

# AVAYA

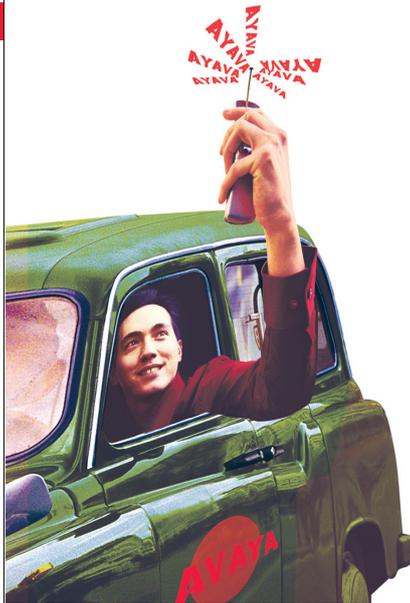
IP Telephony

Contact Centers

Mobility

Services

## Installation Integral 5 easy



User's guide



## Installation manual Integral 5 D/E easy

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Modifications and improvements to the product are possible because of new technical developments.

**Avaya GmbH & Co. KG**



## EU-Declaration of Conformity

### CE Declaration of Conformity

We Avaya GmbH & Co. KG declare that the products I1/I3/I5 (telecommunication systems in various upgrade stages) concur with the basic requirements and other relevant provisions of EC guideline 1999/5/EC concerning on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

The complete Declaration of Conformity can be requested at the following Internet address:

[www.avaya.de/gcm/emea/de/includedcontent/conformity.html](http://www.avaya.de/gcm/emea/de/includedcontent/conformity.html)

or look for „Conformity“ in the index.



The telecommunications systems are intended to be connected to analogue 2-wire interfaces (analogue connection) and digital Euro-ISDN interfaces (base and primary multiplex connection, NTBA or NTPM) of public telecommunication networks within the European Community. The telecommunications systems support radio interfaces in accordance with the DECT standard. The technical details for connecting to the above named public interfaces can be found in the system documentation.

Due to the differences in public telecommunication networks of different states and network providers, this EU conformity with the mentioned EU guidelines is not an absolute guarantee for successful operation in every existing or future telecommunications network.

At present, we are not aware of any public telecommunication network on which this product cannot be operated.

In the event of any problems, please contact your dealer.



## Introduction

This document describes the installation of both systems, **Integral 5 D easy** and **Integral 5 E easy**. The basis of both these systems is the **Integral 5**.

Both systems contain a standard client set (basic programming), so that they are immediately functional after switching on. The special configuration of both systems is achieved by use of the **"ISA"** tool.

Service and customer data can be edited,

on site -	using the system telephone and input of codes
on site -	using a PC (S0, modem, V24)
remotely -	using a PC

The **Integral 5 easy** is designed for universal use, e.g.

as a communication system	
▶ <b>in the office</b>	▶ for self-employed people
▶ <b>in a medical practice</b>	▶ for freelancers
▶ <b>in a legal practice</b>	▶ for private households
▶ <b>in administration</b>	▶ in a hotel
▶ <b>as a central system</b>	etc.
▶ <b>as a serial system (key system)</b>	

This system is driven by software that contains all features described in the "Data Input" handbook.

The system is connected to the exchange by either an ISDN and/or analog connections.

Interfaces:	
▶ <b>digital interfaces for operating system telephones and ISDN/DSS1-compatible end devices such as PCs, terminal adapters, fax (group 4), etc.</b>	▶ analog interfaces for standard telephones or other analog end devices (e.g. fax, modem, speech recorder).
▶ <b>Ethernet interfaces for IP phones using Ethernet release 5 or higher</b>	

The lines for the internal and external communication network (digital / analog subscribers / exchanges) can be plugged in:

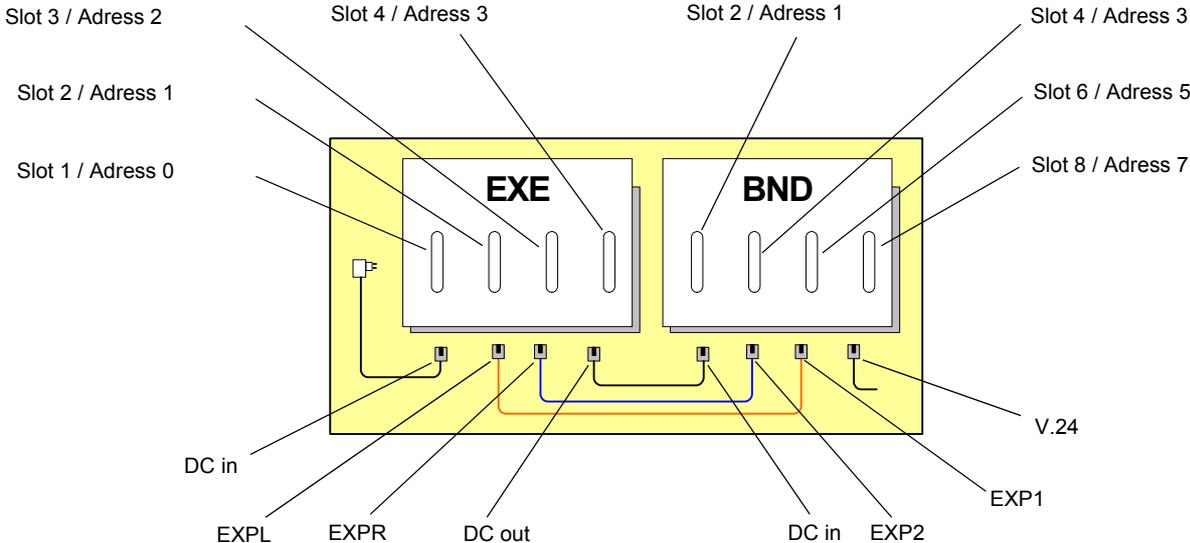
Interfaces:	
▶ <b>plugged directly into the individual socket module</b>	▶ attached to LSA + terminal strips in the distribution box and thence plugged into the individual modules using WE-WE patch cables



A mixed system configuration with direct power supply and emergency power supply (with and without PB1) is not permissible!  
 The system layout rules can be found under  
<http://ucpn.intranet.tenovis.com/unternehmen/marketing/tksysteme/integral5/Konfiguration-Datenblatt/Systemaufbauregel-I5D.pdf>  
 and  
<http://ucpn.intranet.tenovis.com/unternehmen/marketing/tksysteme/integral5/Konfiguration-Datenblatt/Systemaufbauregel-I5E.pdf>

# Integral 5 D easy

The **Integral 5 D easy** is the "smaller" system of the two.

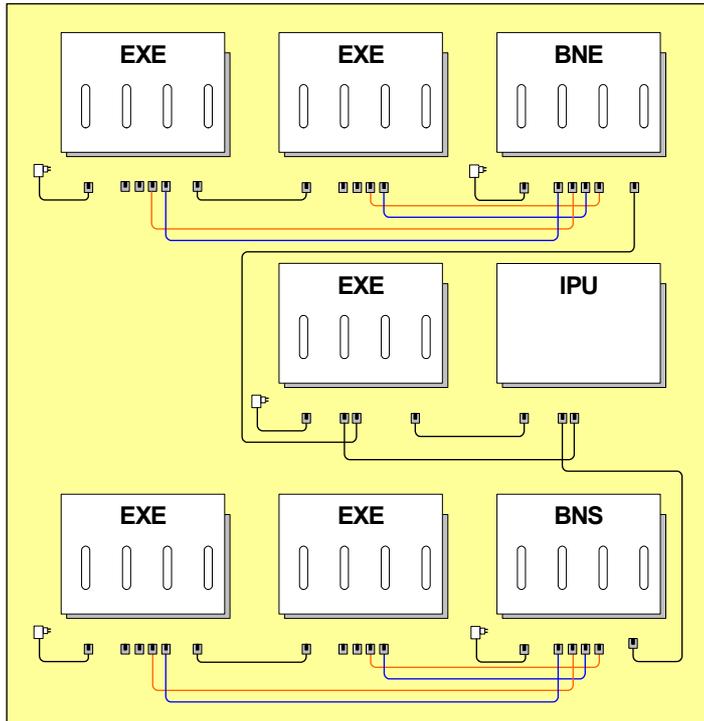


Refer to the chapters identical to the Integral 5 such as "Earthing", "HVT", "Cable channel", "Cable", "Power supply" and "Installation" and also to the module descriptions and "System layout I5 D easy".

The system layout is modular and can comprise the following basic modules and plug-in modules:

Name	LAN/IOM		Name	LAN/IOM	
<b>BND</b>		<b>Basic exchange module</b> ▶ 1 x per system ▶ 4 slots for IOM/LAN plug-in modules ▶ 2 IOM outputs for EXE connections ▶ V24 output ▶ 16 internal IOM channels ▶ 16 external IOM channels	<b>CV1</b>	LAN	Voice controller
<b>EXE</b> (here on BND)		<b>Extension module EXE</b> ▶ controlled by BND ▶ max. 2 x per system ▶ 4 slots for <b>IOM</b> plug-in modules ▶ 2 x IOM inputs	<b>T8S</b>	LAN	4 x S0 fixed, 4 x S0/T0 switchable
<b>DIA</b>	IOM	Integral automatic call recording switchboard	<b>STN</b>		Plug-in mains unit
<b>SXS/S4S</b>	IOM	4 x S0 subscribers	<b>PB1</b>		Emergency power supply
<b>S4A</b>	IOM	4 x a/b subscribers			
<b>M4A</b>	IOM	3 x a/b lines, 1 x a/b subscriber			
<b>S4D</b>	IOM	4 x UPN for 2 x DECT-RBS			
<b>MA2</b>	IOM	1 x a/b line, 1 x a/b subscriber			
<b>DSI</b>	IOM	1 x door station (2-wire, 4-wire), 1 x FSP			
<b>MS4</b>	IOM	2 x T0, 2 x S0			

## Integral 5 E easy



The **Integral 5 E easy** is the "smaller" system of the two. As well as the IOM plug-in modules on the EXE, the LAN plug-in modules on the EXE can also be used here.

Refer to the chapters identical to the Integral 5 such as

"Earthing",

"HVT",

"Cable channel",

"Cable",

"Power supply" and "Installation"

**and also to the module descriptions and "System layout I5 E easy".**

The system layout is modular and can comprise the basic modules and plug-in modules:

Name	LAN/IOM	
BNE		<b>Basic exchange module</b> <ul style="list-style-type: none"> <li>▶ 1 x per system</li> <li>▶ 4 slots for IOM/LAN plug-in modules</li> <li>▶ 4 IOM outputs for EXE connections</li> <li>▶ 1 LAN output</li> <li>▶ in contrast to the BND, no V24 output (slot 2)</li> <li>▶ 16 internal IOM channels</li> <li>▶ 32 external IOM channels</li> </ul>
BNS		Slave module <ul style="list-style-type: none"> <li>▶ 16 internal IOM channels</li> <li>▶ 32 external IOM channels</li> </ul>
EXE (here on BNE/ BNS)		<b>Extension module EXE</b> <ul style="list-style-type: none"> <li>▶ max. 12 x per system                             <ul style="list-style-type: none"> <li>▶ 4 x on BNE</li> <li>▶ 4 x on BNS</li> <li>▶ 4 x LAN</li> </ul> </li> </ul>
IPU		Internet protocol unit <ul style="list-style-type: none"> <li>▶ max. 2 x per system</li> </ul>
DIA	IOM	Integral automatic call recording switchboard
SXS/S4S	IOM	4 x S0 subscribers
S4A	IOM	4 x a/b subscribers
M4A	IOM	3 x a/b lines, 1 x a/b subscriber
S4D	IOM	4 x UPN for 2 x DECT-RBS - 4 channels
MA2	IOM	1 x a/b line, 1 x a/b subscriber
DSI	IOM	1 x door station (2-wire, 4-wire), 1 x FSP
MS4	IOM	2 x T0, 2 x S0

Name	LAN/IOM	
S8P	IOM	8 x UPN 2-wire
PRI	LAN	Primary Rate Interface
CV1	LAN	Voice controller
S8D	LAN	8 x UPD for 4 x DECT-RBS, 7 channels
T8S	LAN	4 x S0 fixed, 4 x S0/T0 switchable
STN		Plug-in mains unit
PB1		Emergency power supply

## Earthing

The PABX Integral 5 easy must be earthed for safety reasons.

Pertinent regulations: **DIN EN 60950 "Safety of information technology systems"**

The Earthing and Potential Equalisation of the I5 System must comply with relevant national installation regulations.

For instance, for Germany: VDE 800 part 2, or also generally EN 50310.

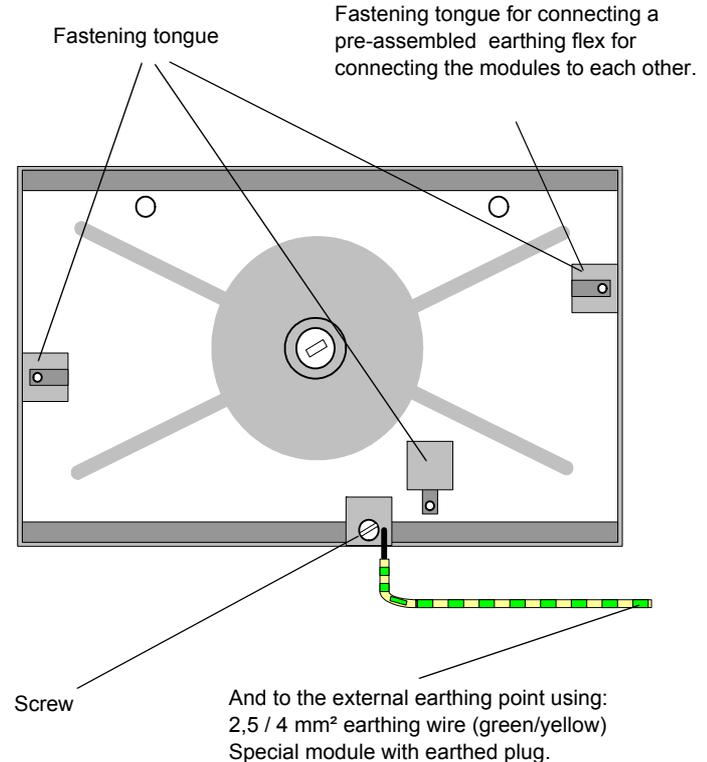
Earthing is provided		
either	▶	using a separate earthing wire (green and yellow) from the potential equalization strip of the building to the earthing terminal of the BNx module.
	▶	Make sure that: <ul style="list-style-type: none"> <li>▶ The absolute minimum cross-section of the separately laid protective earths PE is 2.5 mm<sup>2</sup>, if mechanical protection (e.g.: conductors sheathed in a cable, in a cable duct or conduit),</li> <li>▶ otherwise it must be 4 mm<sup>2</sup></li> </ul>
or	▶	by a lockable earthing plug (via the earthing wire of the wall socket) (special earthed plug with cable).

## BNx from below with earthing connections

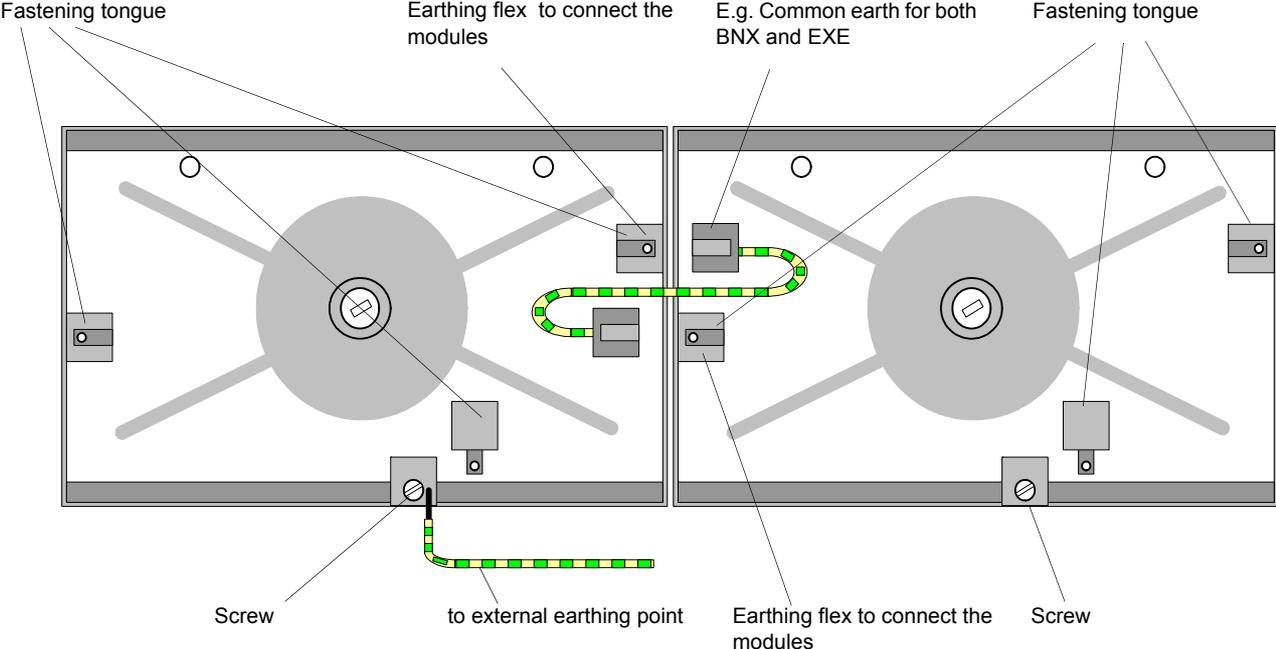
For a system layout with one BNx and several EXE / IP modules, the EXE / IP modules must also be earthed. The earthing connections between modules are made using pre-assembled earthing flexes with 4.8 mm Faston tongues. The link to the external earthing point (potential equalisation rail in the building) is made using a green and yellow earthing wire of 2.5 or 4 mm<sup>2</sup> cross-section with a module (screw). Alternatively a special earthing plug can be used.

When installing, the module with the earthing connection must first be connected to the external earthing point, to establish an effective earth. Only then can further modules be installed. Disassembly should be performed in the reverse order.

No analog exchange line may be connected to / plugged into an MA2 or M4A module unless the I5 systems are earthed.



**BNx and EXE from below with earthing connections**



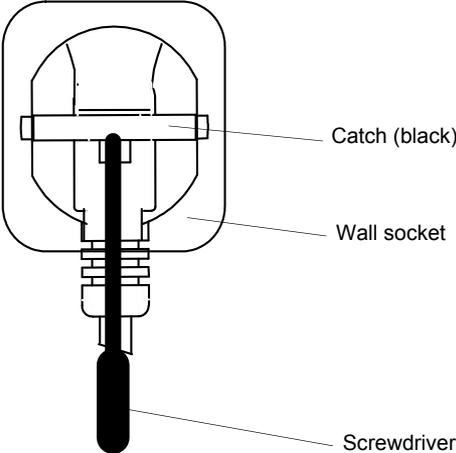
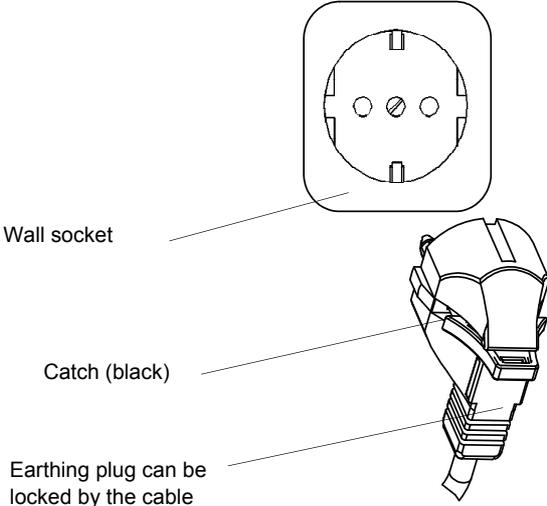
## Earthing plug

Earthing plug		
<b>Permanent earth for PABX Integral 5 easy via the earth wire of the wall-mounted socket with lockable grounded plug (earthing-pin plug with cable 49.9804.5750)</b>		
<b>Connecting Earthing Cable to PABX Integral 5 easy</b>	▶	1. Connect the protective conductor (green/yellow) of the grounded plug to the earth terminal on the module
	▶	2. Insert the grounded plug into the wall socket and press in the black bar, the plug is now locked.
<b>Unlock and remove the grounded plug</b>	▶	1. Use a screwdriver to pull out the black bar by approx. 10 mm.
	▶	2. The plug is unlocked and can be removed
<b>Always plug the grounded plug directly into the wall socket and never into a multiple adapter!</b>		

**Example of earthing using an earthing plug**

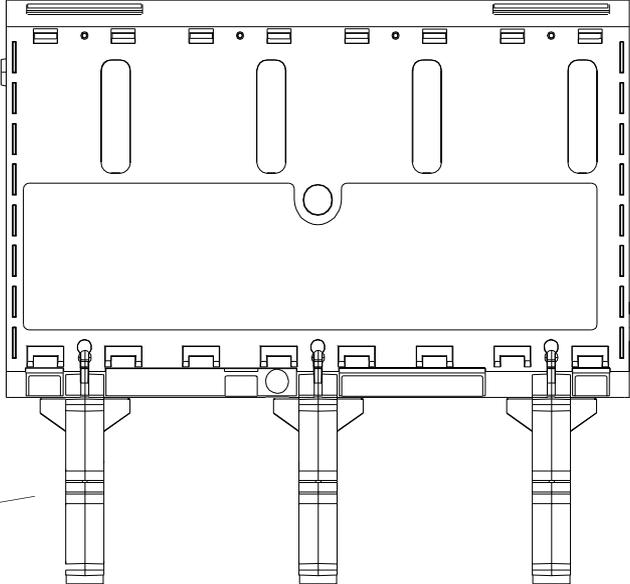
Locking the grounded plug

Unlocking the grounded plug





# Cable channel

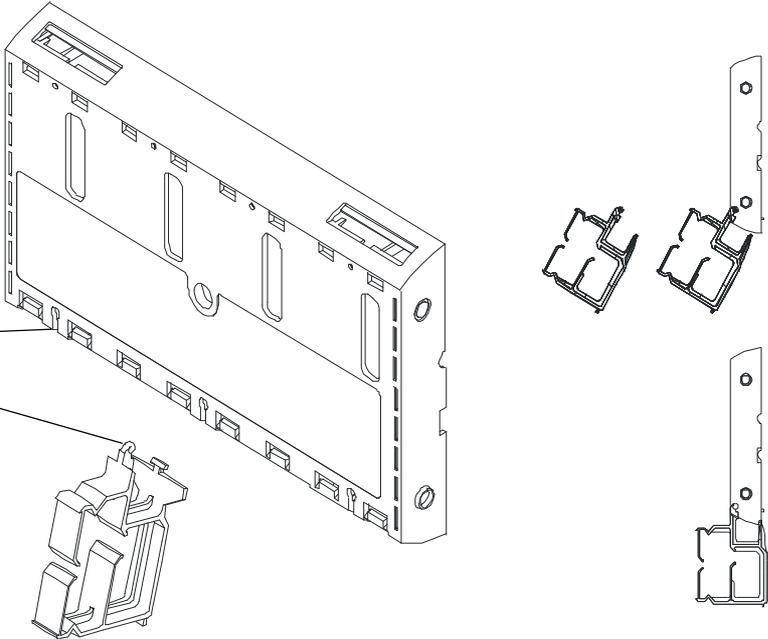


The BNx and EXE are always delivered with cable channel racks engaged and with cable channel covers mounted.

Delivery of the PB1 is without cable channel racks and cable channel cover.

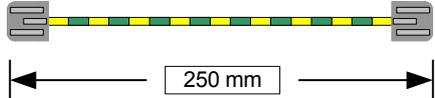
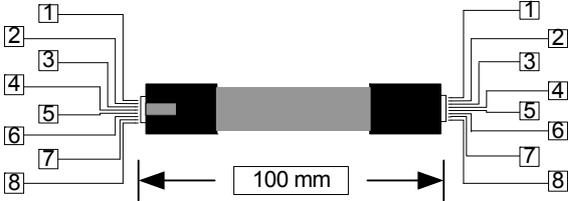
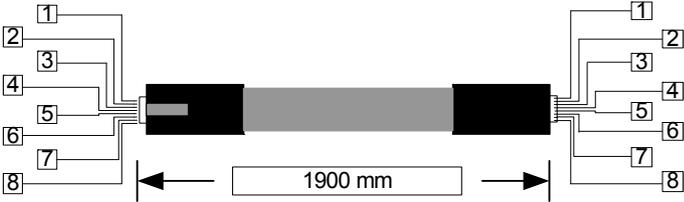
### Install the cable channel

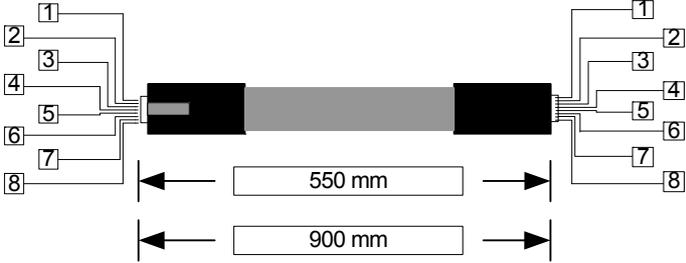
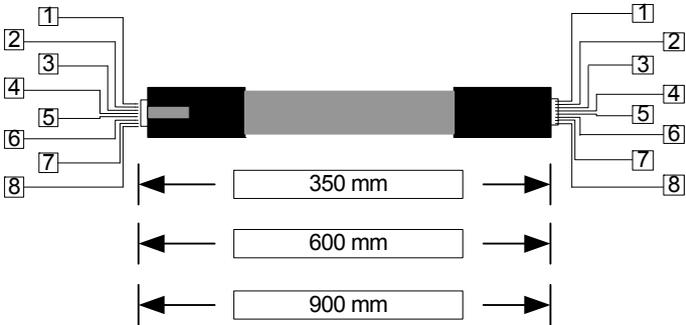
The "nose" of the cable channel rack should engage in the recess "Engagement point for cable channel rack" on the BNx, EXE or IP modules, and click into place by "Pressing home".

