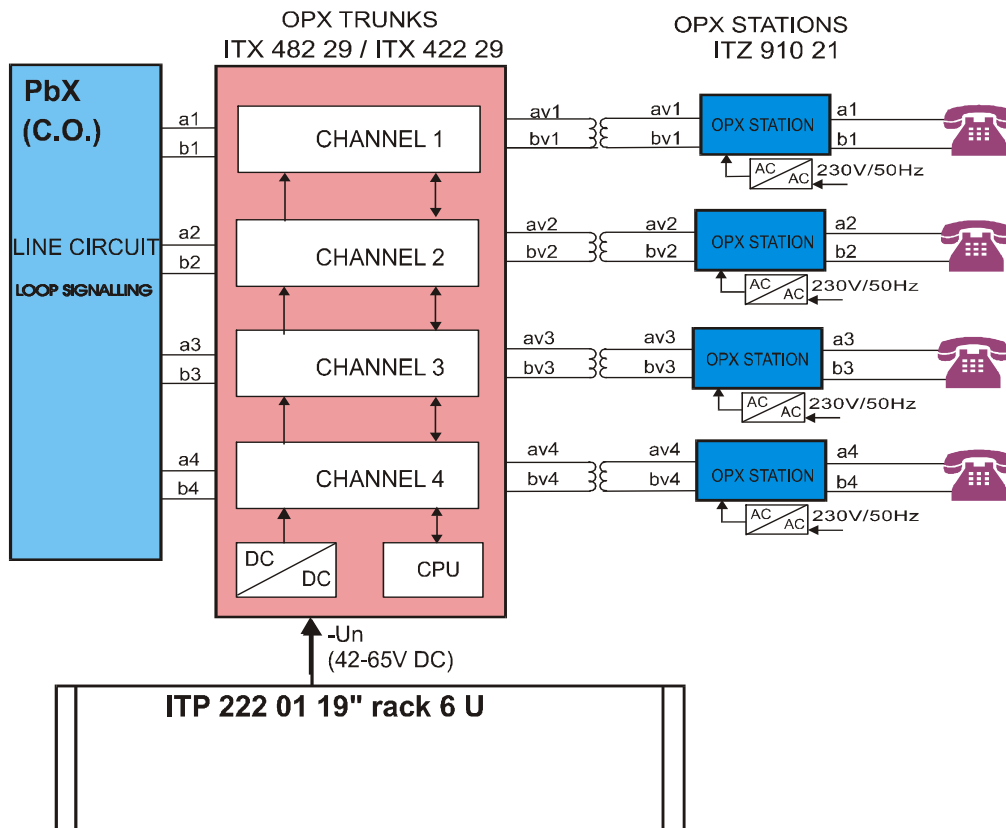
Projecting:

It is possible to insert the individual OPX trunk cards to the 6U rack to make multiple convertor. The cards have only common power source.

In ITP 222 01 there can be placed max. 16 optional cards 4 HP (TE) wide. Because of technical reasons it is possible to place max. 10 cards ITX 422 29 to 19"rack .

Nomenclature	Description		Width HP (TE)
ITX 422 29	OPX Trunk card	4 - fold	8
	<i>Optional positions</i>		16x4=64
ITX 802 01	Convertor DC / DC 25, 6U	-	8
	Free last position behind the power	-	8
ITP 222 02	19", 6U Rack	-	84

1 – 10 pcs	ITX 422 29	OPX Trunk
1 pc	ITP 222 01	19" rack 6U high
1 pc	ITZ 802 01	DC / DC Convertor – 48 V



Signification of jumpers: ITX 482 29 a ITX 422 29

		2-wire	4-wire
1. trunk	PR 105 connect	2-3	1-2
	PR 106	2-3	1-2
	PR 104	1-2	not con.
2. trunk	PR 205 connect	2-3	1-2
	PR 206	2-3	1-2
	PR 204	1-2	not con.
3. trunk	PR 305 connect	2-3	1-2
	PR 306	2-3	1-2
	PR 304	1-2	not con.
4. trunk	PR 405 connect	2-3	1-2
	PR 406	2-3	1-2
	PR 404	1-2	not con.

Amplification

	PbX → Line		Line → PbX		
	3dB	0dB	3dB	0dB	
1. PR 102	not con.	1-2	PR 103	not con.	1-2
2. PR 202	not con.	1-2	PR 203	not con.	1-2
3. PR 302	not con.	1-2	PR 303	not con.	1-2
4. PR 402	not con.	1-2	PR 403	not con.	1-2

not con. – jumper not connected

Amplification of transmitted DTMF mark level

	1. Trunk <i>PR 108</i>	2. Trunk <i>PR 208</i>	3. Trunk <i>PR 308</i>	4. Trunk <i>PR 408</i>
- 6 dB NOM	1-2	1-2.	1-2	1-2
NOM	not con.	not con.	not con.	not con.
+6 dB NOM	2-3	2-3	2-3	2-3

not con. – jumper not connected

NOM – Nominal level of transmitted marks of lower group is -6 dB
of upper group is -8 dB