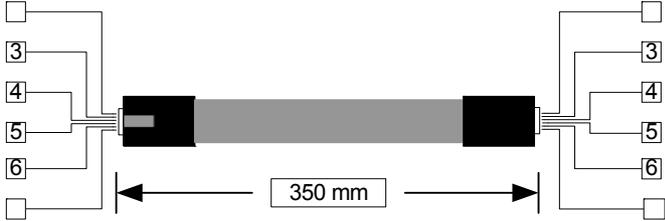
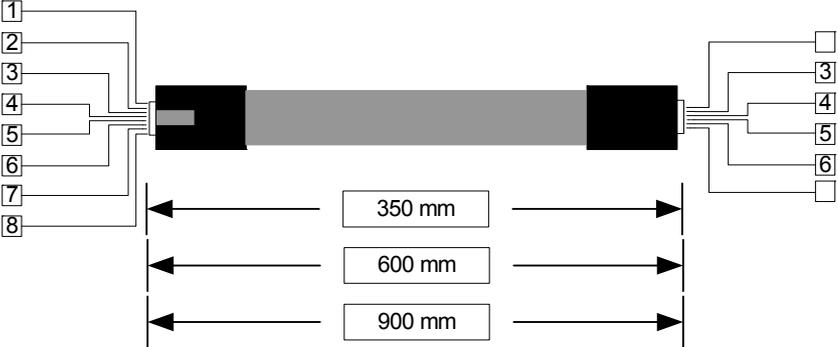


## Cables

### Cables particular to the I5

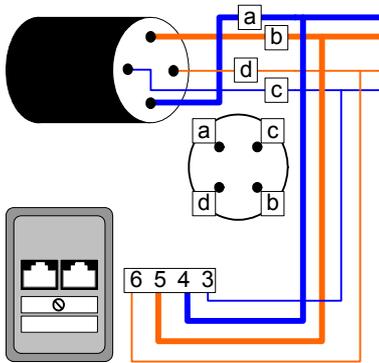
Cables	Type	Length	Information
	<p><b>Work lead</b></p>	<p>250 mm</p>	
	<p><b>SV cable</b></p> <p>Power supply between the basic modules</p>	<p>100 mm</p>	
	<p><b>V24 cable</b></p>	<p>1,900 mm</p>	

Cables	Type	Length	Information
 <p>Diagram of an expansion cable with 8 conductors. The cable has a central grey section and two black end sections. Dimensions are shown as 550 mm for the central section and 900 mm for the total length.</p>	<p><b>Expansion cable</b></p>	<p>550 mm or 900 mm</p>	
 <p>Diagram of a LAN cable with 8 conductors. The cable has a central grey section and two black end sections. Dimensions are shown as 350 mm, 600 mm, and 900 mm for different sections of the cable.</p>	<p><b>LAN cable</b> CAT5</p>	<p>350 mm or 600 mm or 900 mm</p>	

Cables	Type	Length	Information
	<p><b>Patch cable 6 / 6</b> MDF</p>	<p>350 mm</p>	
	<p><b>Patch cable 8 / 6</b> MDF plug-in module</p>		

Cables	Type	Length	Information
<p>Diagram illustrating the Y cable configuration. The cable has two lengths: 550 mm and 900 mm. The 550 mm version has a 5-pin connector on each end. The 900 mm version has a 5-pin connector on one end and an 8-pin plug-in module on the other. The plug-in module has two 5-pin RJ45 ports. The wiring is as follows: Cable 1 (left) has pins 1-a, 2-b, 3-c, 4-d, 5-e, 6-f, 7-g, 8-h. Cable 2 (right) has pins 2-e, 3-f, 4-g, 5-h. The 550 mm version has a 5-pin connector on each end with pins 2-a, 3-b, 4-c, 5-d. The 900 mm version has a 5-pin connector on one end with pins 2-a, 3-b, 4-c, 5-d and an 8-pin plug-in module on the other with pins 1, 2, 3, 4, 5, 6, 7, 8. The plug-in module has two 5-pin RJ45 ports with pins 2, 3, 4, 5, YR and 2, 3, 4, 5, YL.</p>	Y cable  MDF plug-in module	550 mm or 900 mm	

Installation cable



Installation cable to VDE 0815	Type
I-2Y2Y(St)(Zg)2Y ... St III Bd	NT to last UAE socket 180 m
I-Y(St)Y ...LG or I-Y(St)Y ...Bd	NT to last UAE socket 130 m
I-H(St)H ...Bd	NT to last UAE socket 120 m
I-Y(St) ...Bd	NT to last UAE socket 120 m

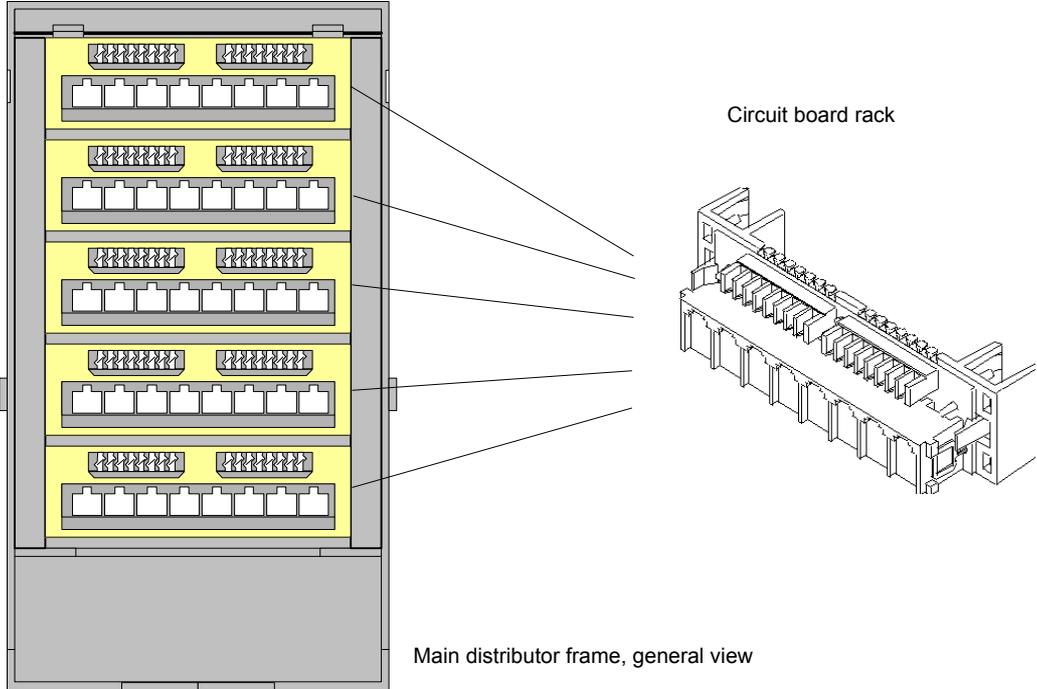
Installation cable to VDE 0816	Type
A-2YF(L)2Y ... St III Bd	NT to last UAE socket 180 m

UAE circuit

The cable has two twisted pairs a/b and c/d  
 UAE: a -> 3, b ->6, c -> 4, d -> 5  
 Be careful not to transpose the wires within a pair!  
 1. Twisted pair: a = white, b = brown  
 2. Twisted pair: c = green, d = yellow



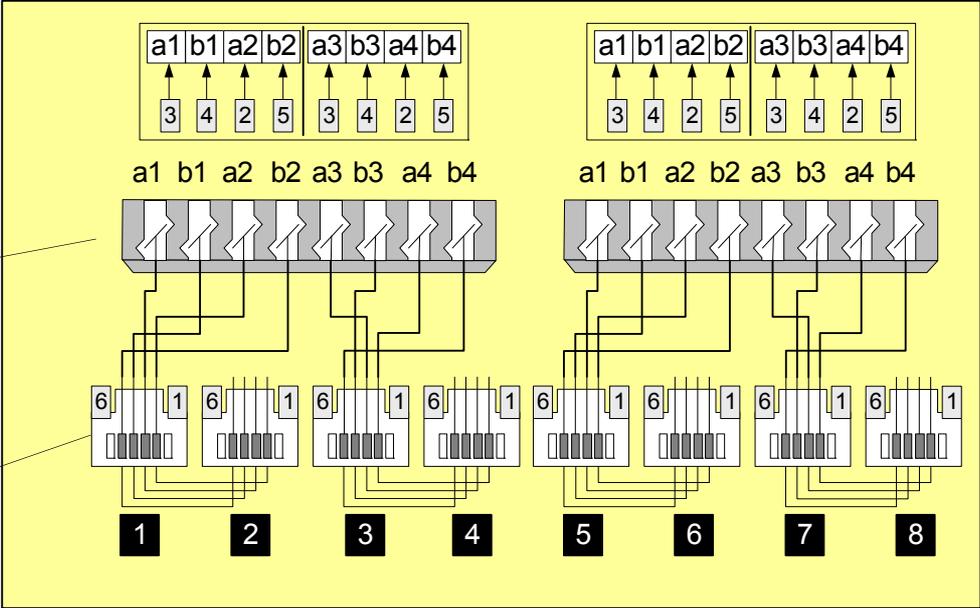
# Main distributor frame (20 ports)



Internal Switching Circuit Board

2 LSA+ strips, 8-pin

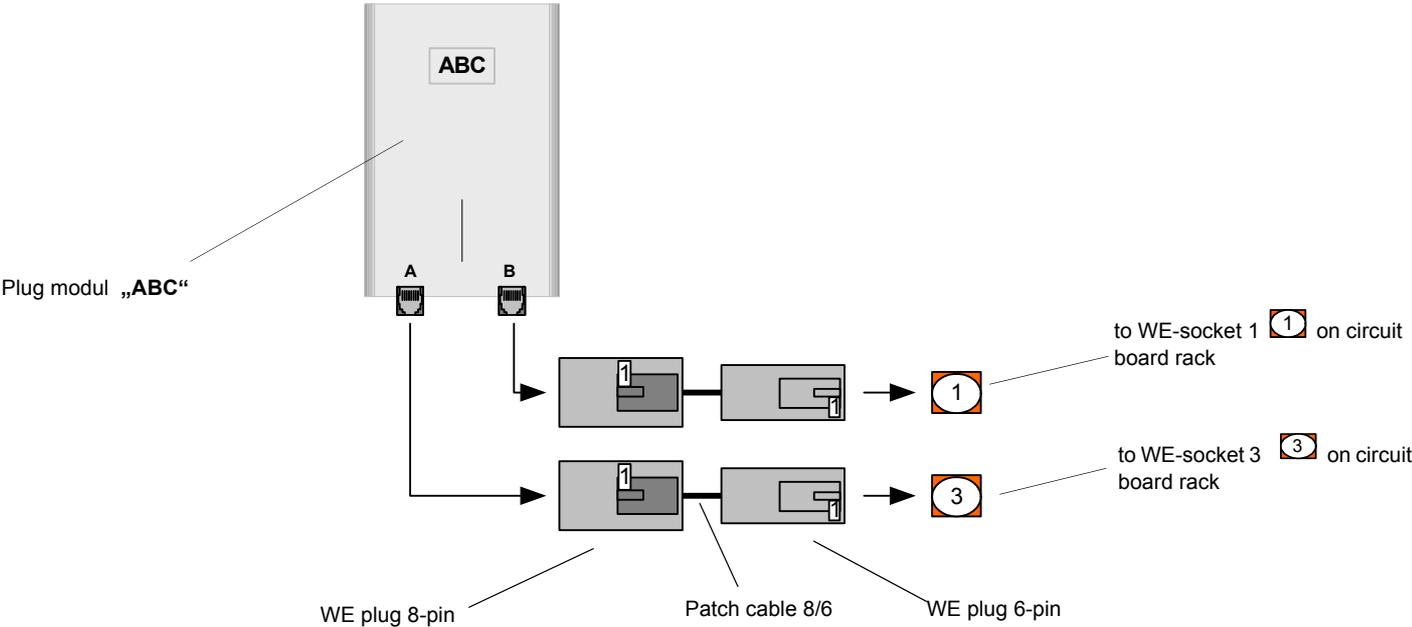
Western sockets 6-pin



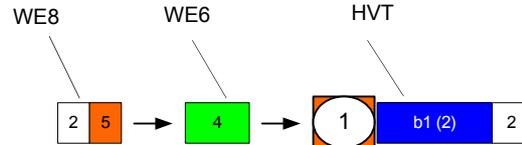
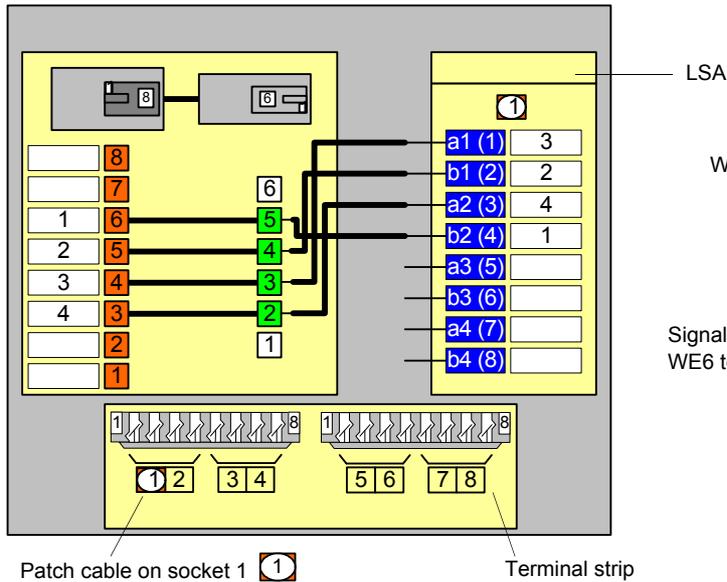
## Short description of main distributor frame

Short description of main distributor frame	
<b>Function</b>	Main distributor frame for connecting 20 ports
<b>Width</b>	123 / 120 mm (corresponding to half the BNx width)
<b>Height</b>	180 / 175 mm (corresponding to height of BNx plus height of cable channel)
<b>Mounting</b>	with 2 screws
<b>Components</b>	<ul style="list-style-type: none"> <li>▶ Installation base</li> <li>▶ Printed circuit board rack</li> <li>▶ Cover</li> </ul>
<b>Expansion</b>	max. 5 circuit board racks (for each of 4 ports)
<b>Layout</b>	<ul style="list-style-type: none"> <li>▶ 8 Western sockets 6-pin</li> <li>▶ 2 LSA+ strips, 8-pin</li> </ul>
<p><b>Always mount the MDF to the right of the modules!</b></p> <p><b>Slide the circuit board rack with the LSA+ strips upward, the Western plugs downward, into the guides in the main distributor frame.</b></p>	

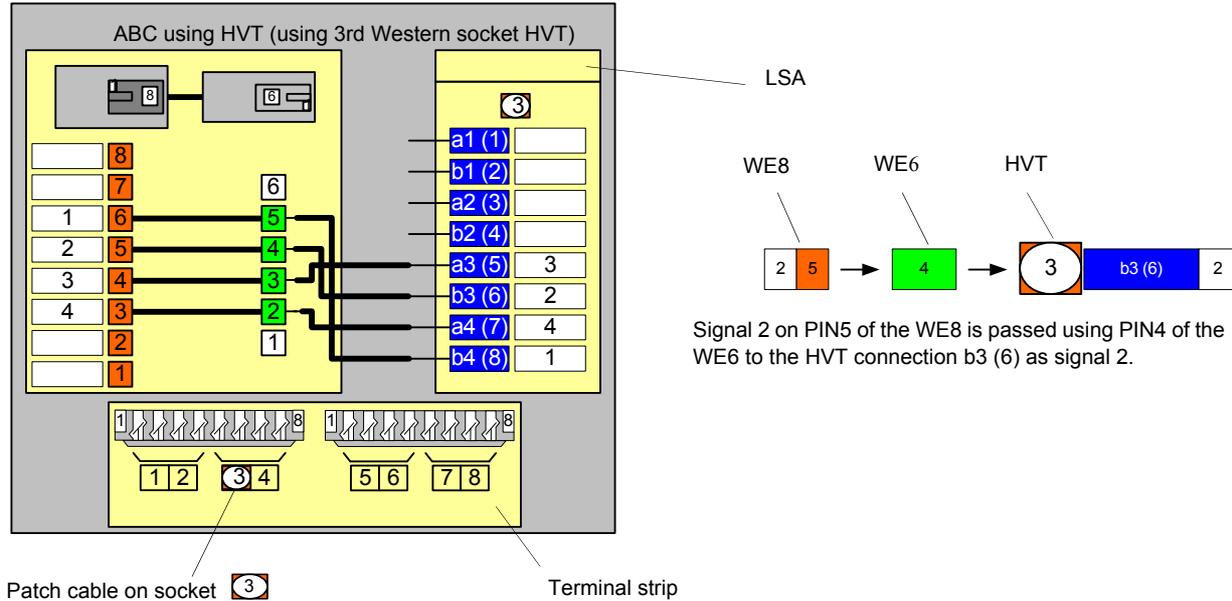
Patch cables – MDF for further illustrations

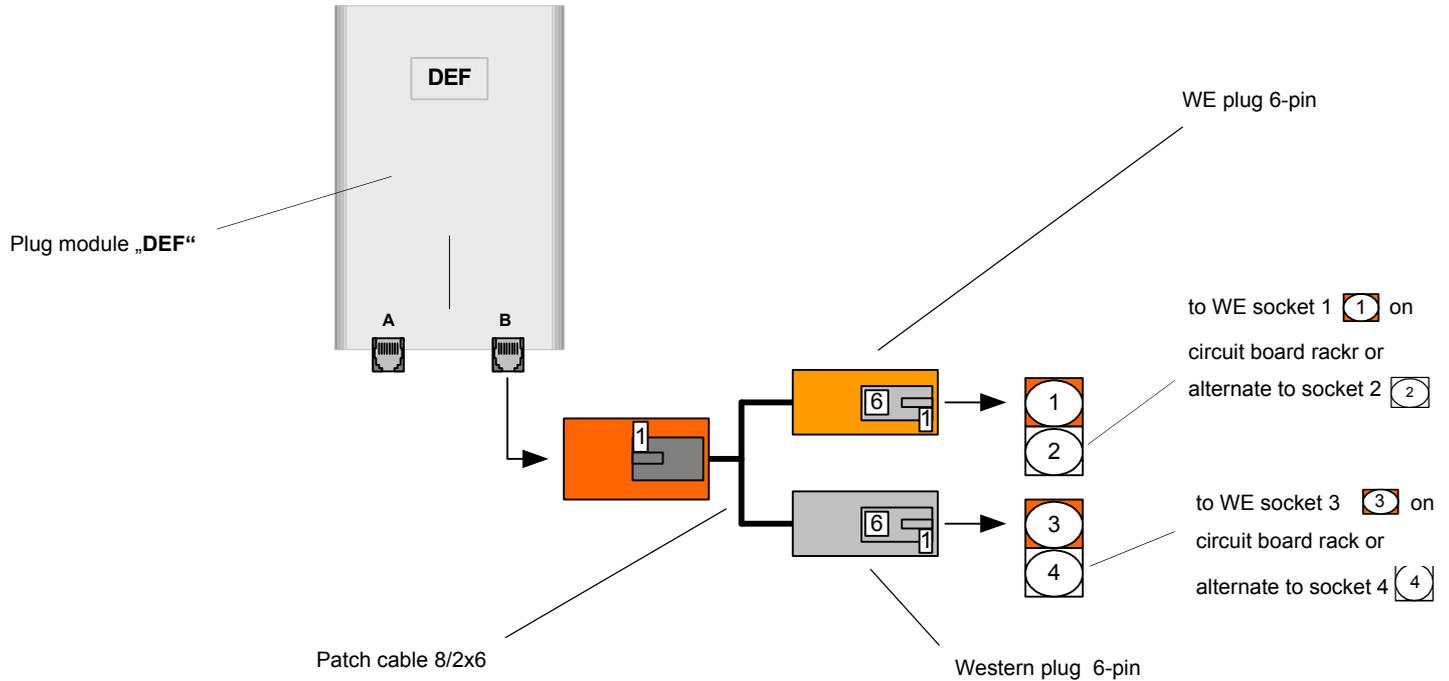


ABC using HVT (using 1st Western socket HVT)



Signal 2 on PIN5 of the WE8 is passed using PIN4 of the WE6 to the HVT connection b1 (2) als Signal 2.



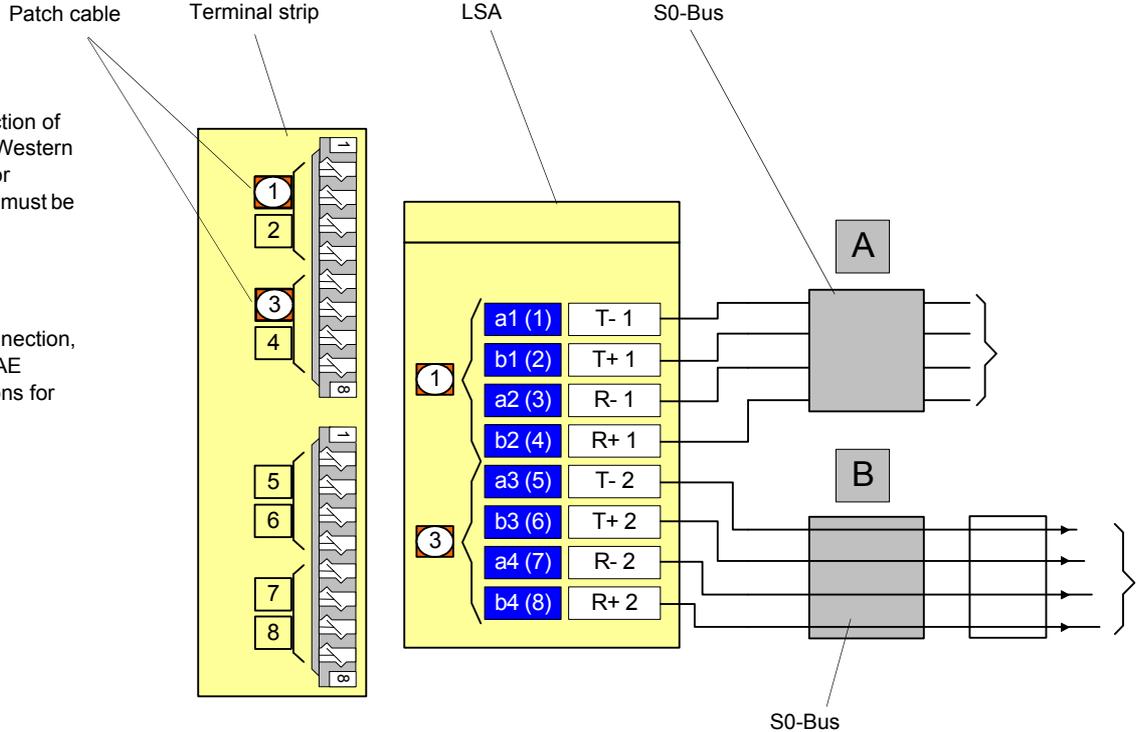


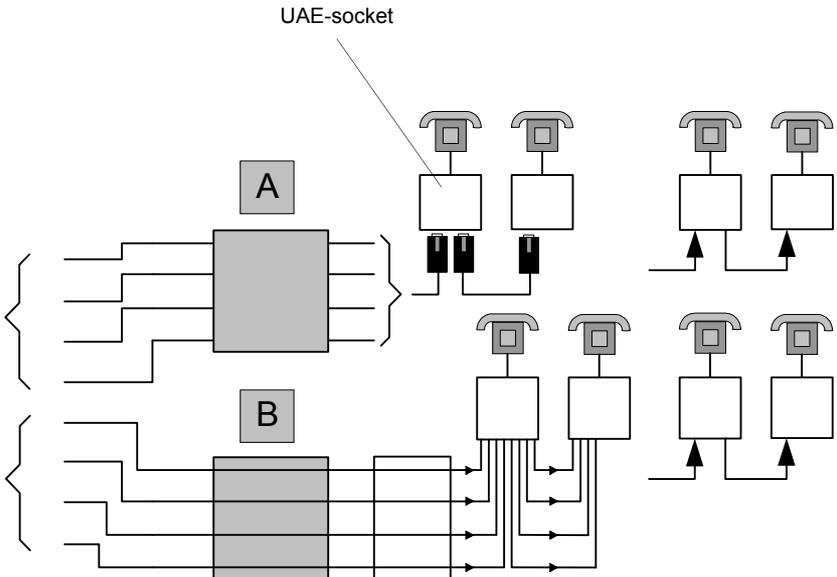


## Connection variants for S0 bus to 2 bus subscribers

**A)** shows the serial connection of two bus subscribers using Western cables with UAE sockets for distribution. S0 subscribers must be close by to the unit.

**B)** shows like **A)** a serial connection, but bypassing the series UAE socket with cable connections for greater distances.

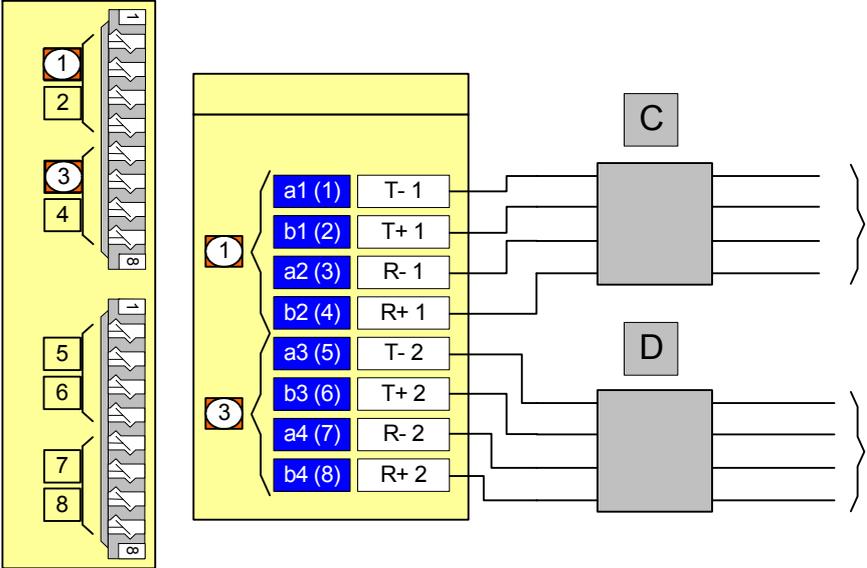


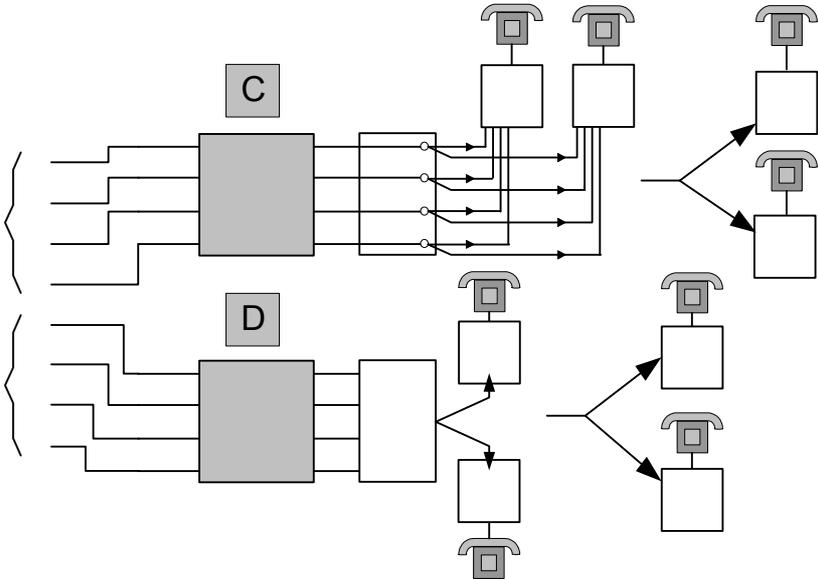


**C)** shows a Y cable arrangement installed by the client using the series UAE socket and cable connections.

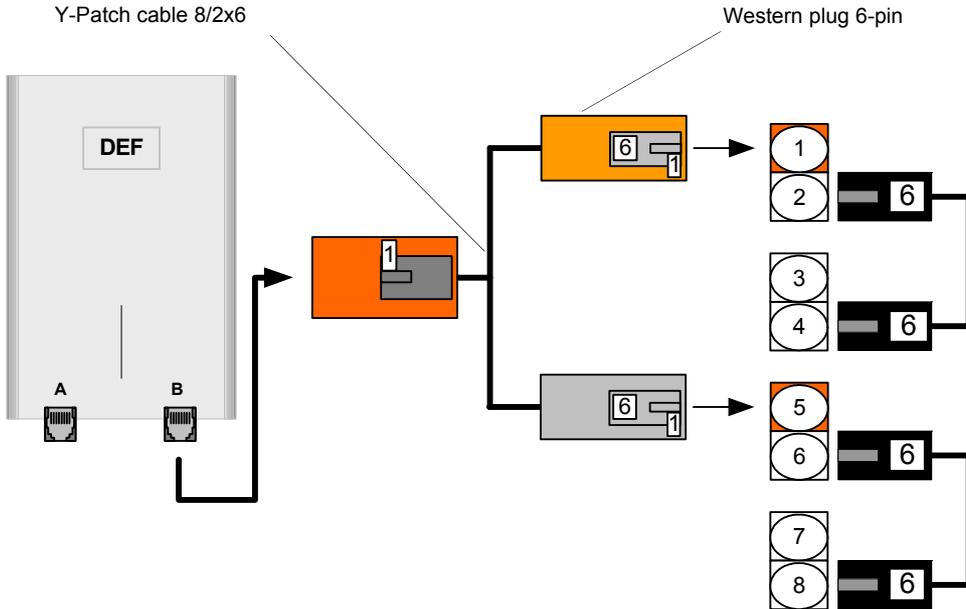
**D)** shows like **C)** a Y cable arrangement, but using the main distributor frame (MDF).