Amplification of received DTMF mark level

	1. Trunk <i>PR 107</i>	2. Trunk <i>PR 207</i>	3. Trunk <i>PR 307</i>	4. Trunk <i>PR 407</i>
0 dB	not con.	not con.	not con.	not con.
+6 dB	2-3	2-3	2-3	2-3
-6 dB	1-2	1-2	1-2	1-2

Signalling elements

LED diodes :

L1 – status of 1. channel a) diode permanently lights – channel is busy

L2 - status of 2. channel b) diode blinks – error status

L3 - status of 3. channel

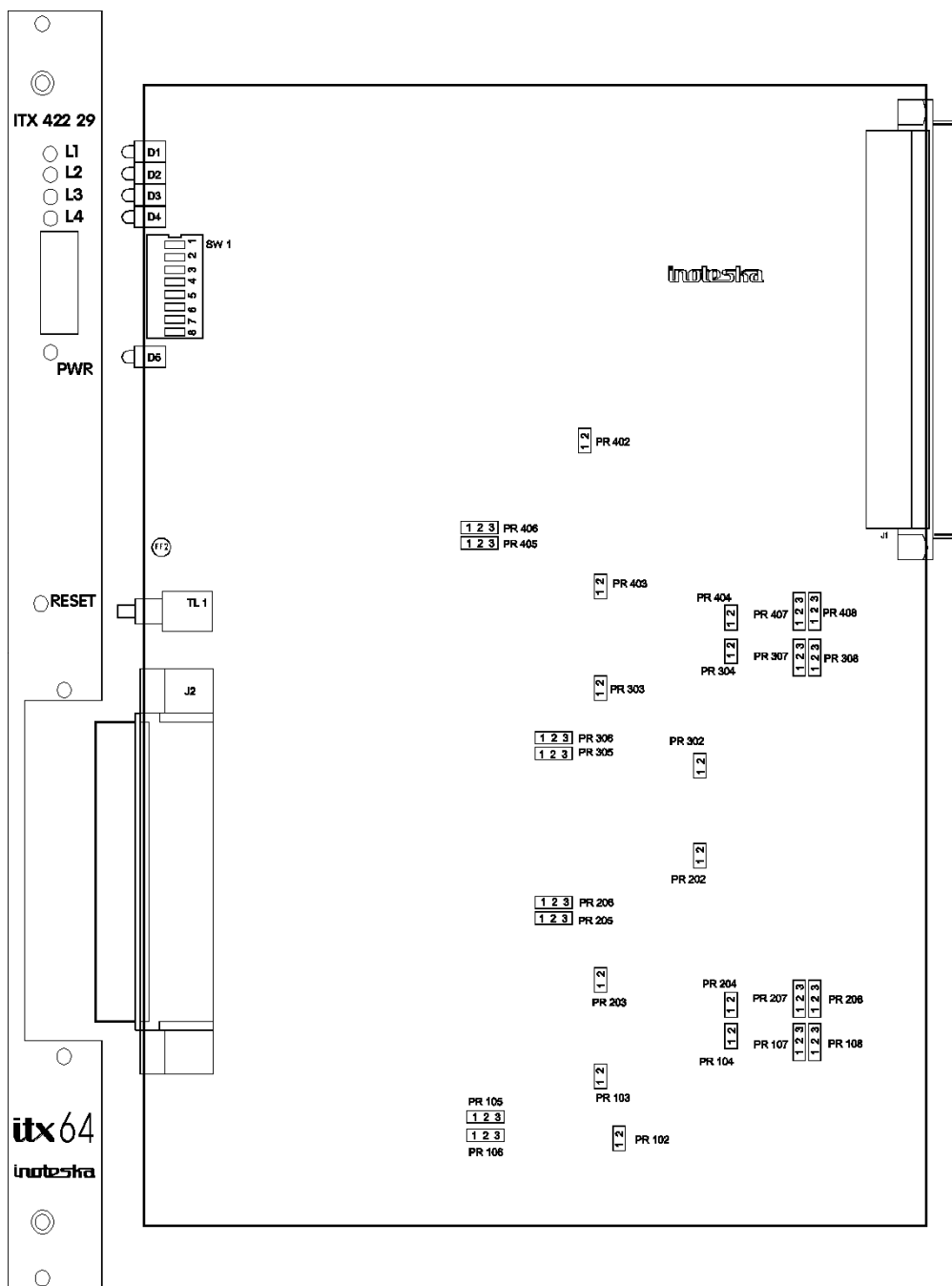
L4 - status of 4. channel

Signification of switches on SW1

1 - signalling *	0 – one-mark	1 – three-mark
2 - diagnostics	0 - no	1 - yes
3 – loop closing when error	0 - no	1 - yes
4 – signalization of not con. line error	0 - no	1 - yes
5 - dial 1. line	0 – pulse	1 - DTMF
6 - dial 2. line	0 – pulse	1 - DTMF
7 - dial 3. line	0 – pulse	1 - DTMF
8 - dial 4. line	0 – pulse	1 - DTMF