The next illustrations show the properties of a Y cable arrangement on the MDF.





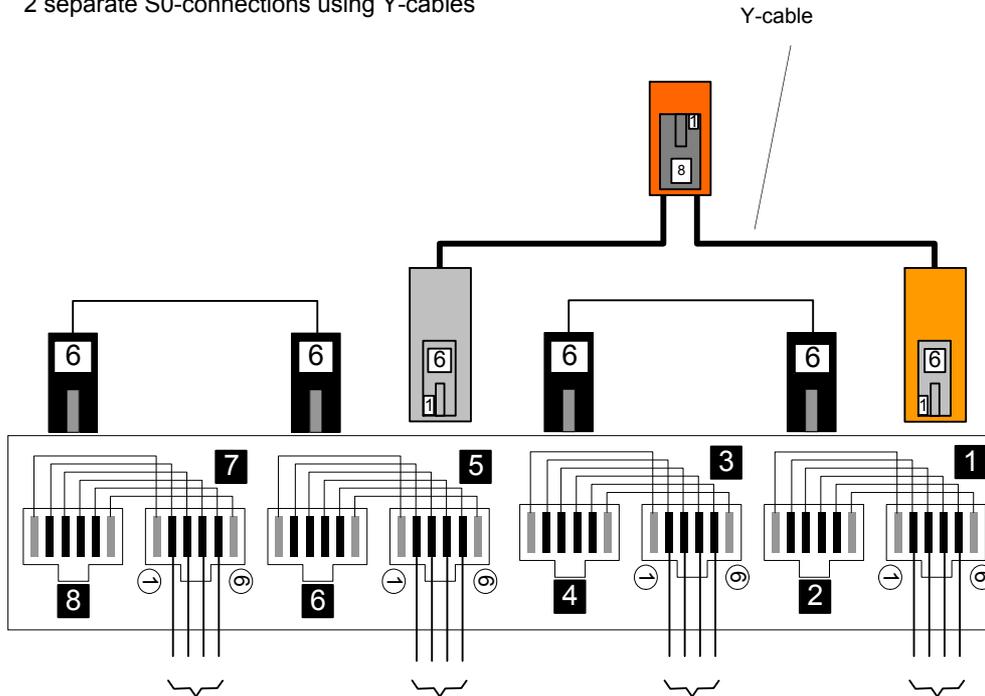
## Star S0 bus using MDF



Only a **single** wire can be attached to each contact (1 - 8) of the terminal strip. If only one S0 bus is plugged in, e.g. to the socket **1** (in the lower illustration), then the terminal **4 3 2 1** are not available for creating an external Y bus. The solution is shown in the next illustration.



2 separate S0-connections using Y-cables

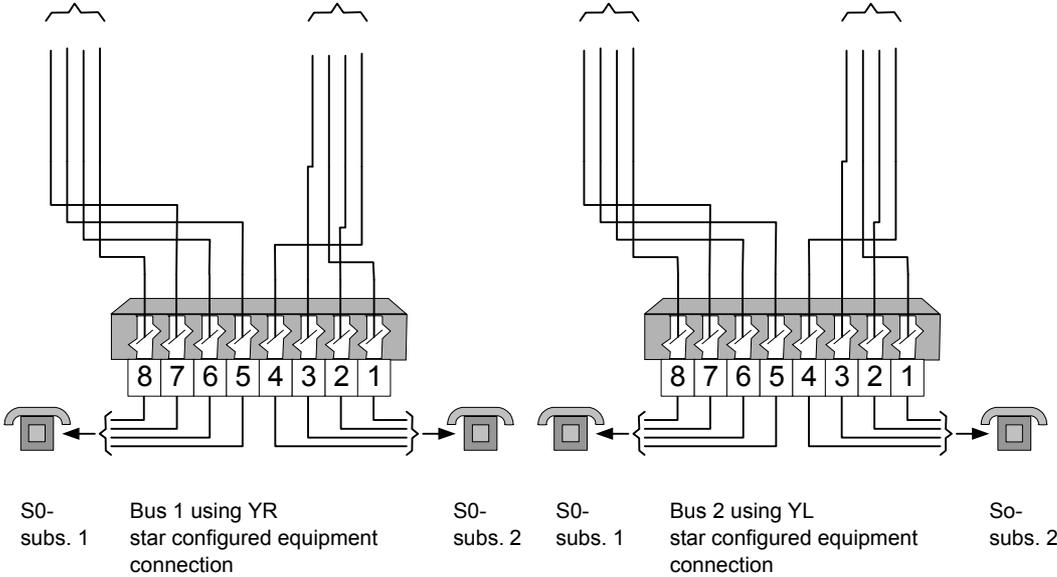


Only a **single** wire can be attached to each contact (1 - 8) of the terminal strip. If only one S0 bus is plugged in, e.g. to the socket **1** (in the lower illustration), then the terminals **4 3 2 1** are not available for creating an external Y bus. The solution is shown in the next illustration.

**Example:**

Using the Y cable (YL), bus 2 is plugged into the Western socket 1. Using LSA contacts 1-4 an S0 unit (S0 subs 2) can be connected. Western sockets 2 and 4 are connected using a 6-pin patch cable. This leaves Western socket 3, corresponding to LSA contacts 5-8, available for connecting a further S0 unit (S0 subs 1). Bus 2 is now wired in star layout. A further bus, corresponding to bus 2, can now be attached to the Y cable (YR).

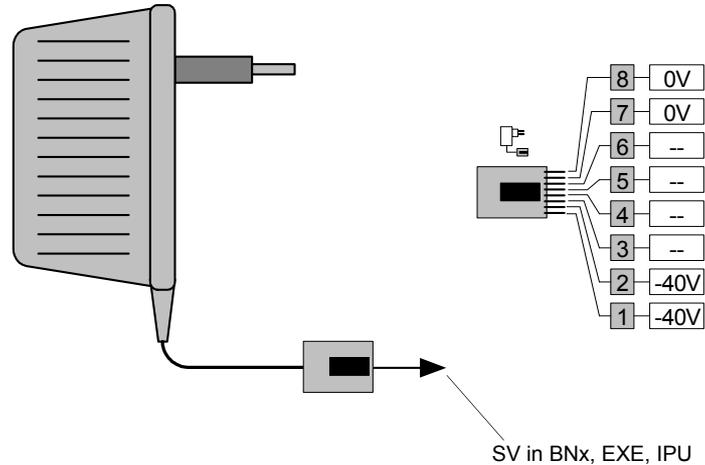
In this way 2 S0 busses, each with 2 S0 units for an external Y network can be connected to a single MDF circuit board



A further bus, corresponding to bus 2, can now be attached to the Y cable (YR).  
 In this way 2 S0 busses, each with 2 S0 units for an external Y network can be connected to a single MDF circuit board.

## Power supply

### Plug-in mains unit



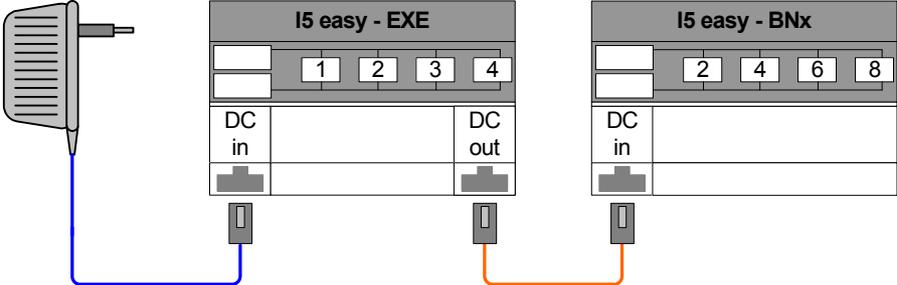
The diagram shows the plug-in mains unit for use with the Integral 5 D/E easy.

The following diagrams show where the plug-in mains unit should be connected and how many plug-in mains units should be connected.

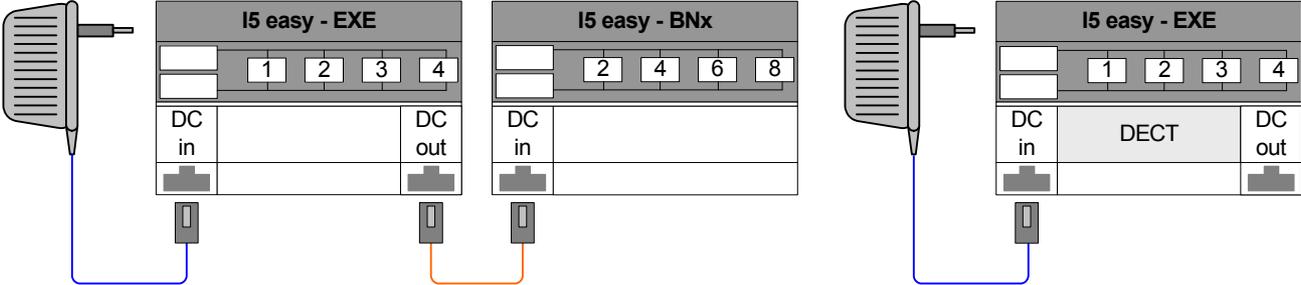
- Any possible IOM or LAN connections are not shown in the diagrams.

### Connection conditions for the plug-in mains unit

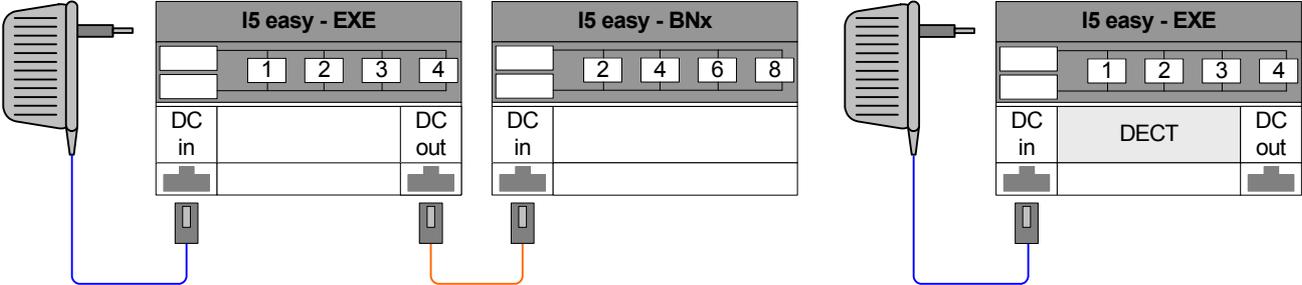
► The rule is, **one** plug-in mains unit can supply 1 x BNx plus 1 x EXE, or 2 x EXE.



► For a combination of 1 x BNx and 2 x EXE the diagram is as follows:



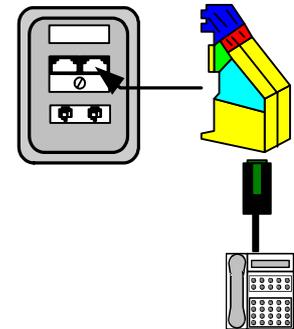
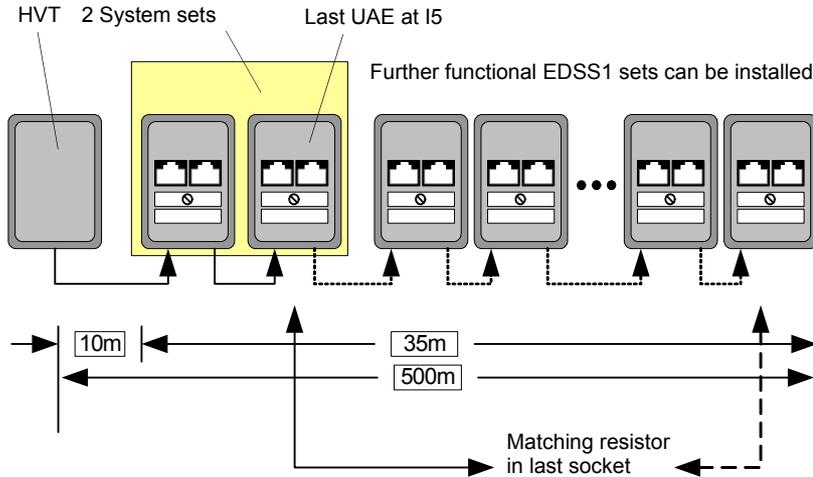
▶▶ If an EXE is fitted with DECT modules (max. 4 x S4D or max. 2 x S8D), the EXE should have its own separate power supply, **even in the minimum configuration.**



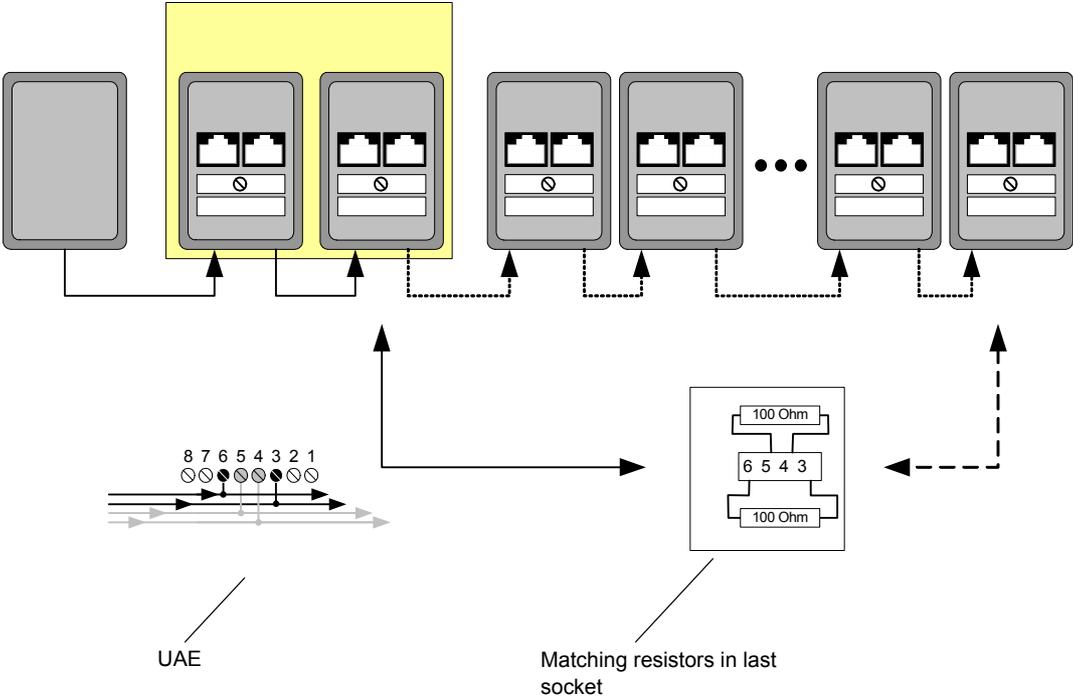
# Wiring

## S0 subscriber – classic S0 wiring

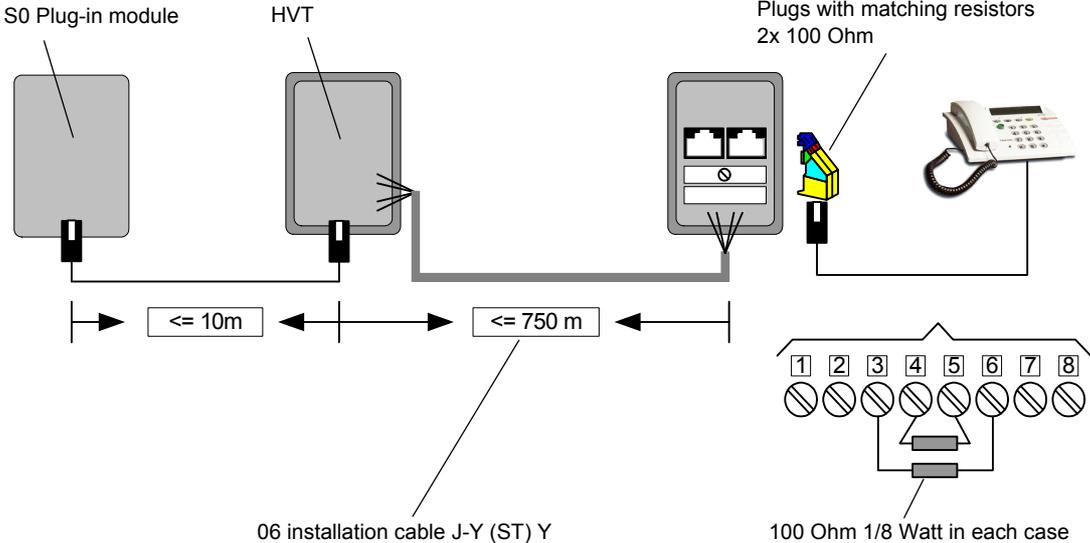
The S0 bus is looped into all UAE sockets.  
 Only two S0 system instruments are permitted on the Integral 5 S0 module bus.  
 The last UAE socket must have a terminating resistors fitted.



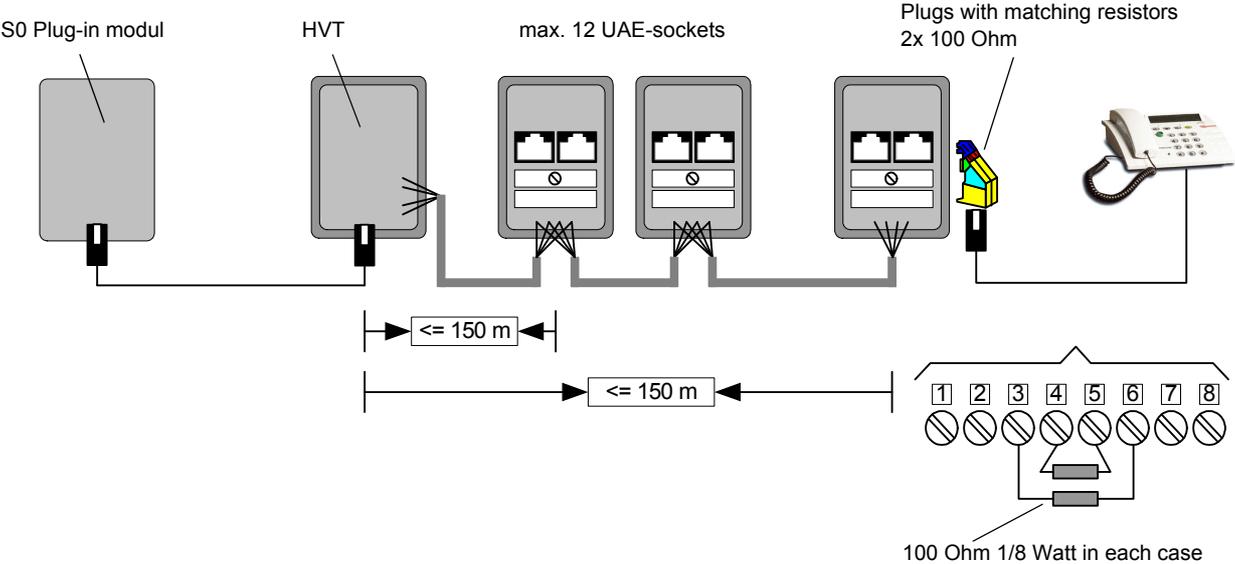
Terminating resistors and Western socket for accepting an S0 instrument, incorporated in a single plug



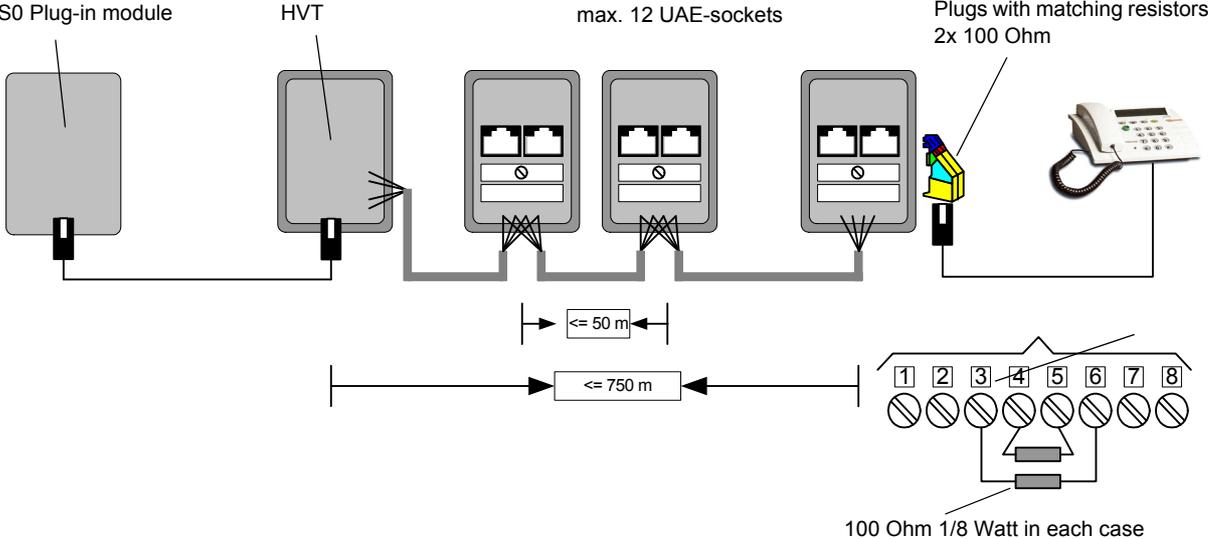
S0 subscriber – point-to-point wiring



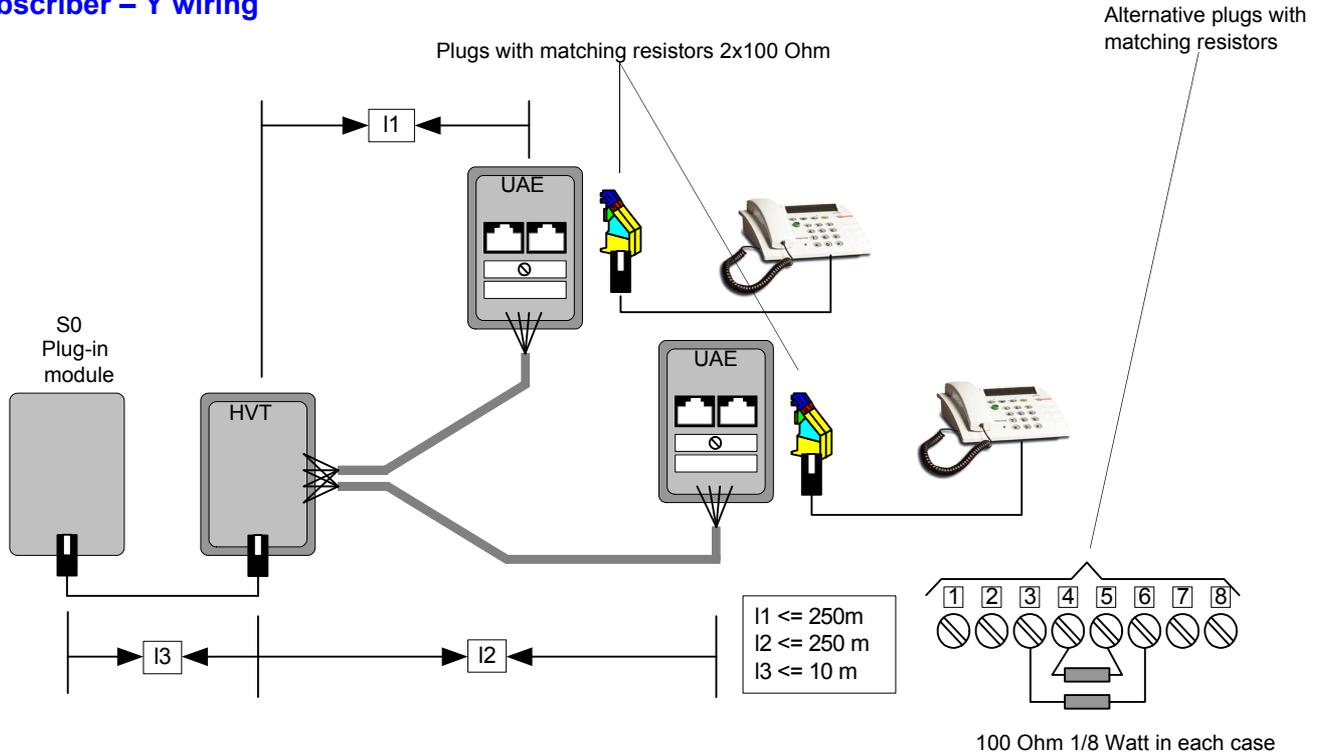
### S0 subscriber – point-to-multiple-point wiring (passive bus)



**S0 subscriber – point-to-multiple-point wiring (extended passive bus)**

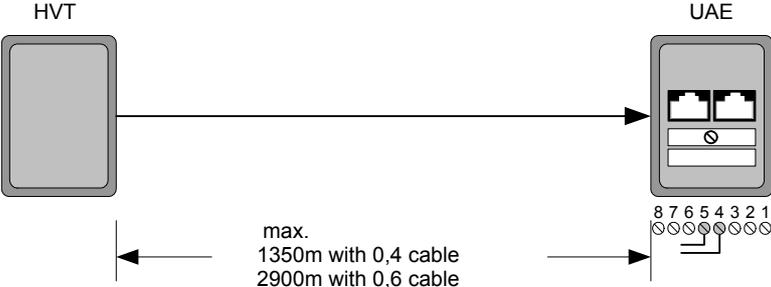


### S0 subscriber – Y wiring



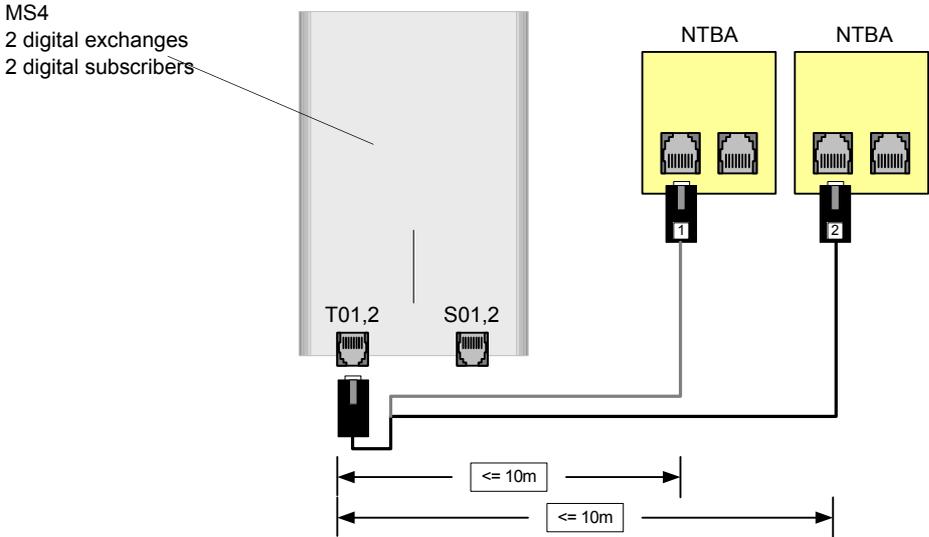
The wired lengths of I1 and I2 must not differ by more than 50 m.

Analog subscribers / UPN subscribers



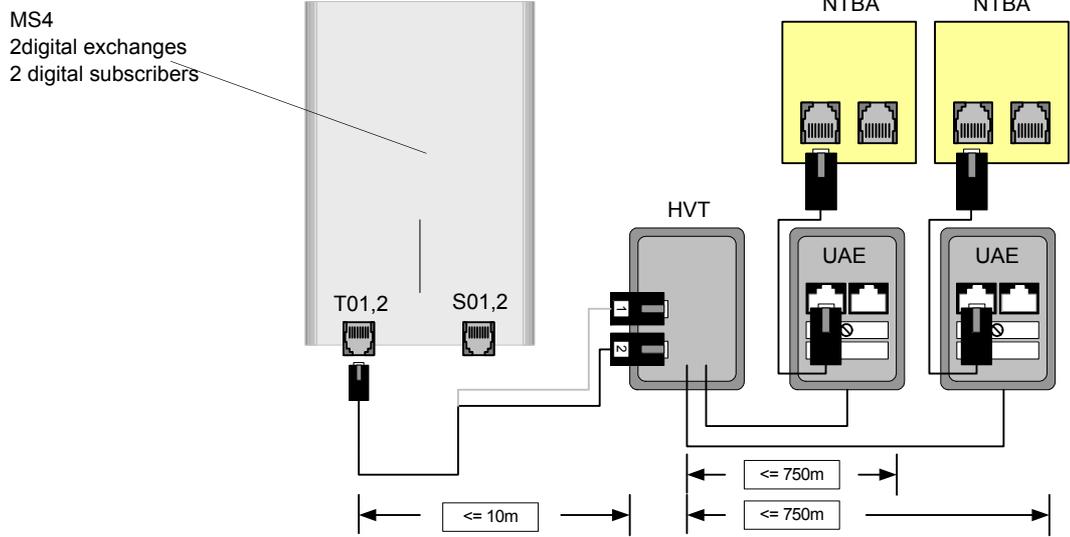
### Connection T0 to NTBA (TK and MSN)

Direct connection (preferred connection option)



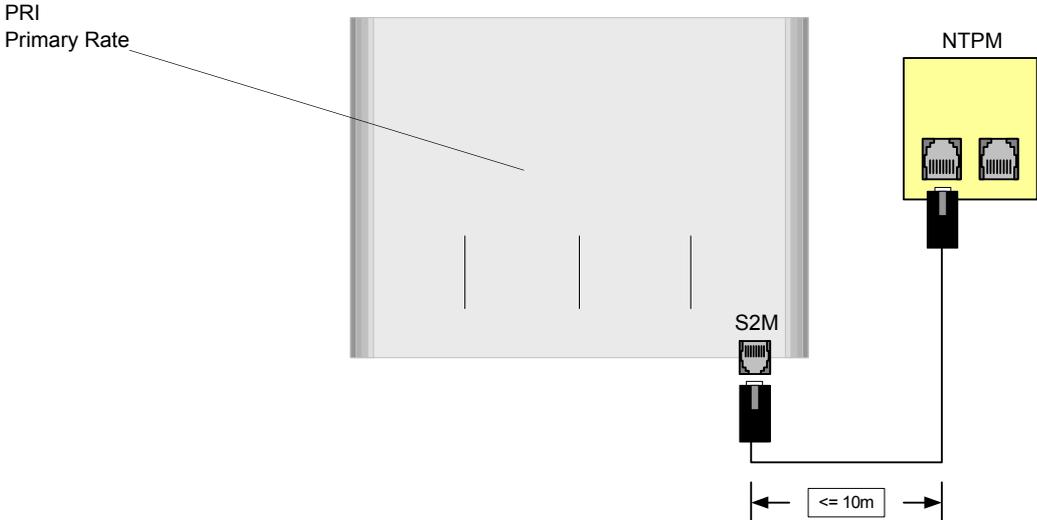
Connection via UAE socket(s) (required, if distance from NTBA to PABX > 10 m)

Connection using MDF

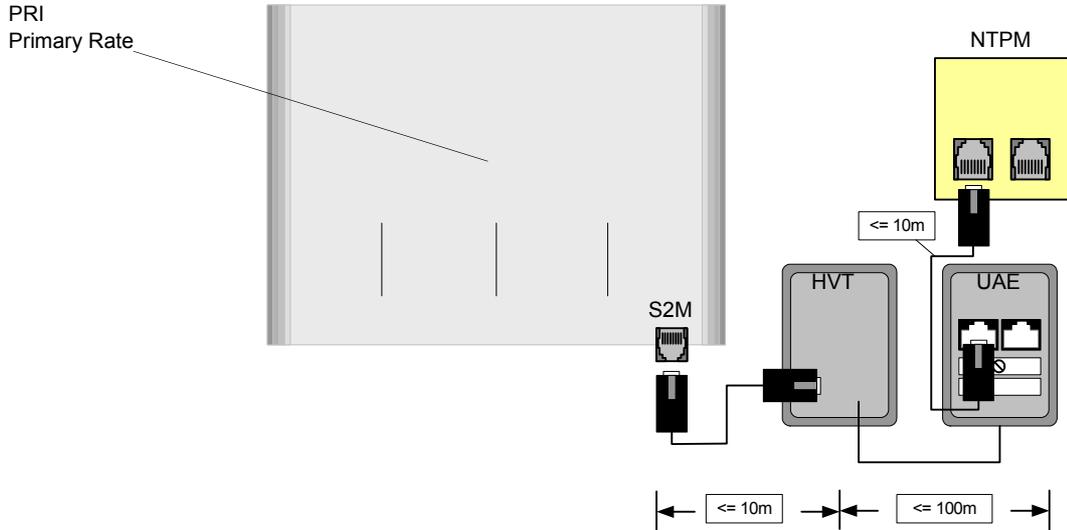


**Connection PRI to NTPM:**

**Direct connection (preferred connection option)**



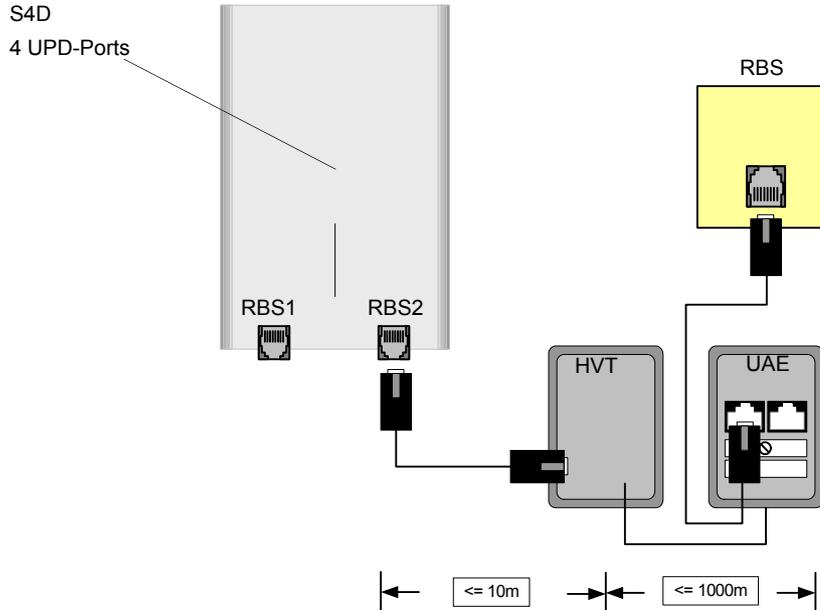
Connection using MDF



The connection from the PRI distribution strip to the NTPM should always be made using a separate cable (J-Y(ST)Y Lg 2 x 2 x 0.6 mm<sup>2</sup> (120nF)).

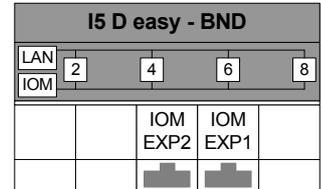
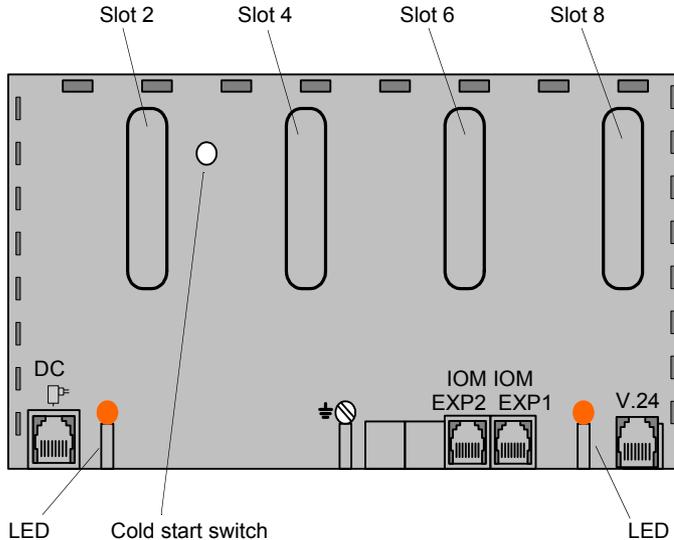
## Connection RBS to UPD port

### Connection using MDF

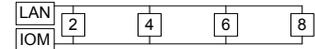


Terminating resistors must be fitted in each final UAE connection socket. The connection cable between RBS and UAE socket has a default length of 0.5 m.

## Basic module BND (control module for I5 D easy)



Schematic layout of the BND



The 4 slots into which LAN and / or IOM modules can be plugged



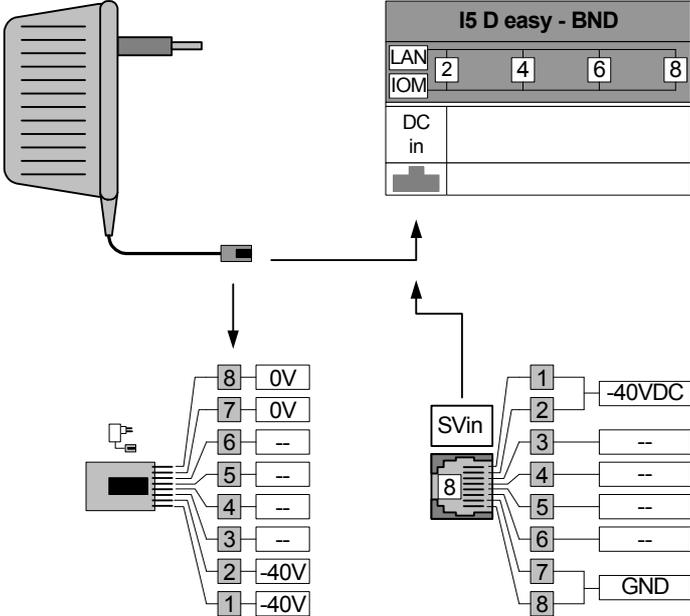
Expansion interface for EXE

Basic module **BND**, control module for I5 D easy

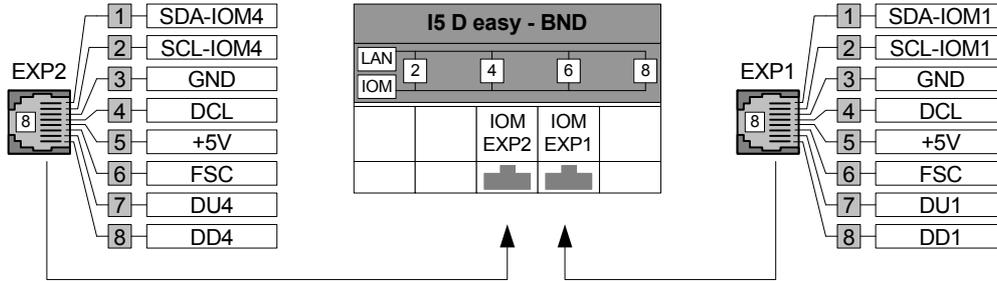
## Short description of BND (control module for I5 D easy)

Short description of BND					
<b>Function</b>	Control module for I5 D easy. 1x per system required				
<b>Slots</b>	There are 4 slots on the BND				
	<table border="0"> <tr> <td>▶ Slot 2 (slot address 1)</td> <td>▶ Slot 4 (slot address 3)</td> </tr> <tr> <td>▶ Slot 6 (slot address 5)</td> <td>▶ Slot 8 (slot address 7)</td> </tr> </table>	▶ Slot 2 (slot address 1)	▶ Slot 4 (slot address 3)	▶ Slot 6 (slot address 5)	▶ Slot 8 (slot address 7)
▶ Slot 2 (slot address 1)	▶ Slot 4 (slot address 3)				
▶ Slot 6 (slot address 5)	▶ Slot 8 (slot address 7)				
<b>Plug-in modules</b>	2-slot and / or 4-slot plug-in module ( <b>IOM and LAN</b> ) Single 1-slot plug-in module " <b>DIA</b> " ( <b>IOM</b> )				
<b>IOM</b>	<ul style="list-style-type: none"> <li>▶ IOM is a connection local to BND, which is available at all slots. IOM modules can be driven through this connection. IOM modules have no switching matrix control of their own and are generally controlled only by the BND through the IOM connection.</li> <li>▶ For an IOM extension using EXE modules, 2 sockets EXP1 and EXP2 are provided. Each socket drives 8 x 2B channels (16 B channels) for further applications</li> </ul>				
<b>LAN</b>	<ul style="list-style-type: none"> <li>▶ LAN is a 128 B channel connection, which is available at all slots. LAN modules that are connected "draw" this connection from their total of available B channels.</li> <li>▶ LAN modules are intelligent plug-in modules with their own switching matrix control</li> <li>▶ The LAN connection is not brought out from the BND for further applications</li> </ul>				
<b>Note</b>	<ul style="list-style-type: none"> <li>▶ 4-slot plug-in module at slots 4 and 8</li> <li>▶ BND has a cold-start switch, which is accessed through a hole in the casing. There is no "cold-start plug". If pressed for less than 5 sec: Reset, warm start. If pressed for more than 5 sec: Cold start</li> <li>▶ Left hand LED, see "LEDs on the BNE" on the back</li> <li>▶ Right hand LED, see "LEDs on the BNE" on the back</li> <li>▶ V.24 plug-in module <b>cannot be inserted</b> into slot 2, the V.24 connection has its own port on the basic module casing</li> <li>▶ The BND can be powered using a separate plug-in mains unit (Vin) or it can be fed from another EXE module (Vin). <b>See plug-in mains unit</b></li> <li>▶ Max. 1 x CV1 and max. 1 x T8S on a BND. 1 x CV1 plus 1 x T8S permissible on a BND.</li> </ul>				

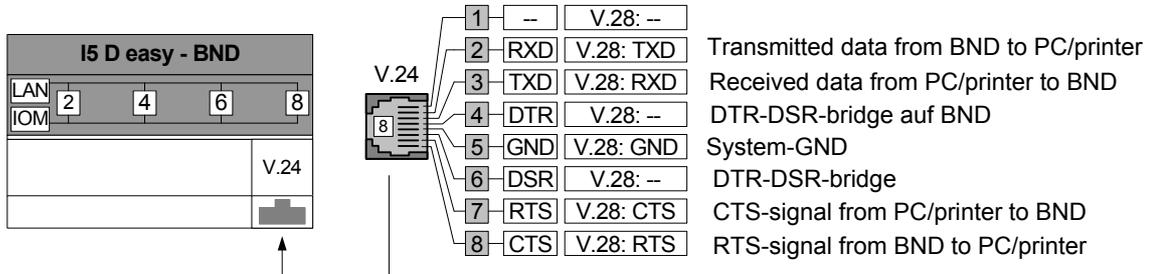
Allocation of plug-in mains unit and SVin socket on BND, BNS, BNE, EXE



### Allocation of IOM expander 1 and 2



### Allocation of V.24 Interface

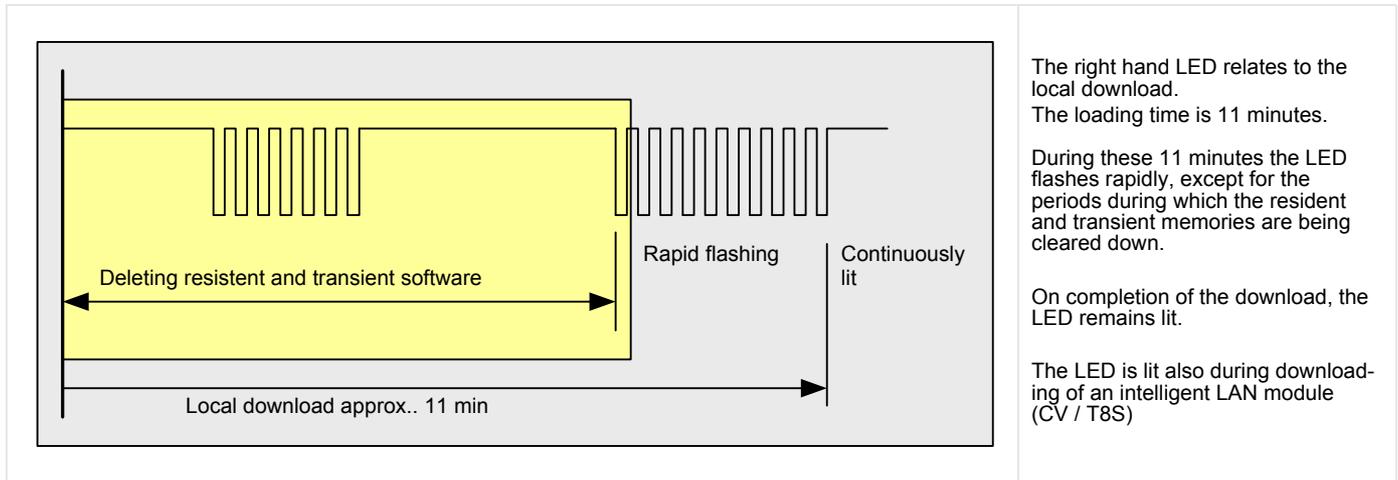


## LEDs on the BND

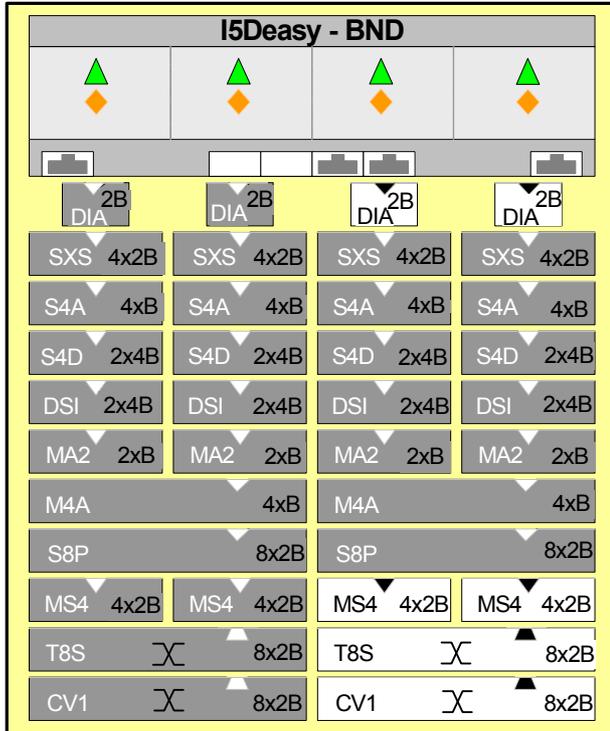
### LED left

The left hand LED indicates whether the BNx is supplied with power. As long as the power supply is present, the red LED remains lit.

### LED right

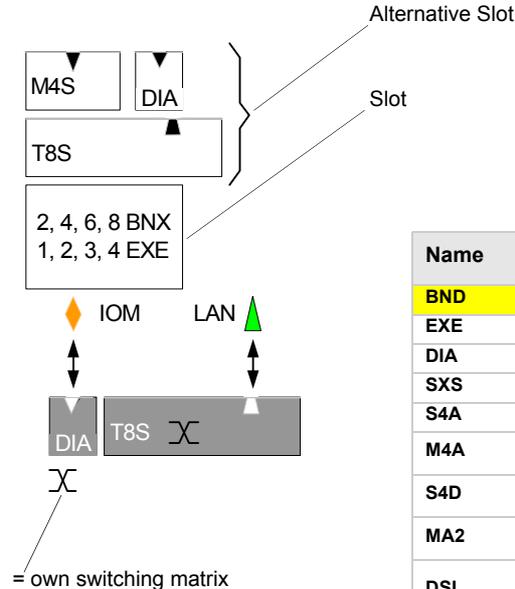
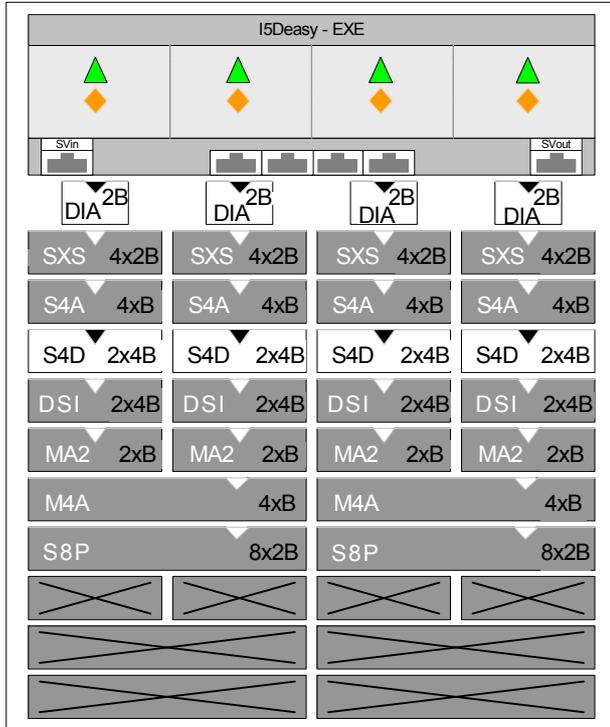


## Items for mounting on the BND



Name	LAN/ IOM	
<b>BND</b>		Basic exchange module
EXE		Extension module EXE
DIA	IOM	Integral call recording
SXS	IOM	4 x S0 subscribers
S4A	IOM	4 x a/b subscribers
M4A	IOM	3 x a/b lines, 1 x a/b subscriber
S4D	IOM	4 x UPD for 2 x DECT-RBS
MA2	IOM	1 x a/b line, 1 x a/b subscriber
DSI	IOM	1 x door station (2- wire, 4-wire), 1 x FSP
MS4	IOM	2 x T0, 2 x S0
S8P	IOM	8 x UPN
CV1	LAN	Voice controller
T8S	LAN	4 x S0 fixed, 4 x S0/T0 switchable

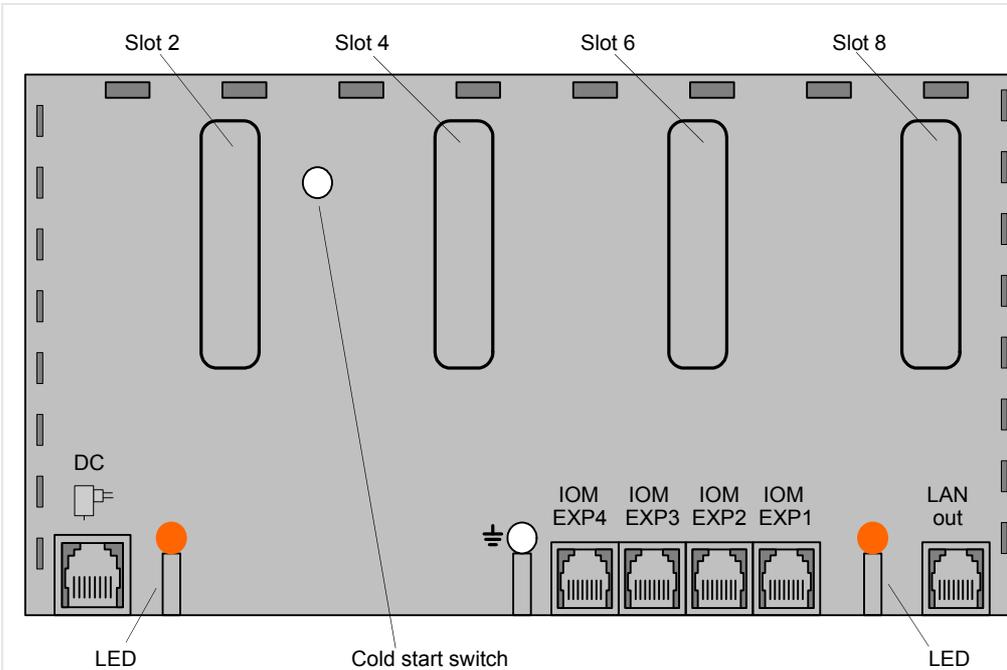
**Items for mounting on the EXE (Extension of Integral 5 D easy with BND and EXE)**