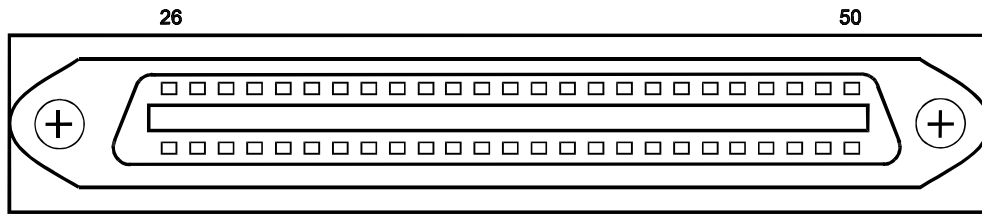
The switches 5 - 8 allow changing the type of dialling for each line. If the PBX is able to receive the DTMF dial, then pulse dialling must be disabled to PBX, because each number will be doubled in the receiver of the PBX (pulse and DTMF).

Note: The digit # is used for end of pulse dial to the PBX.



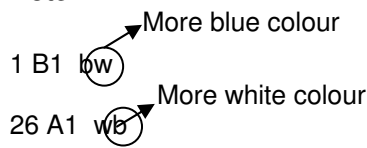
Note: Jumpers allocation on ITX 422 29 and ITX 482 29 is the same.

J 2 connector description for card ITX 422 29 and ITX 482 29



	1		25
1 - B1	bw	26 - A1	wb
2 - Bv1	ow	27 - Av 1	wo
3 - Bvi1	gw	28 - Avi1	wg
4 - B2	brw	29 - A2	wbr
5 - Bv2	grw	30 - Av2	wgr
6 - Bvi2	bp	31 - Avi2	pb
7 - B3	op	32 - A3	po
8 - Bv3	gp	33 - Av3	pg
9 - Bvi3	brp	34 - Avi3	pbr
10 - B4	grp	35 - A4	pgr
11 - Bv4	br	36 - Av4	rb
12 - Bvi4	or	37 - Avi4	ro
13 -		38 -	
14 -		39 -	
15 -		40 -	
16 -		41 -	
17 -		42 -	
18 -		43 -	
19 -		44 -	
20 -		45 -	
21 -		46 -	
22 -		47 -	
23 -		48 -	
24 -		49 -	
25 - 0 V		50 - GFOH	

Note:



Ax, Bx - outgoing speech a, b wires from ITX 422 29
 Aix, Bix –incoming speech a, b wires to ITX 422 29
 Avix, Bvix - input a,b line wires

Avi, Bvi – 4-wire

w-white, b-blue, br-brown, g-green, o-orange, gr-grey, r-red, p-pink

5. TROUBLESHOOTING

6.1 The OPX Station ITZ 910 21

The OPX station's telephone is ringing after power on

- Switch on the OPX S again

The telephone is not working - LED diode PWR is not lighting

- Check the power to OPX S (output of the AC adapter must be 13V to 14 V)
- Check the fuses in OPX S
- Check the battery's voltage

The telephone is without dial tone - LED diode PWR is lighting

- Check proper connection of the telephone
- Check the telephone or change it
- Change the OPX S

The telephone is without dial tone - LED diode LINE is flashing in 1 sec interval

- Check the OPX S if it is transmitting DTMF digits every 4-sec.
- Check the OPX T if it is transmitting DTMF digits every 2-sec.
- Check the line to PBX
- Connect the OPX S to another output from ITX 482 29 / ITX 422 29
- Change the OPX S

The telephone is not ringing

- Check or change telephone
- Make incoming call to OPX S ITZ 910 21 and check the ringing voltage on tip and ring wires of the telephone
- Change the OPX Station

No outgoing call is possible from the OPX Station

- Check a proper setting of the switches according to dial type (switches 5-8 on ITX 482 29 / ITX 422 29)

6.2 The OPX Trunk

The green LED diode does not light

- Check the power supply
- Check the fuse F1 (reserve fuse is in tube fuse F2)
- Change the OPX Trunk

The red LED diode is lighting for every 0.5 s

- Check the voltage on tip and ring wires from PBX
- Change the OPX Trunk

The red LED diode is lighting for every 1 s and acoustic signalisation is working

- Check (measure) line to OPX S or OPX LC
- Check the good function of OPX S (after answer and hang-up the telephone, the OPX S must transmit DTMF marks to line, which are listening in the testing telephone)
- Change the OPX S ITZ 910 21

7. ORDERING INFORMATION

To order the OPX extension, it is necessary to specify separately number of the OPX T ITX 482 29 / ITX 422 29, OPX S ITZ 910 21 and mechanical assemblies.

One OPX T ITX 482 29 / ITX 422 29 provides connection for max. 4 OPX S ITZ 910 21.

Individual box is used for individual assembly of the OPX T ITX 482 29. 19"rack 6u high is used for assembly of max. 10 4-fold cards OPX Ts ITX 422 29. In this case it is necessary to order 19" rack 6U ITP 222 01 and DC/DC convertor ITZ 802 01. Power supply /48V is for rack version ITX 422 29 as well as for desktop version ITX 482 29.

To order the OPX S ITZ 910 21, it is necessary to specify only the number of pieces.