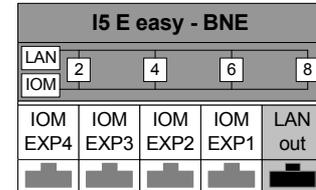
Name	LAN/ IOM	
<b>BND</b>		Basic exchange module
EXE		Extension module EXE
DIA	IOM	Integral call recording
SXS	IOM	4 x S0 subscribers
S4A	IOM	4 x a/b subscribers
M4A	IOM	3 x a/b lines, 1 x a/b subscriber
S4D	IOM	4 x UPD for 2 x DECT-RBS
MA2	IOM	1 x a/b line, 1 x a/b subscriber
DSI	IOM	1 x door station (2-wire, 4-wire), 1 x FSP
MS4	IOM	2 x T0, 2 x S0
S8P	IOM	8 x UPN
CV1	LAN	Voice controller
T8S	LAN	4 x S0 fixed, 4 x S0/T0 switchable



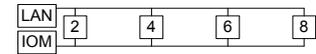
## Basic module BNE (control module for I5 E easy)



Basic module **BNE**, control module for I5 E easy



Schematic layout of the BNE



The 4 slots into which LAN or IOM modules can be plugged

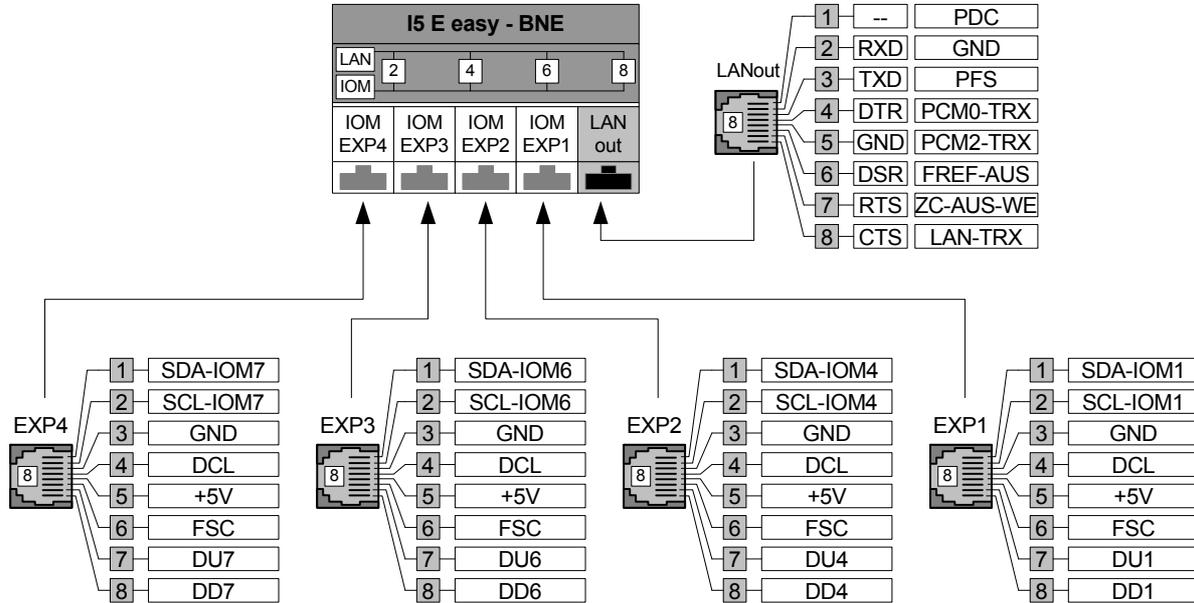


Interfaces available for the EXE/BNS/IPU

## Short description of BNE

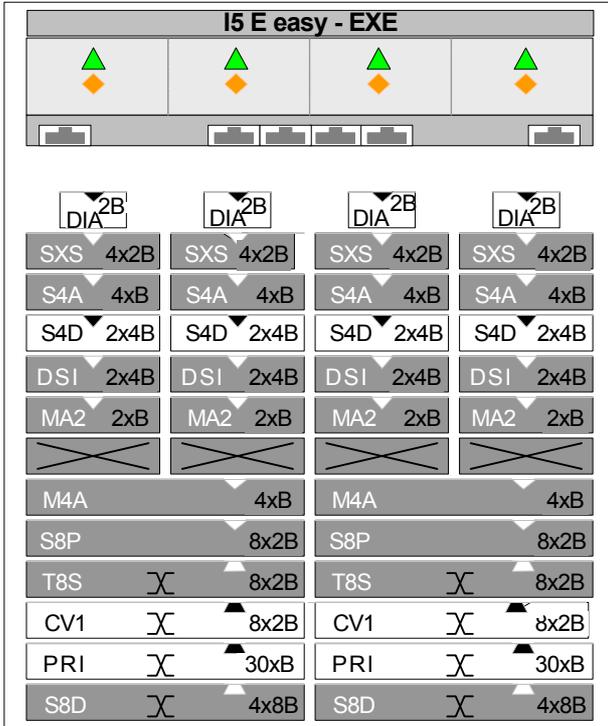
Short description of BNE					
<b>Function</b>	Control module for I5 E easy. 1x per system required				
<b>Slots</b>	There are 4 slots on the BNE				
	<table border="0"> <tr> <td>▶ Slot 2 (slot address 1)</td> <td>▶ Slot 4 (slot address 3)</td> </tr> <tr> <td>▶ Slot 6 (slot address 5)</td> <td>▶ Slot 8 (slot address 7)</td> </tr> </table>	▶ Slot 2 (slot address 1)	▶ Slot 4 (slot address 3)	▶ Slot 6 (slot address 5)	▶ Slot 8 (slot address 7)
▶ Slot 2 (slot address 1)	▶ Slot 4 (slot address 3)				
▶ Slot 6 (slot address 5)	▶ Slot 8 (slot address 7)				
<b>Plug-in modules</b>	2-slot and / or 4-slot plug-in module ( <b>IOM and LAN</b> ) Single 1-slot plug-in module " <b>DIA</b> " ( <b>IOM</b> )				
<b>IOM</b>	▶ IOM is a connection local to BNE, which is available at all slots. IOM modules can be driven through this connection. IOM modules have no switching matrix control of their own and are generally controlled only by the BNE through the IOM connection. Max. 96 IOM channels, 48 per BNE/BNS				
	▶ For an IOM extension using EXE modules, 4 sockets EXP1 thro EXP4 are provided. Each socket drives 8 x 2B channels (16 B channels) for further applications				
<b>LAN</b>	▶ LAN is a 128 B channel connection, which is available at all slots. LAN modules that are connected "draw" this connection from their total of available B channels.				
	▶ LAN modules are intelligent plug-in modules with their own switching matrix control				
	▶ The LAN connection (LANout) is brought out from the BNE for further applications				
<b>Note</b>	▶ 4-slot plug-in module at slot 4 and 8, V24 available only at slot 2 (module V24)				
	▶ BNE has a cold-start switch, which is accessed through a hole in the casing. There is no "cold-start plug". If pressed for less than 5 sec: Reset, warm start. If pressed for more than 5 sec: Cold start.				
	▶ Left hand / right hand LEDs, see "LEDs on the BNE" on the back				
	▶ The BNE can be powered using a separate plug-in mains unit (Vin) or it can be fed from another EXE module (Vin). <b>See plug-in mains unit</b>				
	▶ Max. 1 x CV1 and max. 1 x T8S on a BND. 1 x CV1 plus 1 x T8S permissible on a BND.				
▶ Max 4 x EXE between BNE and BNS using LAN					

Allocation of IOM expander 1 thro 4 and LANOut





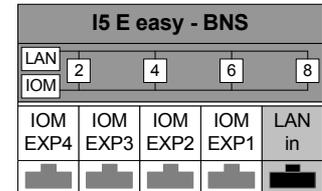
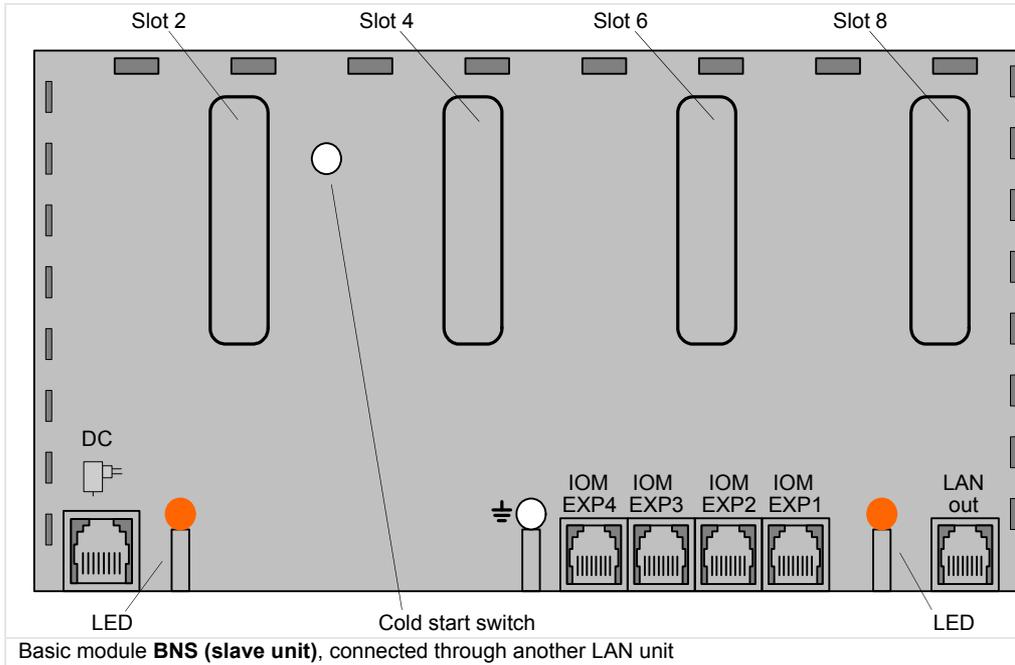
Items for mounting on the EXE (Extension of Integral 5 E easy with BNE and EXE)



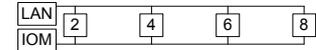
Name	LAN/ IOM	
<b>BNE</b>		Basic exchange module
<b>EXE</b>		Extension module EXE
<b>V.24</b>		V24 interface
<b>DIA</b>	IOM	Integral call recording
<b>SXS</b>	IOM	4 x S0 subscribers
<b>S4A</b>	IOM	4 x a/b subscribers
<b>M4A</b>	IOM	3 x a/b lines, 1 x a/b subscriber
<b>S4D</b>	IOM	4 x UPD for 2 x DECT-RBS
<b>MA2</b>	IOM	1 x a/b line, 1 x a/b subscriber
<b>DSI</b>	IOM	1 x door station (2-wire, 4-wire), 1 x FSP
<b>MS4</b>	IOM	2 x T0, 2 x S0
<b>S8P</b>	IOM	8 x UPN
<b>CV1</b>	LAN	Voice controller
<b>T8S</b>	LAN	4 x S0 fixed, 4 x S0/T0 switchable
<b>PRI</b>	LAN	30 x digital exchange



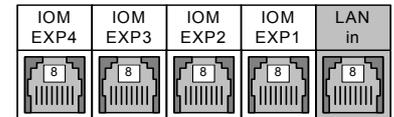
## Basic module BNS (slave module for I5 E easy)



Schematic layout of the BNS



The 4 slots into which LAN and / or IOM modules can be plugged

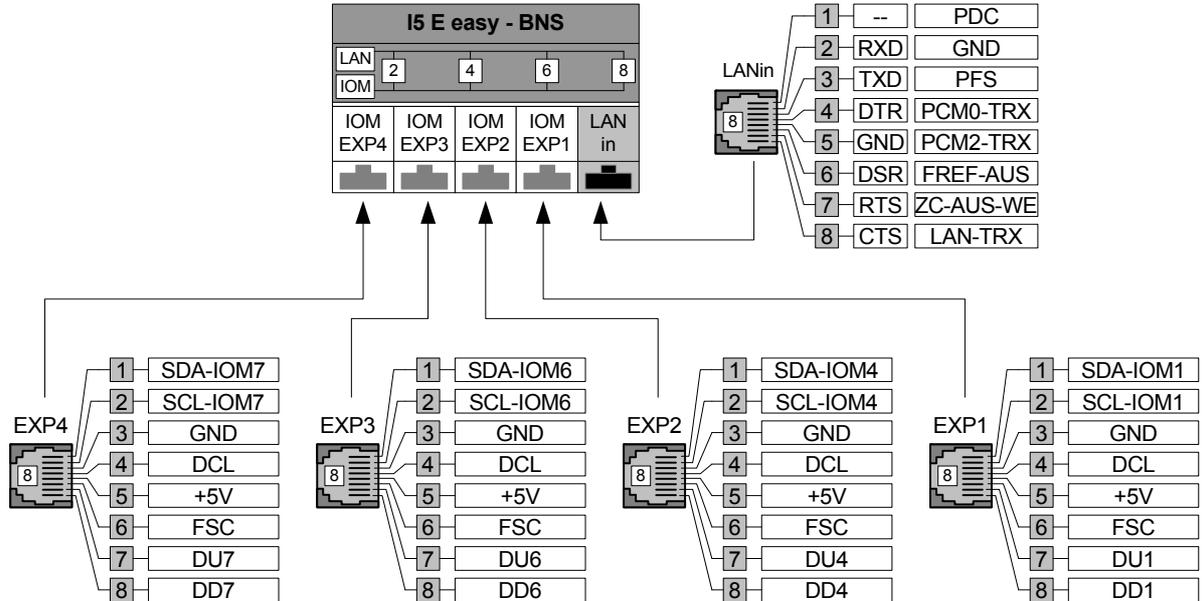


Interfaces available for the EXE and LANin

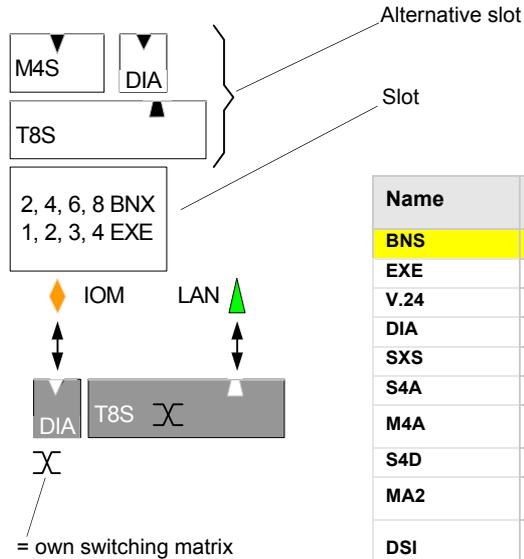
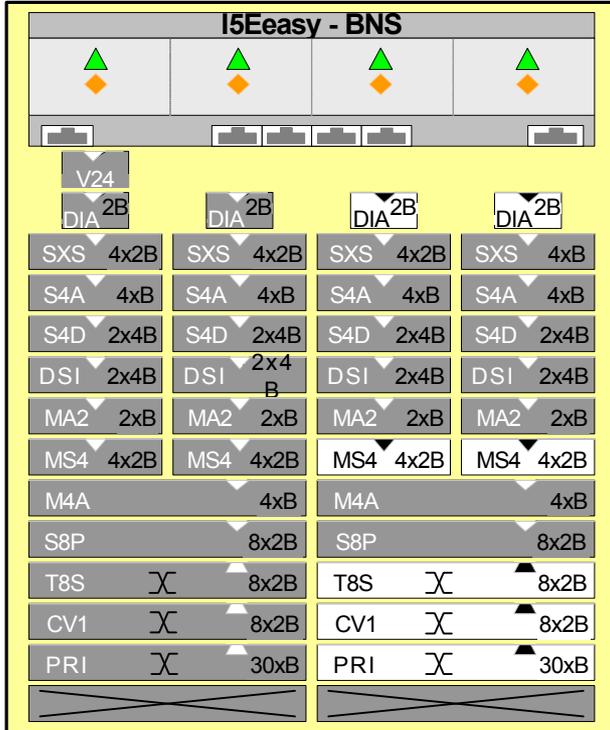
## Short description BNS (slave module)

Short description of BNE											
<b>Function</b>	Slave module for I5 E easy. This is the last module for connection to the LAN channels. It undertakes independently the management of its own local IOM channels.										
<b>Slots</b>	There are 4 slots on the BNS										
	<table border="0"> <tr> <td style="width: 20px;">▶</td> <td style="width: 300px;">Slot 2 (slot address 1)</td> <td style="width: 20px;">▶</td> <td style="width: 200px;">Slot 4 (slot address 3)</td> <td style="width: 100px;"></td> </tr> <tr> <td>▶</td> <td>Slot 6 (slot address 5)</td> <td>▶</td> <td>Slot 8 (slot address 7)</td> <td></td> </tr> </table>	▶	Slot 2 (slot address 1)	▶	Slot 4 (slot address 3)		▶	Slot 6 (slot address 5)	▶	Slot 8 (slot address 7)	
▶	Slot 2 (slot address 1)	▶	Slot 4 (slot address 3)								
▶	Slot 6 (slot address 5)	▶	Slot 8 (slot address 7)								
<b>Plug-in modules</b>	2-slot and / or 4-slot plug-in module ( <b>IOM and LAN</b> ) Single 1-slot plug-in module " <b>DIA</b> " ( <b>IOM</b> )										
<b>IOM</b>	<ul style="list-style-type: none"> <li>▶ IOM is a connection local to BNS, which is available at all slots. IOM modules can be driven through this connection. IOM modules have no switching matrix control of their own and are generally controlled only by the BNS through the IOM connection. Max. 96 IOM channels, 48 per BNE/BNS</li> <li>▶ For an IOM extension using EXE modules, 4 sockets EXP1 thro EXP4 are provided. Each socket drives 8 x 2B channels (16 B channels) for further applications</li> </ul>										
<b>LAN</b>	<ul style="list-style-type: none"> <li>▶ LAN is a 128 B channel connection, which is available at all slots. LAN modules that are connected "draw" this connection from their total of available B channels.</li> <li>▶ LAN modules are intelligent plug-in modules with their own switching matrix control</li> <li>▶ The LAN connection is not brought out from the BNS for further applications, i.e. no LAN connections can be used on an EXE connected to the BNS</li> </ul>										
<b>Note</b>	<ul style="list-style-type: none"> <li>▶ 4-slot plug-in module at slot 4 and 8, V24 available only at slot 2 (module V24)</li> <li>▶ BNS has a cold-start switch, which is accessed through a hole in the casing. There is no "cold-start plug". Local reset for the BNS, no time-based differentiation as offered on BND/BNE.</li> <li>▶ Left hand / right hand LEDs, see "LEDs on the BNS" on the back</li> <li>▶ The BNS can be powered using a separate plug-in mains unit (Vin) or it can be fed from another EXE module (Vin). <b>See plug-in mains unit</b></li> <li>▶ Max. 1 x CV1 and max. 1 x T8S on a BND. 1 x CV1 plus 1 x T8S permissible on a BND.</li> <li>▶ Max 4 x EXE between BNE and BNS using LAN</li> </ul>										

Allocation of IOM expander 1 thro 4 and LANin

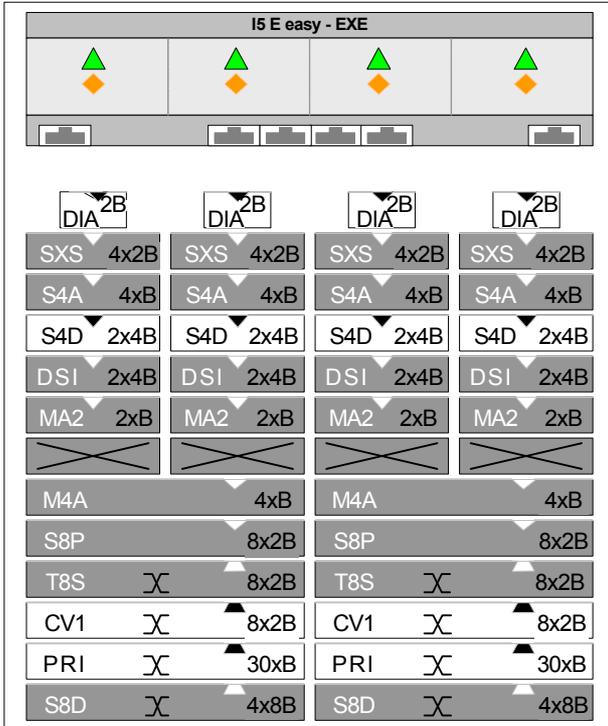


## Items for mounting on the BNS



Name	LAN/ IOM	
<b>BNS</b>		<b>Basic exchange module</b>
EXE		Extension module EXE
V.24		V24 interface
DIA	IOM	Integral call recording
SXS	IOM	4 x S0 subscribers
S4A	IOM	4 x a/b subscribers
M4A	IOM	3 x a/b lines, 1 x a/b subscriber
S4D	IOM	4 x UPD for 2 x DECT-RBS
MA2	IOM	1 x a/b line, 1 x a/b subscriber
DSI	IOM	1 x door station (2-wire, 4-wire), 1 x FSP
MS4	IOM	2 x T0, 2 x S0
S8P	IOM	8 x UPN
CV1	LAN	Voice controller
T8S	LAN	4 x S0 fixed, 4 x S0/T0 switchable
PRI	LAN	30 x digital exchange

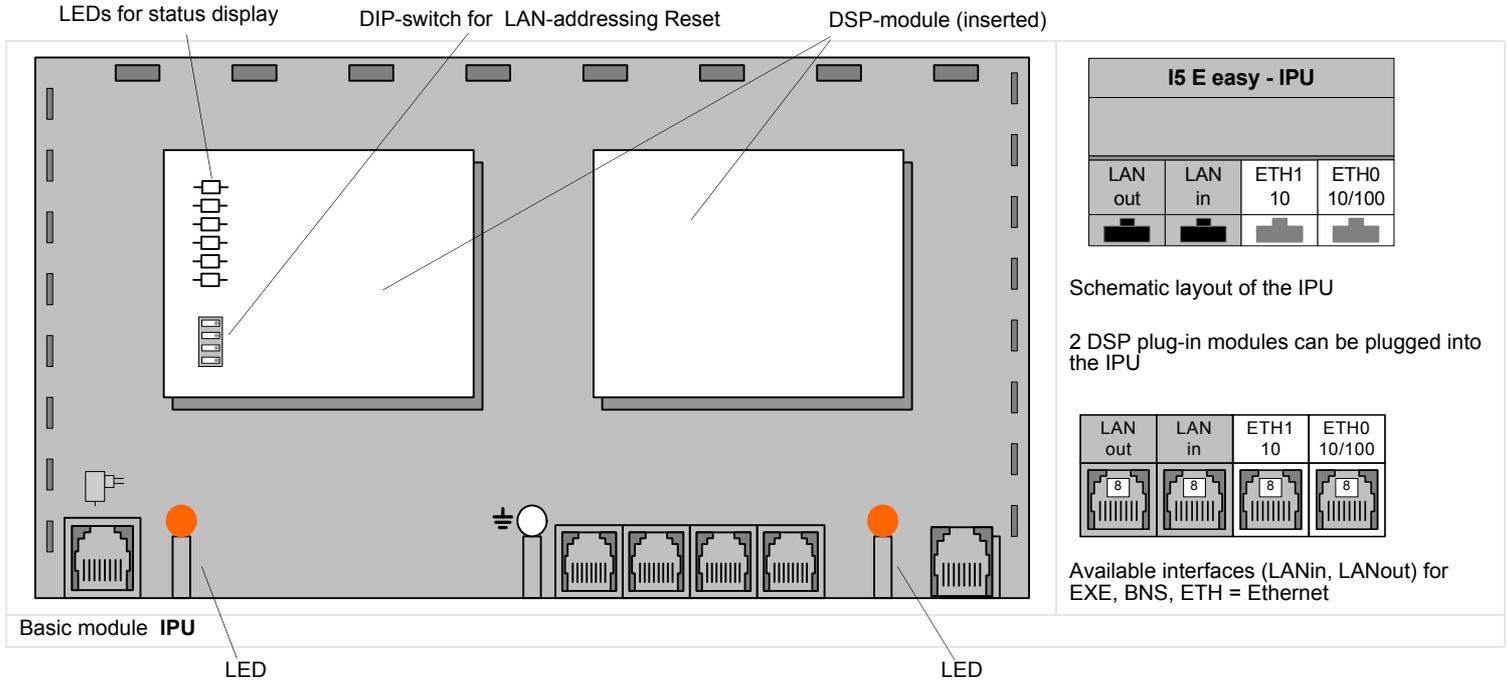
Items for mounting on the EXE (Extension of Integral 5 E easy with BNS and EXE)



Name	LAN/ IOM	
<b>BNS</b>		Basic exchange module
EXE		Extension module EXE
V.24		V24 interface
DIA	IOM	Integral call recording
SXS	IOM	4 x S0 subscribers
S4A	IOM	4 x a/b subscribers
M4A	IOM	3 x a/b lines, 1 x a/b subscriber
S4D	IOM	4 x UPD for 2 x DECT-RBS
MA2	IOM	1 x a/b line, 1 x a/b subscriber
DSI	IOM	1 x door station (2-wire, 4-wire), 1 x FSP
MS4	IOM	2 x T0, 2 x S0
S8P	IOM	8 x UPN
CV1	LAN	Voice controller
T8S	LAN	4 x S0 fixed, 4 x S0/T0 switchable
PRI	LAN	30 x digital exchange



## Basic module IPU (IP unit)

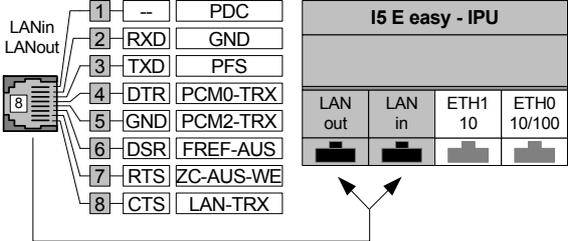


## Short description of IPU

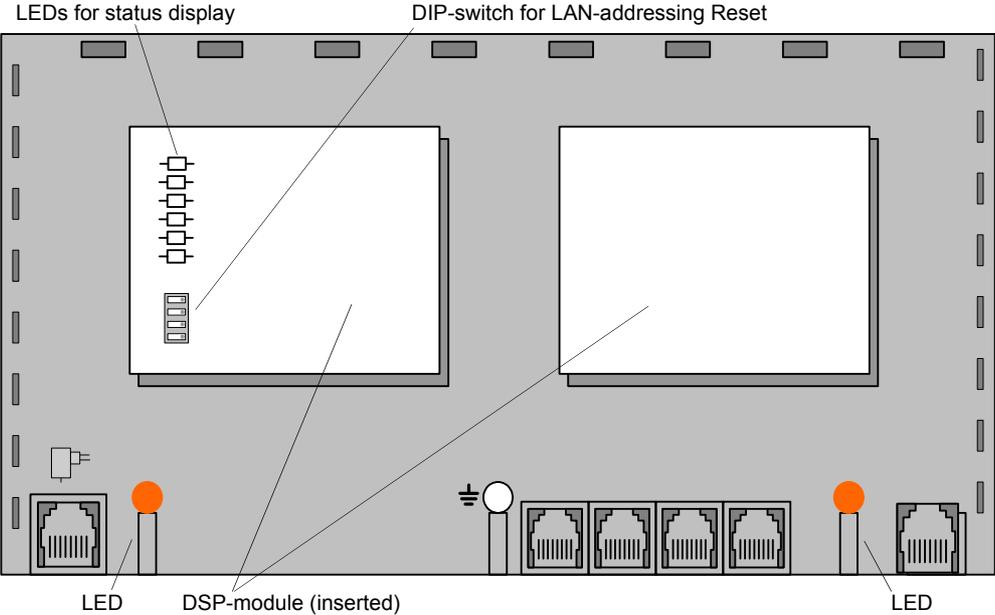
### Short description of IPU

- ▶ The IPU allows connection of IP phones or PCs using the Ethernet interface
- ▶ **The IPU is supplied without a DSP, this must be ordered separately**
- ▶ **Max. 2 IPU's per system (using series EXE units)**
- ▶ **Max. 15 IP phones per IPU**
- ▶ **2 slots for DSP modules**
- ▶ **DIP switch for addressing and reset**
- ▶ **LEDs for status indication**
- ▶ The IPU can be powered using a separate plug-in mains unit (Vin) or it can be fed from another EXE module (Vin). **See plug-in mains unit**

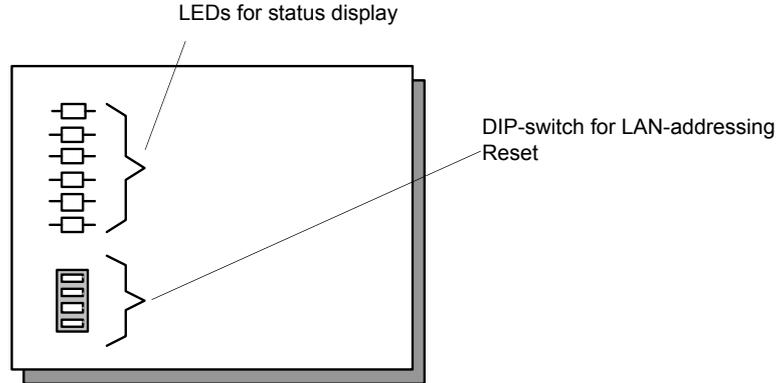
### Assignment of LANin, LANout, plug-in mains unit, SV socket IPU



### LEDs and DIP switch on the IPU



LED displays

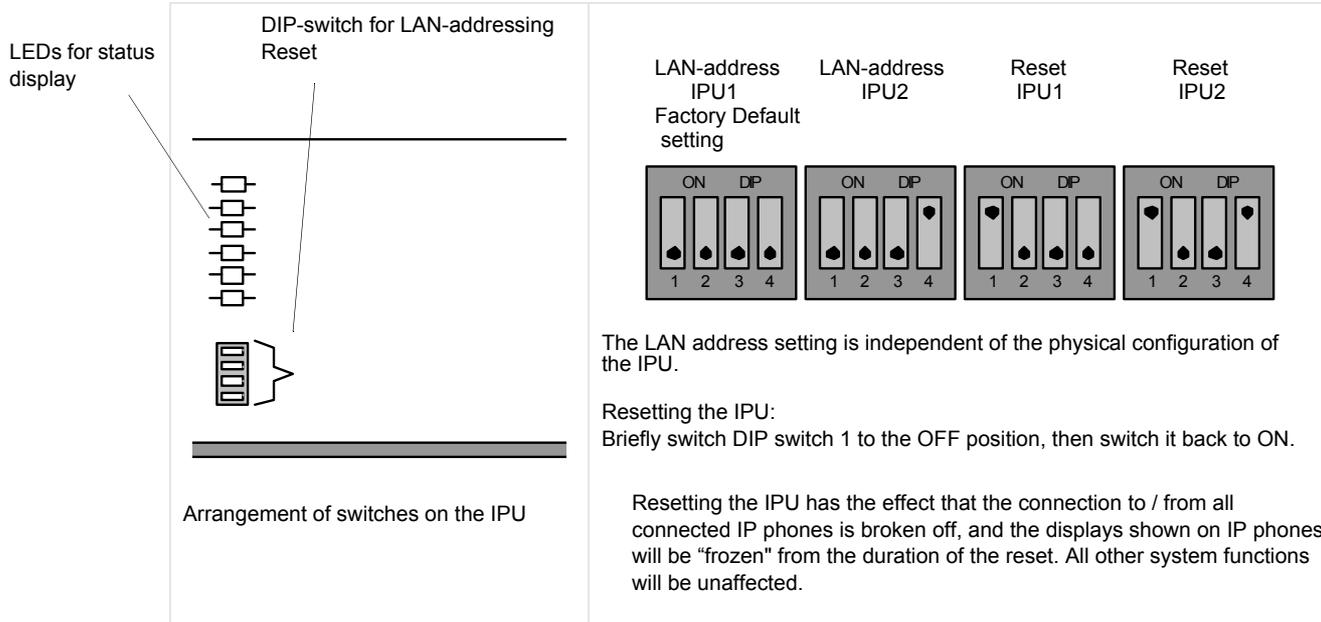


Status indications by LEDs										
LED 1	LED 2	Status	LED 3		LED 4		LED 5		LED 6	
off	off	off	off		off		off		off	10Mbit/s ETH0
flashing green	on green	Starting up	on green	ETH1 10Mbit/s Connection available	on red	Collision detected	on green	ETH0 10/100Mbit/s Connection available	on	10/100Mbit/ s ETH0
on green	on green	Running								
flashing green	flashing green	Error								

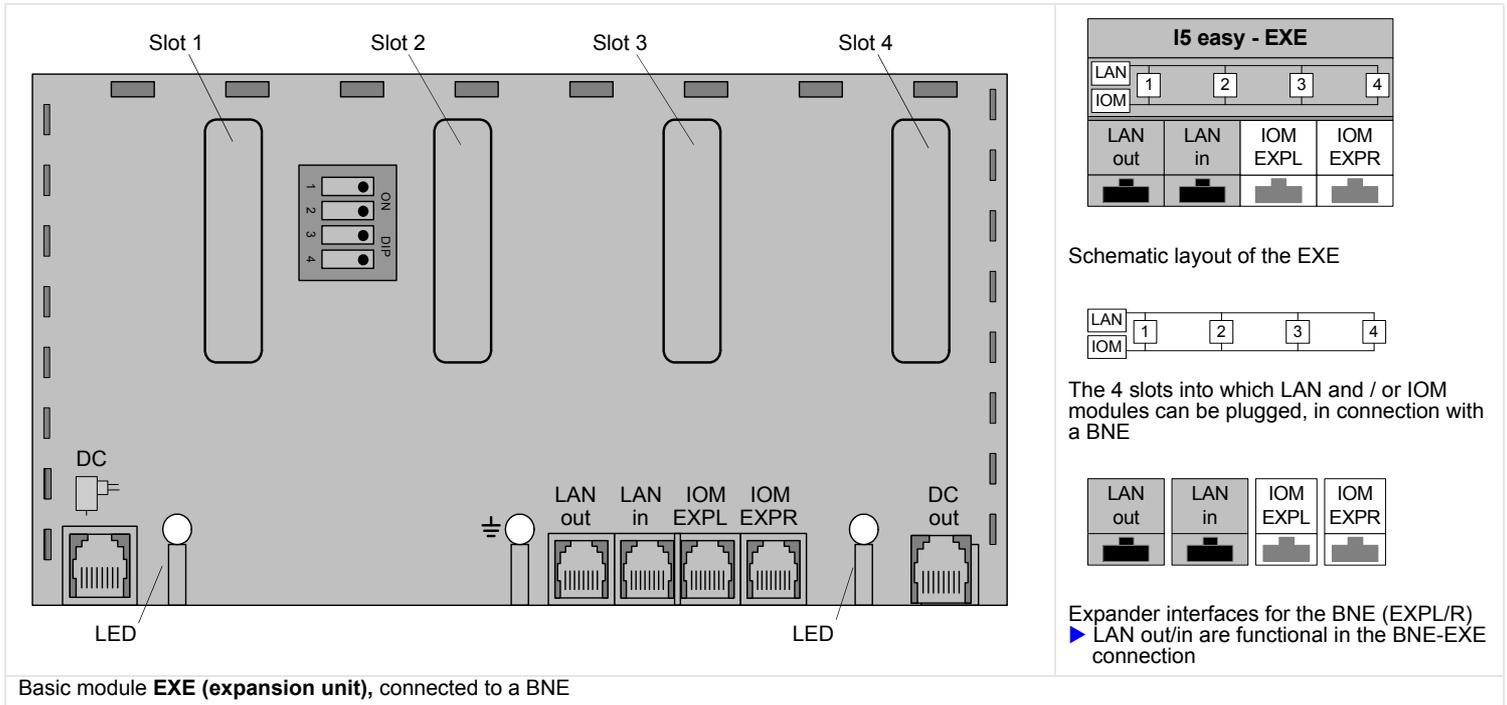
## Dip switch

The DIP switch on the IPU has the following functions

- ▶ Setting the LAN address
- ▶ Resetting the IPU



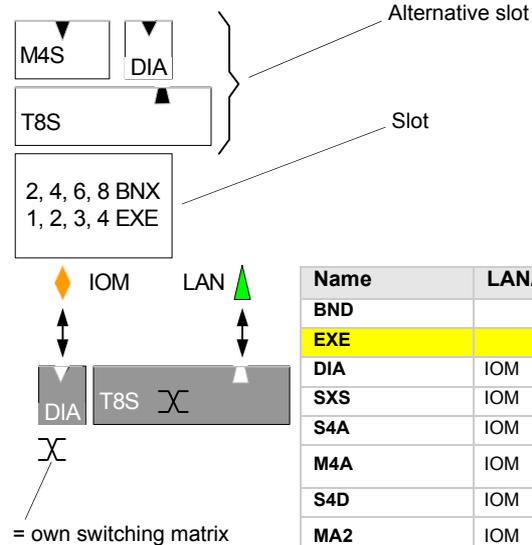
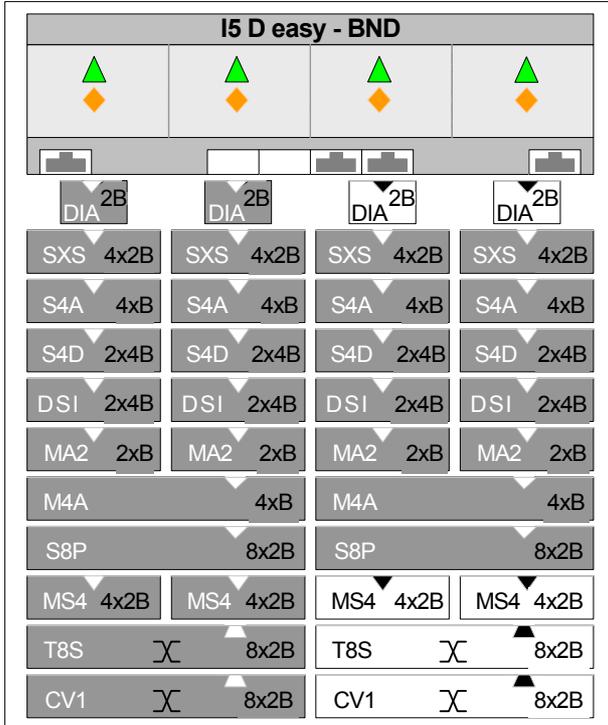
## Basic module EXE (expansion unit for I5 D/E easy)



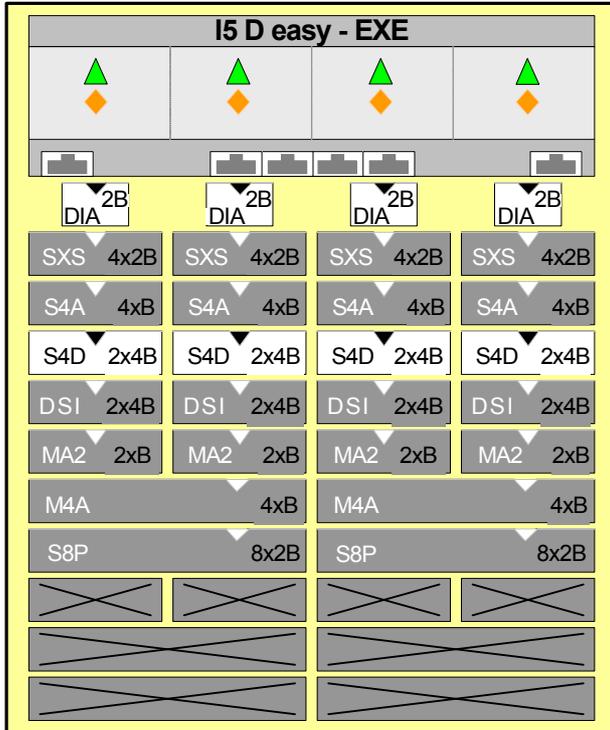
## Short description of EXE

Short description of EXE			
<b>Function</b>	Expansion module for the I5 D/E easy (no control functions).		
<b>Slots</b>	There are 4 slots on the EXE		
	▶	Slot 1 (slot address 0)	▶ Slot 2 (slot address 1)
	▶	Slot 3 (slot address 2)	▶ Slot 4 (slot address 3)
<b>Plug-in modules</b>	2-slot and / or 4-slot plug-in module ( <b>IOM and LAN</b> ) Single 1-slot plug-in module " <b>DIA</b> " ( <b>IOM</b> )		
<b>IOM</b>	▶	IOM is a connection local to BND/BNE/BNS, which is available at all slots. IOM modules can be driven through this connection. IOM modules have no switching matrix control of their own and are generally controlled only by the BND/BNE/BNS through the IOM connection.	
	▶	<ul style="list-style-type: none"> <li>- For an IOM extension using EXE modules, 2 sockets EXPL and EXPR are provided. Each socket can accept 8 x 2B channels (16 B channels) from the BND/BNE/BNS</li> <li>- The EXE IOM modules can only be used if the <b>EXE is connected using its EXP-L/R socket(s) with the BND/BNE/BNS EXP1/2 and/or EXP3/4</b></li> <li>- If there is only a <b>single</b> connection from the BND/BNE/BNS to the EXE, there are 8 x 2 B channels (16 B channels) available on the EXE for IOM modules. This "simple" connection type is <b>permitted only for connecting pure analog units to the EXE</b>.</li> <li>- If there are <b>two</b> connections from the BND/BNE/BNS to the EXE, there are 2 x 8 x 2 B channels (32 B channels) available on the EXE for IOM modules. This type of circuit is essential <ul style="list-style-type: none"> <li>- for operating mixed analog and digital modules</li> <li>- for pure digital circuits</li> <li>- or for an incomplete analog circuit to the EXE where there are options for additional digital circuits</li> </ul> </li> </ul>	
<b>LAN</b>	▶	LAN is a 128 B channel connection, which is available at all slots. LAN modules that are connected "draw" this connection from their total of available B channels.	
	▶	LAN modules are intelligent plug-in modules with their own switching matrix control	
<b>Note</b>	▶	The EXE can be powered using a separate plug-in mains unit (Vin) or it can be fed from another EXE module (Vin). <b>See plug-in mains unit</b>	
	▶	Max 4x EXE between BNE and BNS using LAN	

Items for mounting on the EXE, connected to a BND

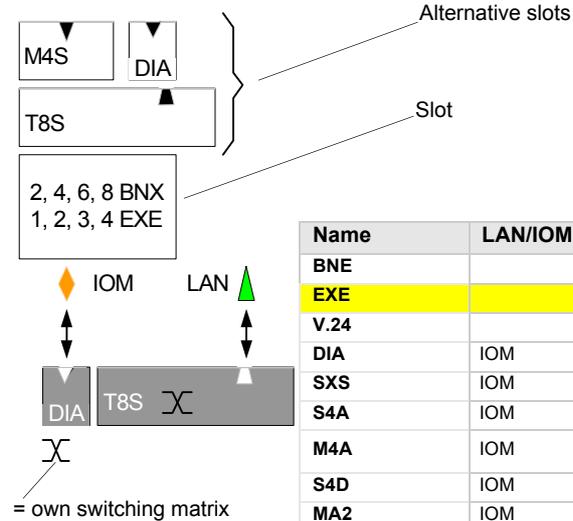
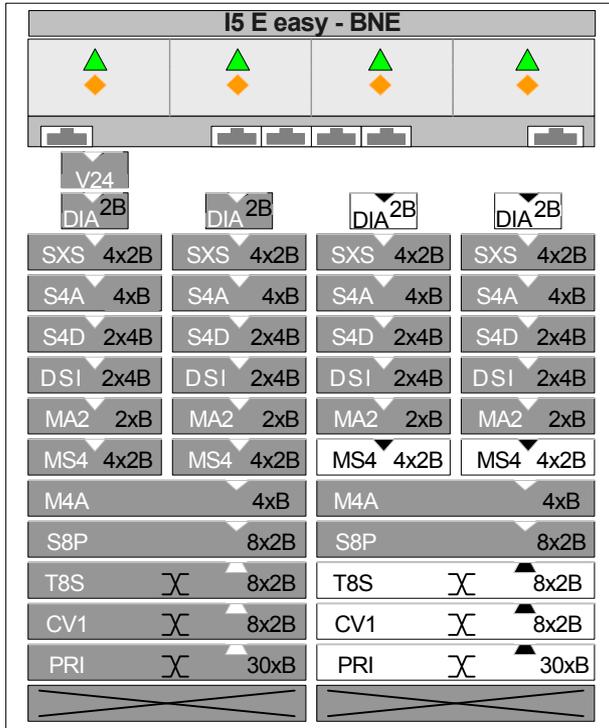


Name	LAN/IOM	
BND		Basic exchange module
EXE		Extension module EXE
DIA	IOM	Integral call recording
SXS	IOM	4 x S0 subscribers
S4A	IOM	4 x a/b subscribers
M4A	IOM	3 x a/b lines, 1 x a/b subscriber
S4D	IOM	4 x UPD for 2 x DECT-RBS
MA2	IOM	1 x a/b line, 1 x a/b subscriber
DSI	IOM	1 x door station (2-wire, 4-wire), 1 x FSP
MS4	IOM	2 x T0, 2 x S0
S8P	IOM	8 x UPN
CV1	LAN	Voice controller
T8S	LAN	4 x S0 fixed, 4 x S0/T0 switchable

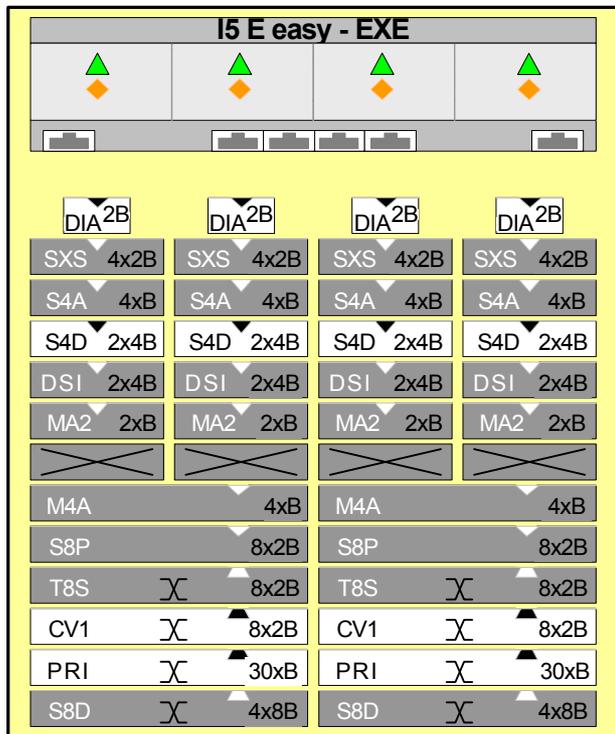


Name	LAN/ IOM	
<b>BND</b>		Basic exchange module
<b>EXE</b>		Extension module EXE
<b>DIA</b>	IOM	Integral call recording
<b>SXS</b>	IOM	4 x S0 subscribers
<b>S4A</b>	IOM	4 x a/b subscribers
<b>M4A</b>	IOM	3 x a/b lines, 1 x a/b subscriber
<b>S4D</b>	IOM	4 x UPD for 2 x DECT-RBS
<b>MA2</b>	IOM	1 x a/b line, 1 x a/b subscriber
<b>DSI</b>	IOM	1 x door station (2-wire, 4-wire), 1 x FSP
<b>MS4</b>	IOM	2 x T0, 2 x S0
<b>S8P</b>	IOM	8 x UPN
<b>CV1</b>	LAN	Voice controller
<b>T8S</b>	LAN	4 x S0 fixed, 4 x S0/T0 switchable
<b>BND</b>		Basic exchange module

Items for mounting on the EXE, connected to a BNE/BNS

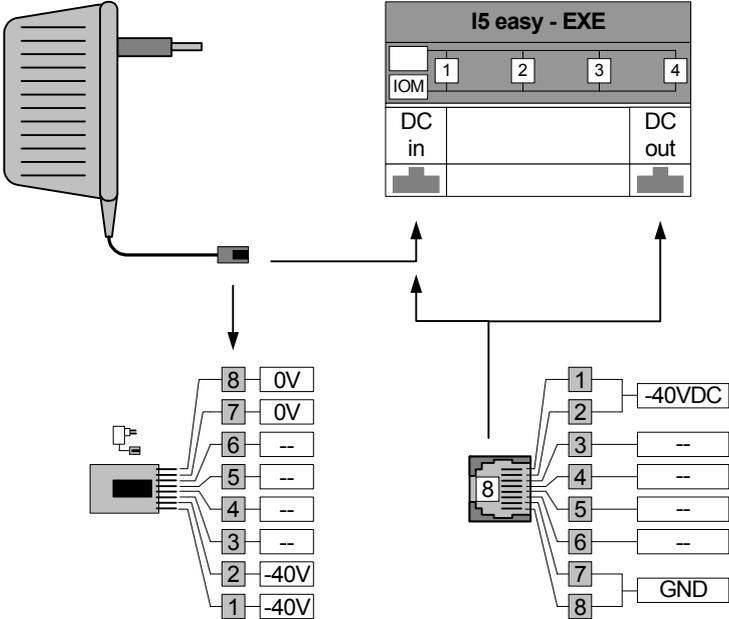


Name	LAN/IOM	
BNE		Basic exchange module
<b>EXE</b>		<b>Extension module EXE</b>
V.24		V24 interface
DIA	IOM	IOM
SXS	IOM	4 x S0 subscribers
S4A	IOM	4 x a/b subscribers
M4A	IOM	3 x a/b lines, 1 x a/b subscriber
S4D	IOM	4 x UPD for 2 x DECT-RBS
MA2	IOM	1 x a/b line, 1 x a/b subscriber
DSI	IOM	1 x door station (2-wire, 4-wire), 1 x FSP
MS4	IOM	2 x T0, 2 x S0
S8P	IOM	8 x UPN
CV1	LAN	Voice controller
T8S	LAN	4 x S0 fixed, 4 x S0/T0 switchable
PRI	LAN	30 x digital exchange

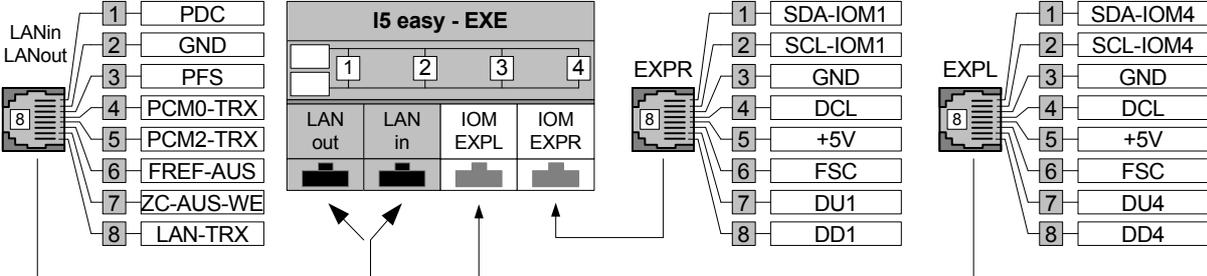


Name	LAN/IOM	
BNE		Basic exchange module
<b>EXE</b>		<b>Extension module EXE</b>
V.24		V24 interface
DIA	IOM	Integral call recording
SXS	IOM	4 x S0 subscribers
S4A	IOM	4 x a/b subscribers
M4A	IOM	3 x a/b lines, 1 x a/b subscriber
S4D	IOM	4 x UPD for 2 x DECT-RBS
MA2	IOM	1 x a/b line, 1 x a/b subscriber
DSI	IOM	1 x door station (2-wire, 4-wire), 1 x FSP
MS4	IOM	2 x T0, 2 x S0
S8P	IOM	8 x UPN
CV1	LAN	Voice controller
T8S	LAN	4 x S0 fixed, 4 x S0/T0 switchable
PRI	LAN	30 x digital exchange

**Assignment of plug-in mains unit and SVin and SVout socket on BND**

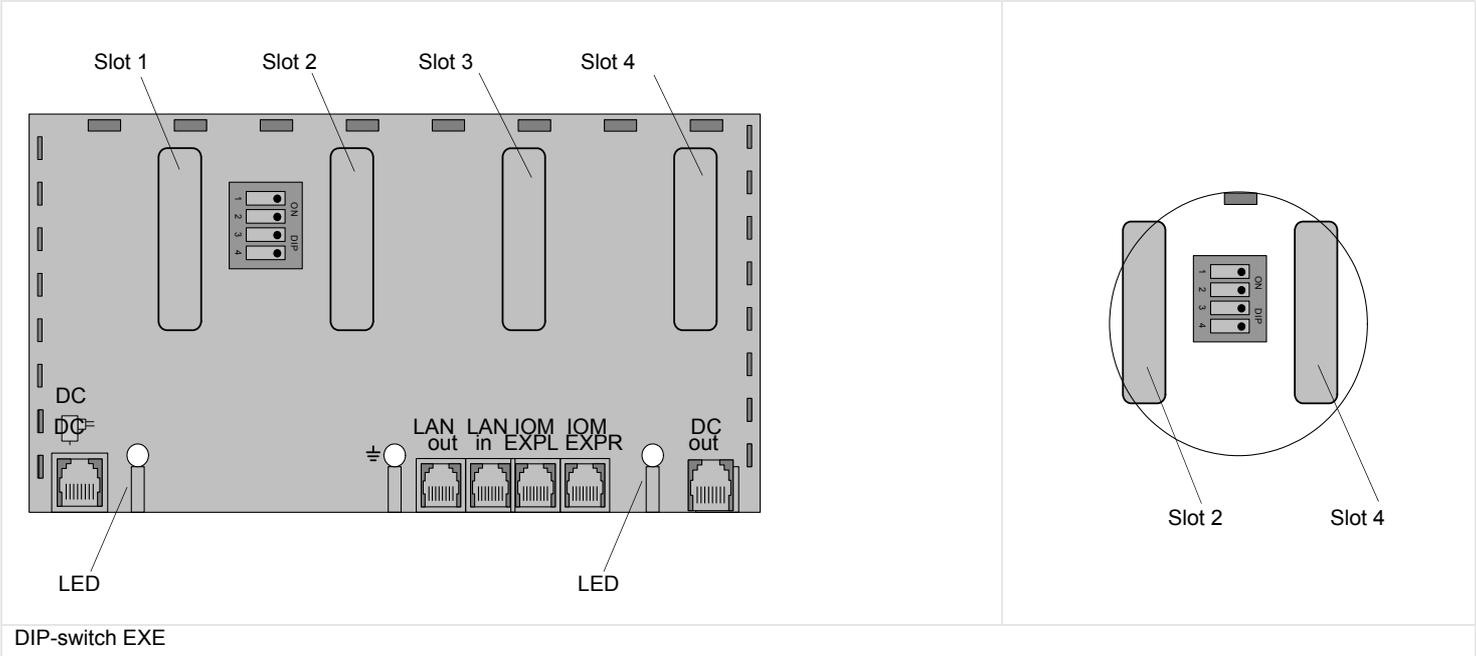


### Assignment of IOM expander L, R and LAN



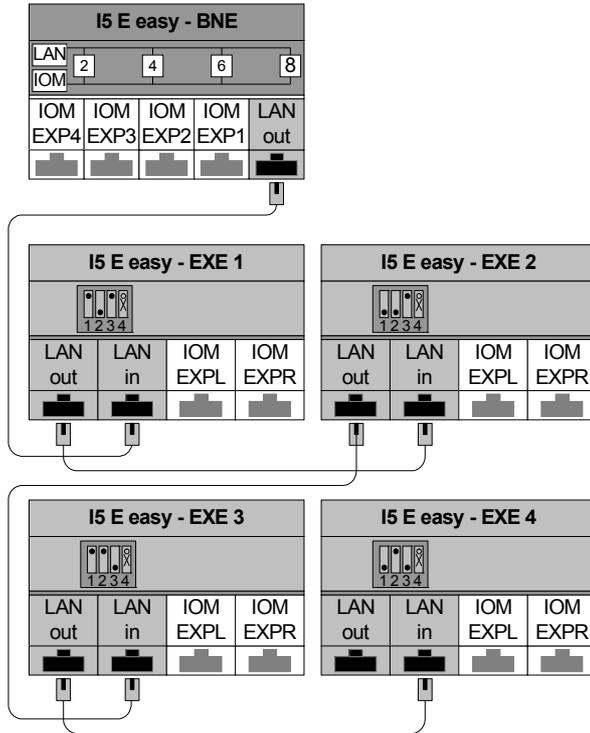
### DIP switch on the EXE

EXE settings required if the module is wired using LAN

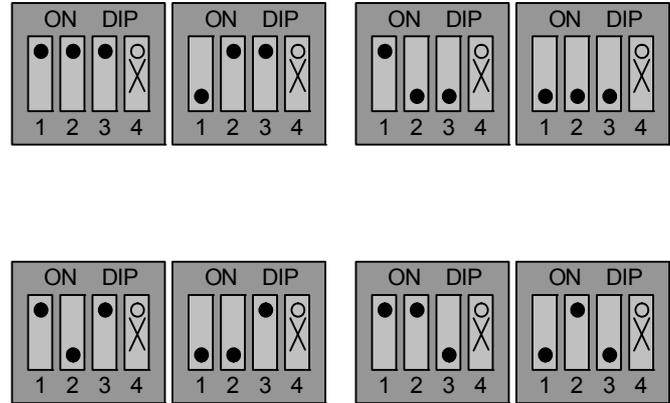


DIP-switch EXE

## DIP switch on the EXE



Addressing for IOM-operation



DIP switch on the EXE (for IOM operation without LAN):  
 Positions 0,1 and 6,7 are reserved. Switch 4 is inoperative.

The EXE wired to the BNE is driven in position 2, the following looped through EXEs take sequentially positions 3, 4 and 5.

This completes the address allocation of EXE modules for the BNE.

## Compatibility



The modul EXE can be used to replace the moduls EUE or EUD or for extension business. In this case it can be used instead of EUE or EUD.

In application instead of a EUD please consider that the EXP-L plug has to be connected.

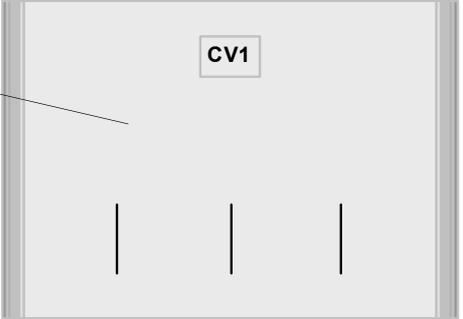
The software supports only valid configuration rules (e.g. nur 1x S8D or CC1).



# Plug-in module CV1 (LAN, I5 D/E)

## Module view and socket allocation

Voice Mail Box  
Auto. call forwarding  
Announcement before answering  
MOH

Module view	Socket allocation
 <p>The diagram shows a rectangular module with a central box labeled 'CV1'. Below this box are three vertical lines, likely representing ports or indicators. The module is shown in a perspective view with a grey background.</p>	<p>none</p>

## Short description CV1

Short description CV1	
<b>Function</b>	Voice mailbox, announcement before answering, Automatic call transfer, automatic call forwarding AWW
<b>Width</b>	4-slot width
<b>Connection options</b>	<ul style="list-style-type: none"><li>▶ max. 1 x on BND, slot 4 or 8, not with DIA within a system</li><li>▶ max. 1 x per system, BNE, BNS, slot 4 or 8</li><li>▶ max. 1 x per system, EXE slot 4 or 2</li></ul>
<b>Cables</b>	
<b>Note</b>	

## Further information

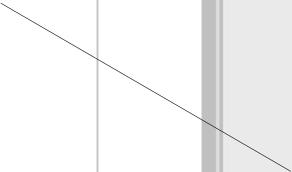
Further Information	
<b>Funktionen "CV1"</b>	
	<ul style="list-style-type: none"><li>▶ Auto. call transfer</li><li>▶ Announcement before answering</li><li>▶ Music On Hold (MOH)</li><li>▶ Configuration only possible using the ISA tool (remote)</li></ul>

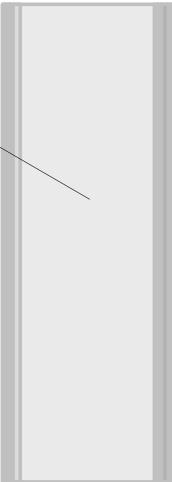


# Plug-in module DIA (IOM, I5 D/E)

## Module view and socket allocation

Call recording



Module view	Socket allocation
	none

## Short description of DIA

Short description of DIA	
<b>Function</b>	<ul style="list-style-type: none"> <li>▶ Integrated answering machine with max. two channels</li> <li>▶ 2 x answering machines or 2 x automatic call forwarding</li> <li>▶ Each channel can be operated as either an answering machine or for automatic call forwarding.</li> <li>▶ Voice message capacity of 29 minutes per channel (incl. all announcements)</li> </ul>
<b>Width</b>	1-slot width
<b>Connection options</b>	BND, BNE, BNS, EXE all slots
<b>Cables</b>	no cables required
<b>Note</b>	<ul style="list-style-type: none"> <li>▶ BND: max. 2 x per system</li> <li>▶ BND, BNE: not with CV1 within a system</li> <li>▶ For a uniform appearance a dummy module is plugged into the free slot of the DIA</li> </ul>

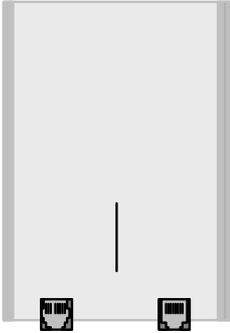
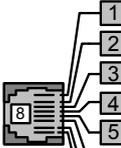
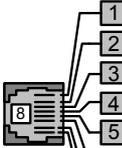
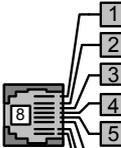
## Specific features

Specific features (plug-in module details)	
▶ <b>Own subscriber number per channel</b>	
▶ <b>Control via DTMF (external, internal via DTMF post dialling)</b>	
▶ <b>different messages per channel</b>	▶ Messages 1 and 2, if there is still space for the set recording time ▶ Message 3, if there is no more recording capacity ▶ Error message
▶ <b>Editing the messages</b>	Call up with DTMF character and enter PIN
▶ <b>Message Waiting is checked (Mailbox) by query to a permanently assigned number</b>	
▶ <b>Message Information (the time of message is announced in the local language when listening to messages)</b>	
▶ <b>4-digit individually set PIN, non-volatile on reset and loss of power</b>	
▶ <b>Maximum number of messages per channel: 124</b>	
▶ <b>Configurable recording time: 30 seconds, 1 minute, 2 minutes</b>	
▶ <b>Activate message call up by entering a DTMF tone in answering machine mode</b>	
▶ <b>Listen: continuously, by individual step</b>	
▶ <b>Changing PIN number</b>	
▶ <b>Acoustic operation prompting (menu prompting with set help texts)</b>	
▶ <b>Automatic Attendant, direct switching of incoming calls (analog or ISDN) by means of DTMF post dialling</b>	

Specific features (plug-in module details)	
<ul style="list-style-type: none"> <li>▶ All DIAs can be configured as Automatic Attendant subscribers either individually or collectively</li> </ul>	<p><b>Function:</b></p> <ul style="list-style-type: none"> <li>▶ If a DIA which is set up as an automatic attendant subscriber is called, its general greeting message is first output.</li> <li>▶ The caller can have the call forwarded to the desired subscriber by DTMF post dialling (also via call diversion to another DIA which is configured as an answering machine).</li> </ul>
▶ <b>Up to two / four Automatic Attendant exchange connections (one fixed exchange line assigned per channel, allocation can be to a hunt group).</b>	
▶ <b>Greeting message (changeable individual message per channel)</b>	
▶ <b>Continued dialling</b>	
▶ <b>additional communication with operator control</b>	
▶ <b>Recognition of end of connection</b>	<ul style="list-style-type: none"> <li>▶ if speech pause of approx. 8 sec. occurs</li> <li>▶ Timeout of approx. 2.5 min</li> <li>▶ using busy signal recognition</li> </ul>

## Plug-in module DSI (IOM, I5 D/E)

### Module view and socket allocation

Module view	Socket allocation DHI 4-wire	Socket allocation FSP
<p>Door handsfree operation Free switching points</p>  <p>FSP      DHI</p>	 <ul style="list-style-type: none"> <li>1 MIC Speech path connection 1(micro)</li> <li>2 LS/MIC Speech path connection 2(Speaker, micro)</li> <li>3 TOE Door opener, connection 1</li> <li>4 ELA1 ELA-switched output 1</li> <li>5 ELA2 ELA-switched output 2</li> <li>6 LS/KL Speech path connection 3 (speaker)</li> <li>7 KL Bell (connection 1)</li> <li>8 KL/TOE Bell (conn. 2), Door opener (conn.2)</li> </ul>	 <ul style="list-style-type: none"> <li>1 FSP3_1 Free switched point 3</li> <li>2 FSP3_2 Free switched point 3</li> <li>3 FSP1_1 Free switched point 1</li> <li>4 FSP2_1 Free switched point 2</li> <li>5 FSP2_2 Free switched point 2</li> <li>6 PFK1 Potential-free sensor</li> <li>7 PFK2 Potential-free sensor</li> <li>8 FSP1_1 Free switched point 1</li> </ul>
	<p><b>Socket allocation DHI 2-wire</b></p>  <ul style="list-style-type: none"> <li>1 MIC Speech path connection 1 to door station</li> <li>2 LS/MIC Speech path connection 2 to door station</li> <li>3 TOE Door opener, connection 1</li> <li>4 ELA1 ELA-switched output 1</li> <li>5 ELA2 ELA-switched output 2</li> <li>6 LS/KL Bell (connection 1)</li> <li>7 KL Bell (connection 2)</li> <li>8 KL/TOE Bell (conn. 2), Door opener (conn. 2)</li> </ul>	

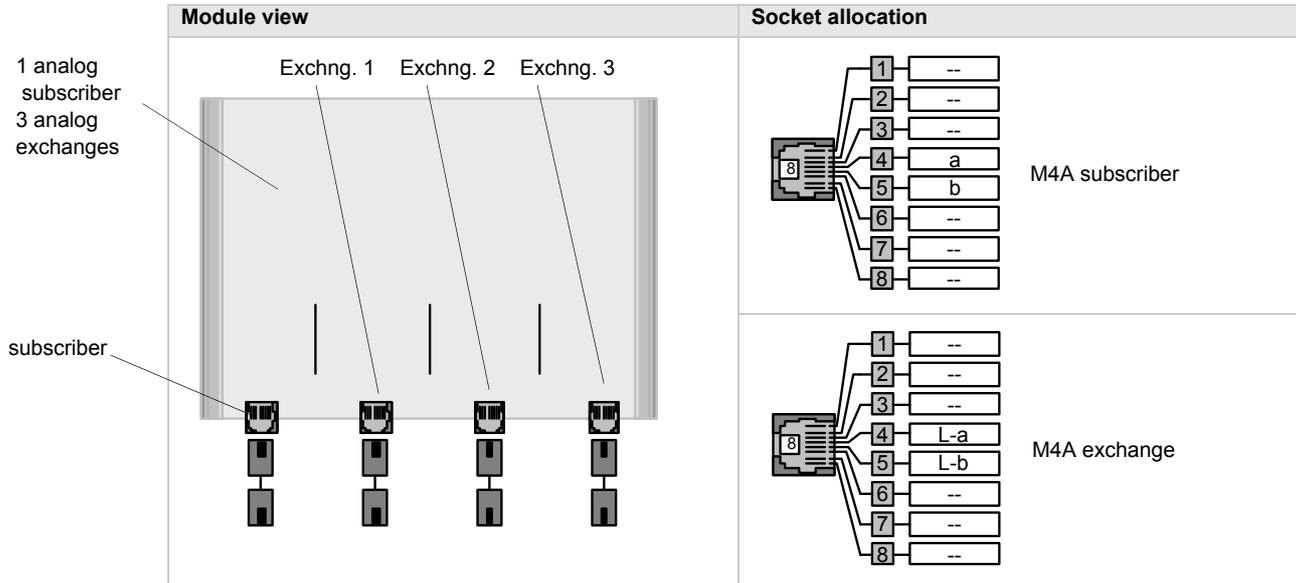
## Short description DSI, DHI, FSP

Short description DSI, DHI, FSP	
<b>Function</b>	<ul style="list-style-type: none"> <li>▶ 1x door station, 2-wire or 4-wire (SW switchable)</li> <li>▶ 1x FSP = free switching points plus sensor input</li> </ul>
<b>Width</b>	2-slot width
<b>Connection options</b>	BND, BNE, BNS, EXE all slots
<b>Cables</b>	2 x patch cables
<b>Note</b>	<ul style="list-style-type: none"> <li>▶ DHI and FSP functions available concurrently</li> <li>▶ DHI for connection to a 2-wire or 4-wire door station</li> <li>▶ DHI 4-wire and DHI 2-wire are software switchable</li> <li>▶ Door stations from Siedle and Grothe can be directly connected with no adaptation</li> <li>▶ Can also be used by floor (multi-family systems)</li> <li>▶ The door station module can incorporate a suitable amplifier both for the microphone and also for the speaker</li> <li>▶ FSP with 3 free switching points and 1 potential-free sensor input</li> <li>▶ Max. permissible voltage at the switching points: &lt; 30 Veff or &lt; 60 V DC</li> <li>▶ Max permissible current at the switching points: 1A</li> <li>▶ At the potential-free sensor input a voltage of &gt;7.3 V .. 20 V AC or DC must be present; this corresponds to an input current of &gt;1 mA, which activates the sensor</li> <li>▶ There must be no transfer of mains voltage to the system via the Western socket.</li> </ul>

The description of the connection of the Door stations is found in appendix 1.

## Plug-in module M4A (IOM, I5 D/E)

### Module view and socket allocation



## Short description M4A

Short description M4A

Short description M4A	
<b>Function</b>	3 x analog exchange lines, 1x analog subscriber
<b>Width</b>	4-slot width
<b>Connection options</b>	<ul style="list-style-type: none"><li>▶ BND, slot 4 or 8</li><li>▶ BNE, BNS, slot 4 or 8</li><li>▶ EXE slot 2 or 4</li></ul>
<b>Cables</b>	4 x patch cables
<b>Note</b>	<p><b>Only for Austria</b></p> <ul style="list-style-type: none"><li>▶ analog direct dial-in possible</li><li>▶ Inward dialling to an analog exchange line in accordance with the Austrian ÜFS standard.</li><li>▶ Direct dialling to a system subscriber possible (corresponds to point-to-point connection on an analog basis)</li><li>▶ Prior to disconnecting the module the exchange line must be disconnected</li></ul>

## Short description of the M4A exchange connection

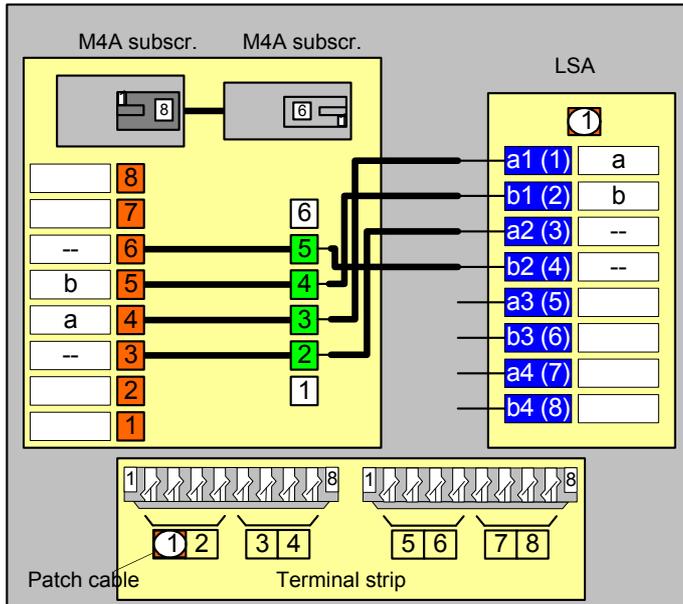
Short description of the M4A exchange connection	
<b>Exchange Connections</b>	<ul style="list-style-type: none"> <li>▶ Overvoltage protection to 4 kV</li> <li>▶ Pulse dialling or DTMF dialling procedures with country-specific settings</li> <li>▶ Country-specific meter pulse counting 12 kHz, 16 kHz</li> <li>▶ Call recognition with frequency and level evaluation, DC decoupling for NTA (network termination, analog)</li> <li>▶ a/b polarity reversal detection with loop current evaluation</li> <li>▶ Flash signalling</li> <li>▶ Reverse polarity protection</li> <li>▶ 2-wire/4-wire interface (fork switching)</li> <li>▶ max. feed voltage 57 V=</li> <li>▶ Power-cut switching with direct connection of the subscriber to the exchange line</li> <li>▶ Calling Line Identification Presentation (CLIP), symmetrical connection</li> <li>▶ Coherer circuit (fitting option)</li> <li>▶ Feed current 20 .... 40 mA (country specific configuration possible with variant fittings)</li> <li>▶ PTC input protection configuration (fitting option, France)</li> <li>▶ In the event of a power-cut, the subscriber (Western socket 1) is connected directly to the exchange (Western socket 2).</li> </ul>

## Short description of the M4A subscriber connection

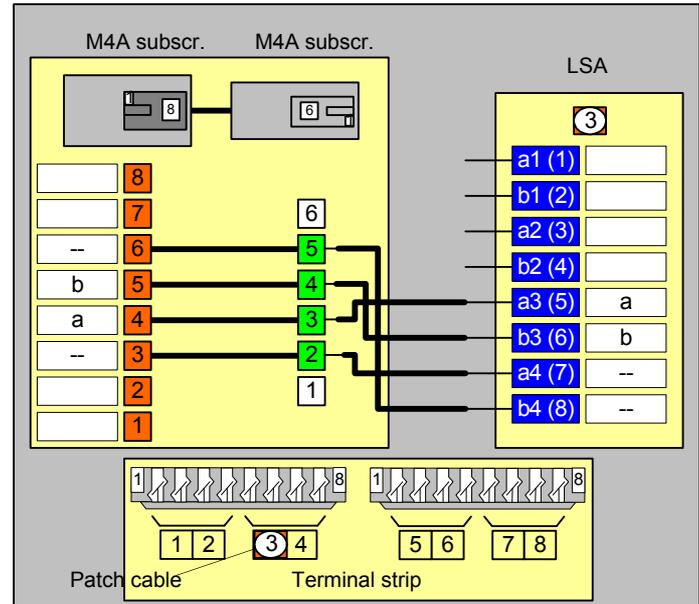
Short description of the M4A subscriber connection	
<b>Subscriber Connection</b>	<ul style="list-style-type: none"> <li>▶ Symmetrical call connection (35 .... 40 Veff)</li> <li>▶ 2-wire/4-wire interface (fork switching)</li> <li>▶ Feed polarity reversal</li> <li>▶ Loop current identification (flash, on-hook, off-hook)</li> <li>▶ Ranges for telephone station feed with -40 V, permissible cable resistance included Device resistance 800 Ohm (range for 20 mA):</li> <li>▶ Installation cable 0.4 mm<sup>2</sup> (J-Y(St)Y2x2x0.4) :ca. 1350 m</li> <li>▶ Installation cable 0.6 mm<sup>2</sup> (J-Y(St)Y2x2x0.6) :ca. 2900 m</li> <li>▶ Clip display on subscriber instrument</li> </ul>

## M4A – subs circuit using MDF

M4A- subscr. using HVT (using 1st Western socket HVT)

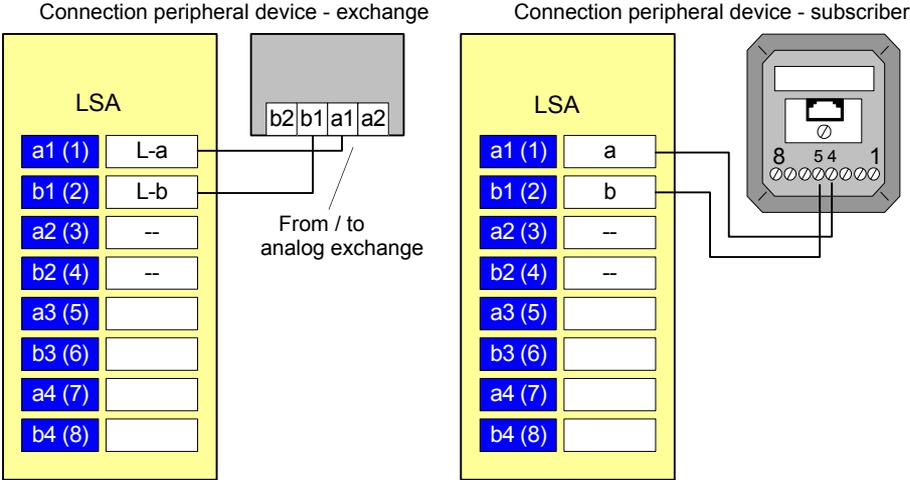


M4A- subscr. using HVT (using 3rd Western socket HVT)



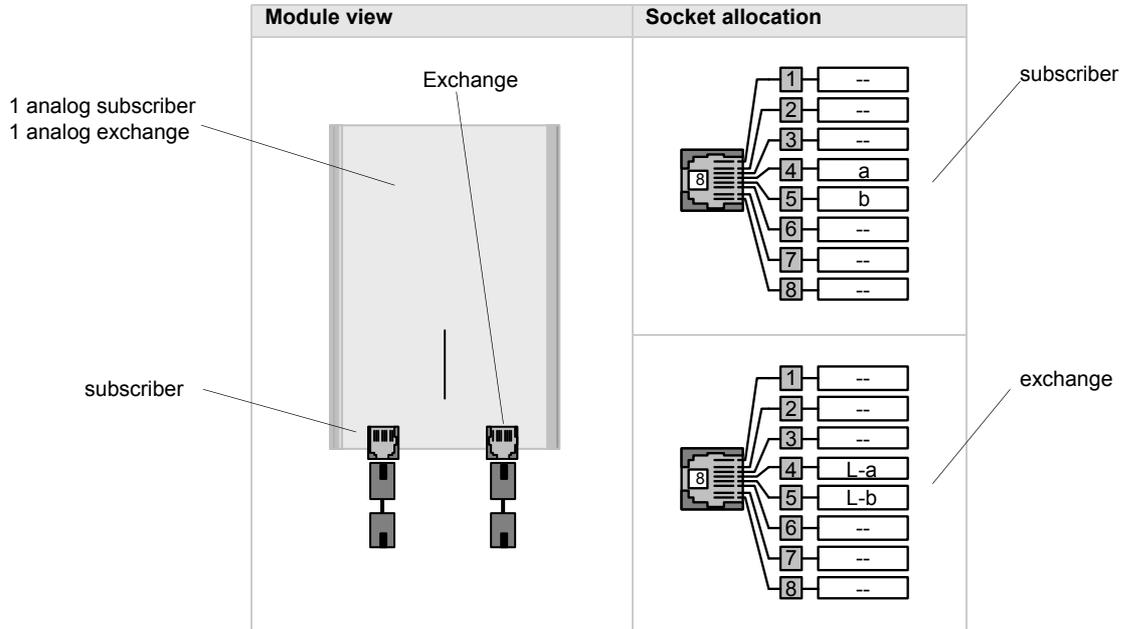


### Peripherals circuit using MDF



## Plug-in module MA2 (IOM, I5 D/E)

### Module view and socket allocation



## Short description of the MA2

Short description of the MA2

Short description of the MA2	
<b>Function</b>	1 x analog line, 1 x analog subscriber
<b>Width</b>	2-slot width
<b>Connection options</b>	BND, BNE, BNS, EXE, all slots
<b>Cables</b>	2 x patch cable 1
<b>Note</b>	Prior to disconnecting the module the exchange line must be disconnected

Short description of the MA2 exchange connection

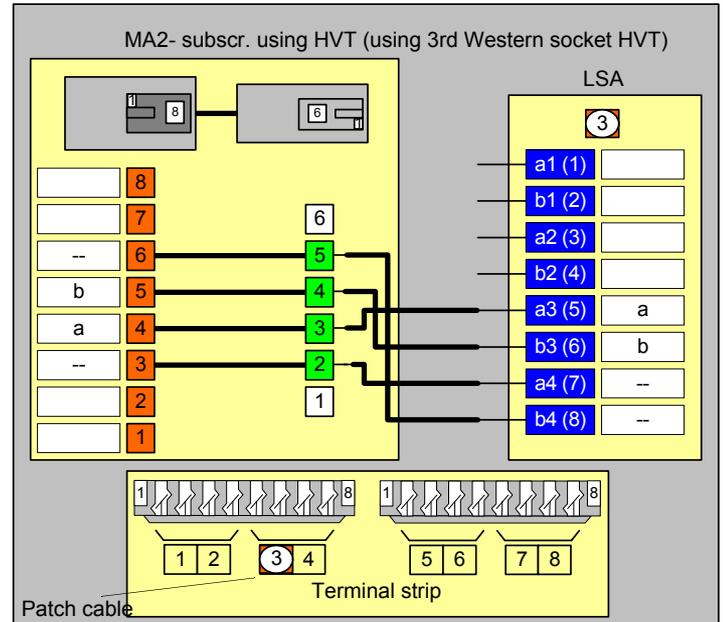
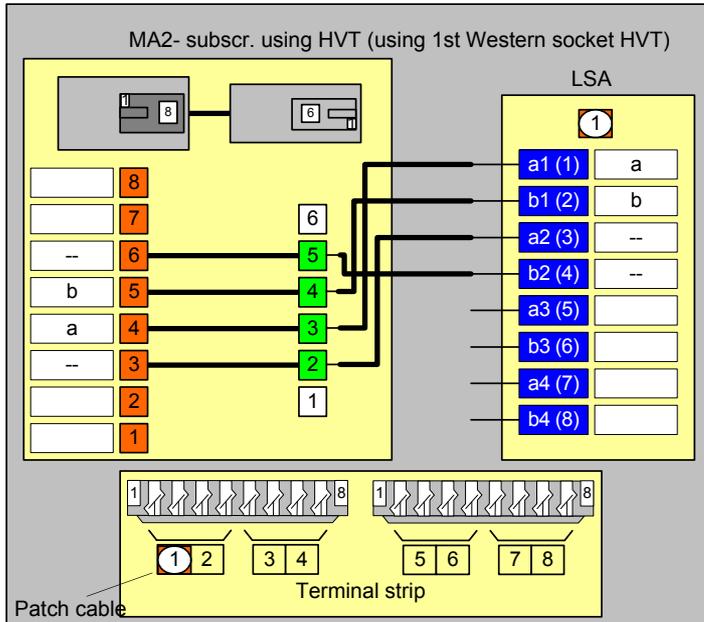
Short description of the MA2 exchange connection
<ul style="list-style-type: none"> <li>▶ Pulse dialling or DTMF dialling procedures with country-specific settings</li> <li>▶ Country-specific meter pulse counting 12 kHz, 16 kHz</li> <li>▶ Call recognition with frequency and level evaluation</li> <li>▶ DC decoupling for NTA (network termination, analog)</li> <li>▶ a/b polarity reversal with loop current evaluation</li> <li>▶ Flash signalling</li> <li>▶ Reverse polarity protection</li> <li>▶ Power-cut switching with direct connection of the subscriber to the exchange line</li> <li>▶ CLIP</li> <li>▶ Coherer circuit (fitting option) / country variants</li> <li>▶ PTC input protection configuration (fitting option, France)</li> </ul>

## Short description of the MA2 subscriber connection

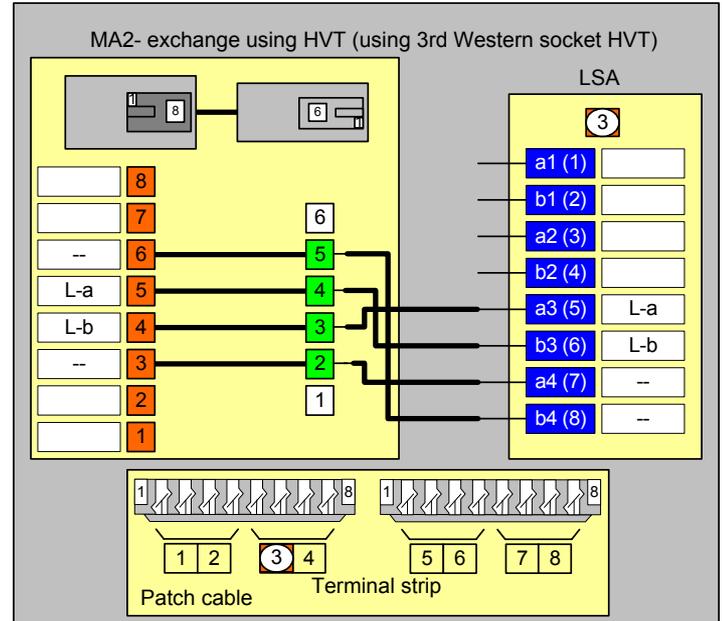
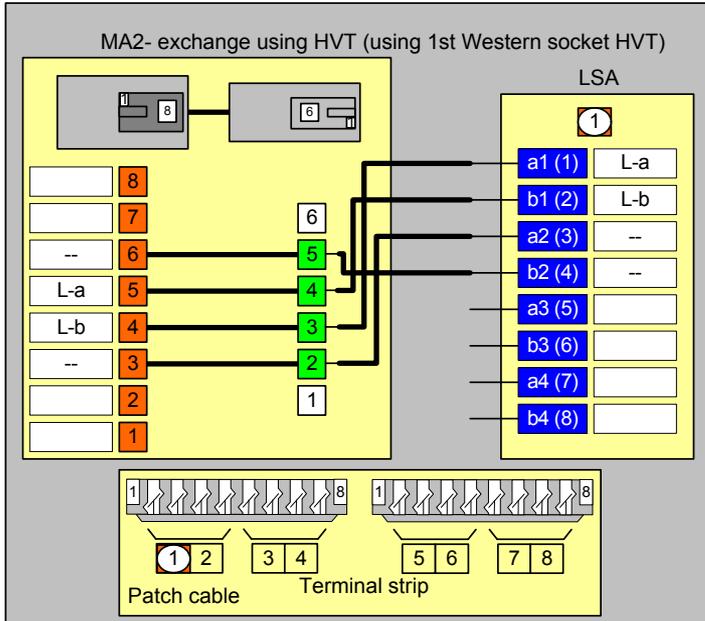
**Short description of the MA2 subscriber connection**

- ▶ Feed current 20..40 mA (country-specific configuration using variant fittings)
- ▶ Ringing voltage (35...40 V<sub>eff</sub>)
- ▶ Feed polarity reversal
- ▶ Loop current identification (flash, on-hook, off-hook)
- ▶ Ranges for telephone station feed with -40 V, permissible cable resistance included  
Instrument resistance 800 Ohm
- ▶ Ranges when using 20 mA:
  - with installation cable with 0.4 mm Ø up to approx. 1350 m
  - with installation cable with 0.6 mm Ø up to approx. 2900 m
- ▶ CLIP display on subscriber instrument
  
- ▶ Only Austria:
  - Analog direct dial-in possible
  - Inward dialling of an analog exchange line in accordance with the ÜFS standard.
  - Direct dialling to a system subscriber possible (corresponds to point-to-point connection on an analog basis).

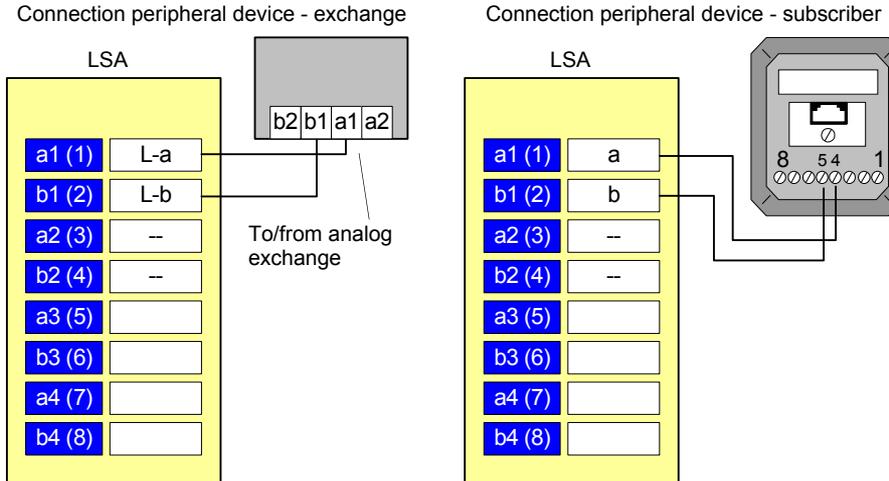
### MA2 – subscriber circuit using MDF



**MA2 – exchange circuit using MDF**



## Peripherals circuit using MDF

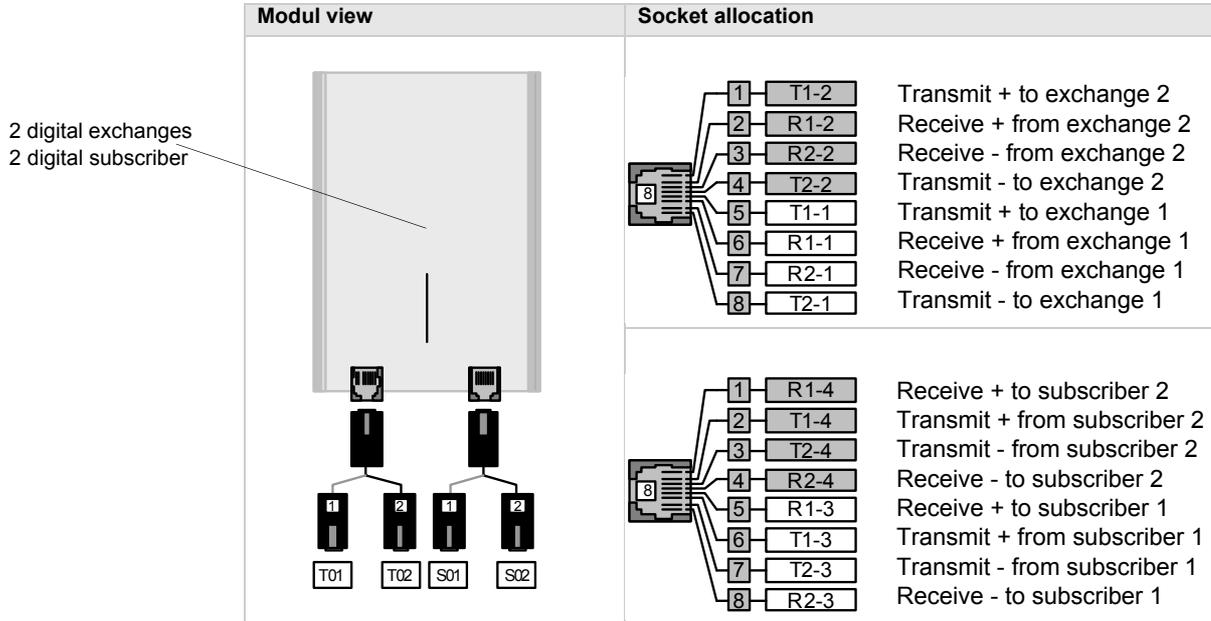


Connections from distributor to external connection points can be made using installation cable J-Y(St)Y 2 x 2 x 0.6.

In this case to the analog connection socket of the network operator, or to a UAE socket for connection to an analog telephone.

## Plug-in module MS4 (IOM, I5 D/E)

### Module view and socket allocation



## Short description of MS4

Short description of module

Short description of module	
<b>Function</b>	2 x T0, 2 x S0
<b>Width</b>	2-slot width
<b>Connection options</b>	<ul style="list-style-type: none"> <li>▶ BND: max. 2 x per system</li> <li>▶ BNE/BNS: max. 2 x</li> <li>▶ BND, BNE, BNS, all slots</li> </ul>
<b>Cables</b>	2 x Y patch cables
<b>Note</b>	<ul style="list-style-type: none"> <li>▶ Left hand socket: 2 x T0</li> <li>▶ Right hand socket: 2 x S0, each terminated with 100 Ohm</li> <li>▶ Unplugging and plugging in under power is permissible</li> </ul>

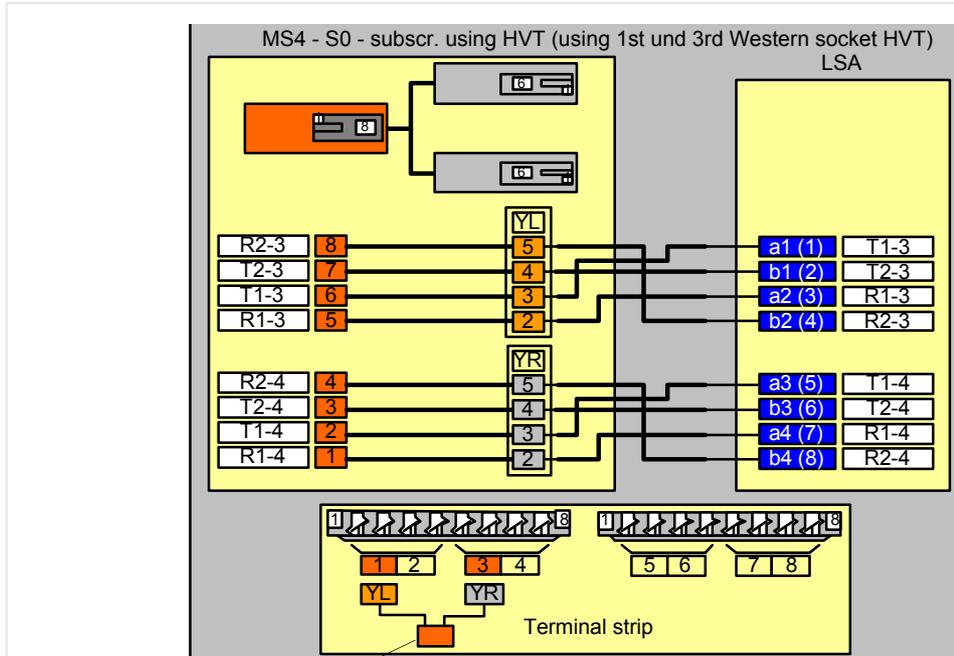
Short description of exchange connection

Short description of exchange connection
<ul style="list-style-type: none"> <li>▶ Left hand socket: 2 x T0, the T0 connection does not require a power supply</li> <li>▶ No 100 Ohm termination, no earth reference for the rough lightning strike protection, insulation principle</li> <li>▶ Without exchange synchronisation operates at high precision internal clock, otherwise synchronised to the exchange</li> <li>▶ T0 data see T8S</li> </ul>

Short description of subscriber connection

Short description of subscriber connection
<ul style="list-style-type: none"> <li>▶ Right hand socket: 2 x S0, each terminated with 100 Ohm</li> <li>▶ Range: Point to point: &lt;= 1000m, shorter passive bus: &lt;= 100m, extended passive bus: &lt;= 500 m</li> <li>▶ See SXS for further data</li> </ul>

Connecting MS4 T0/S0 using MDF



**Connection:**

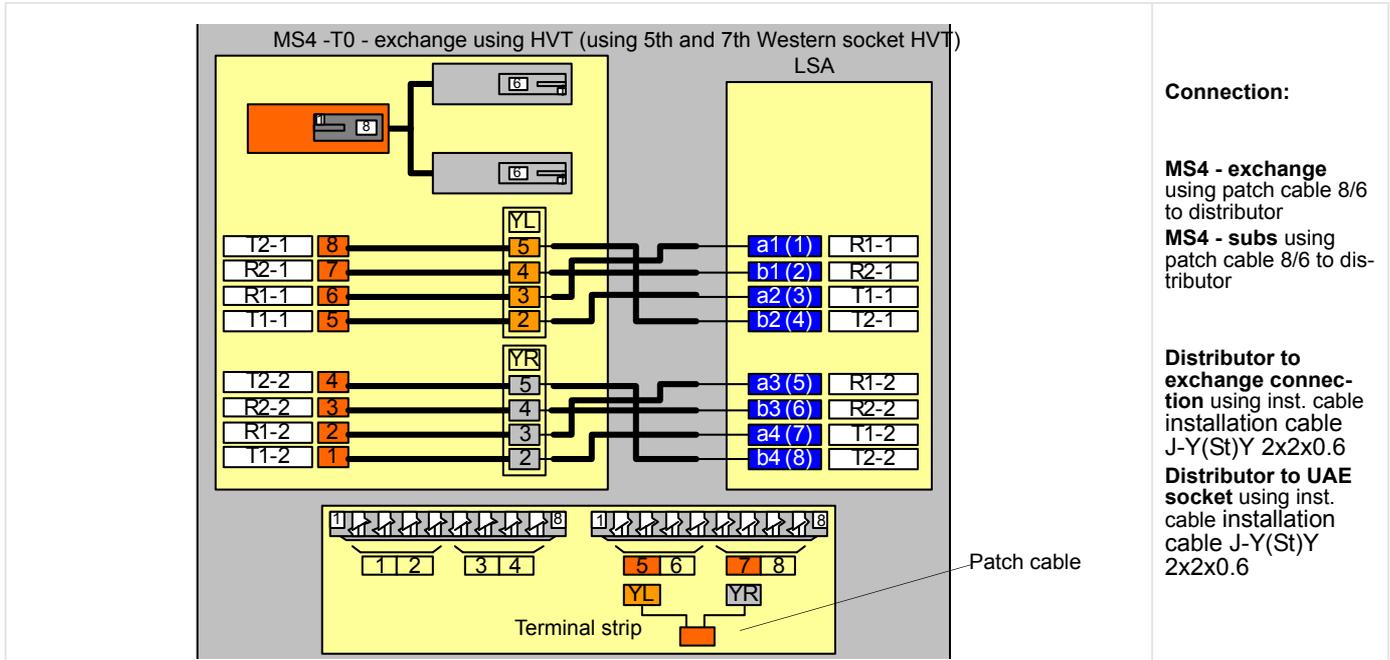
**MS4 - exchange**  
using patch cable 8/6  
to distributor

**MS4 - subs** using  
patch cable 8/6 to  
distributor

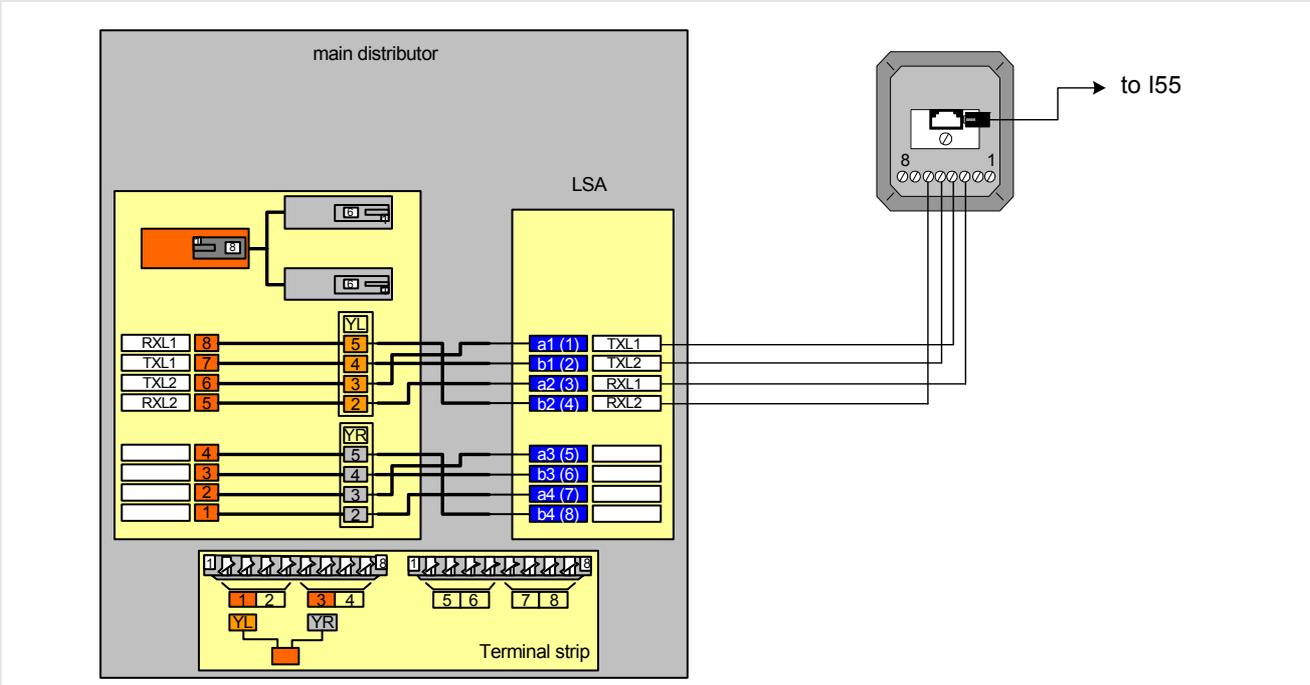
**Distributor to  
exchange  
connection** using  
inst. cable  
installation cable  
J-Y(St)Y 2x2x0.6

**Distributor to UAE  
socket** using inst.  
cable installation  
cable J-Y(St)Y  
2x2x0.6

## Connecting MS4 T0/S0 using MDF



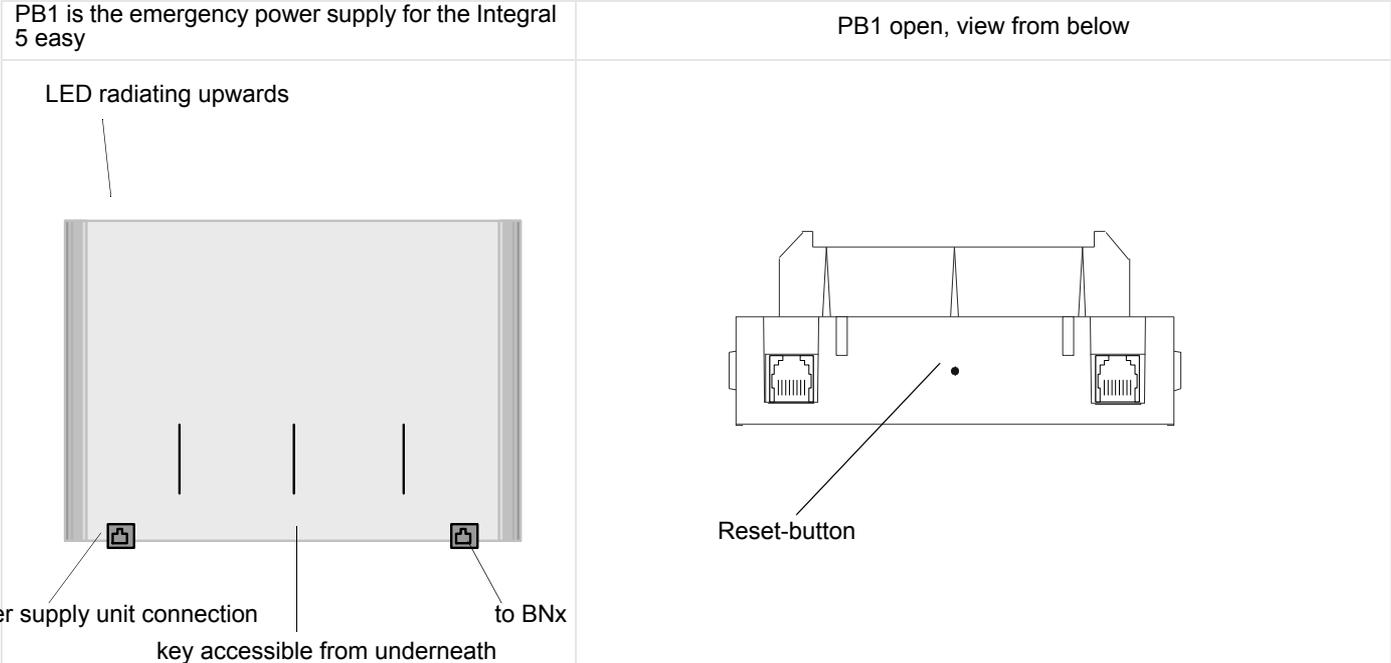
I55 <----> I5 connection via QSIG to/via MS4

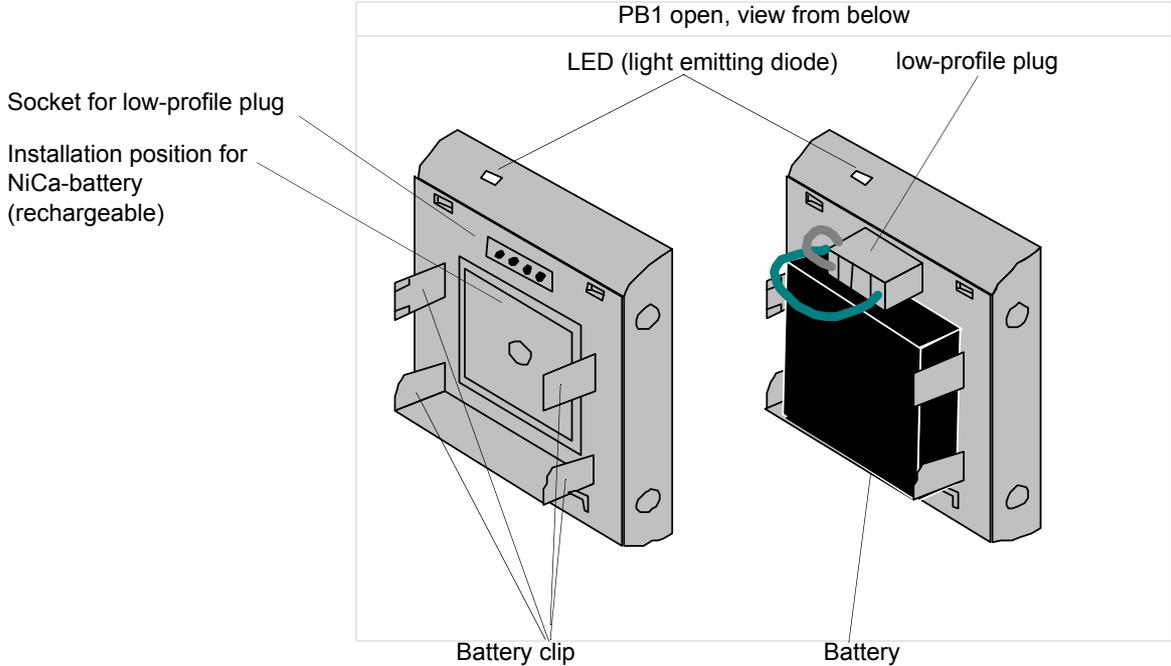




# PB1 (emergency power supply)

## Module views





## Short description PB1

Short description of PB1	
<b>Function</b>	The PB1 plug-in module is the integral emergency power supply for the Integral 5.
<b>Width</b>	123 / 120 mm (corresponding to half the BNx width)
<b>Height</b>	140 / 125 mm (corresponding to height of BNx)
<b>Mounting</b>	with one screw
<b>Cables</b>	1 x patch cable
<b>Note</b>	<ul style="list-style-type: none"><li>▶ I5 D: 1x PB1 is connected between plug-in mains unit and system.</li><li>▶ I5 E: The number of PB1 modules depends on the number of required plug-in mains units.</li></ul>

## Further information

### Further information

The plug-in module is fed only with a voltage of (–40 Volt) from the external plug-in mains unit; this supplies the BNx basic modules.

All other system voltages +14 Volt, +5 Volt are created directly on the PB1 circuit board by DC/DC converters. In the case of a power-cut, the negative feed voltage of -39 Volt is produced by the discreetly assembled DC/DC converter and sent to the output socket.

There is space in the PB1 module for an NC battery pack with 8 cells (9.6 V), which provides power during a power-cut.

The battery cells are charged during normal operation by means of a charging switching.

It is, however, possible to connect an external lead-acid battery (+12 Volt) instead.\*

The  $\mu$ P system monitors the charging and switches off as required. (Protection against total discharge)

An LED with optical fibres is installed on the circuit board for signalling the internal status.

The rechargeable NC battery directly within the module provides a direct emergency power supply even if no other rechargeable batteries are connected.

The battery operation time varies between approx. 15 and 60 minutes between min. and max. load operation, depending on configuration and activity in the Integral 5.

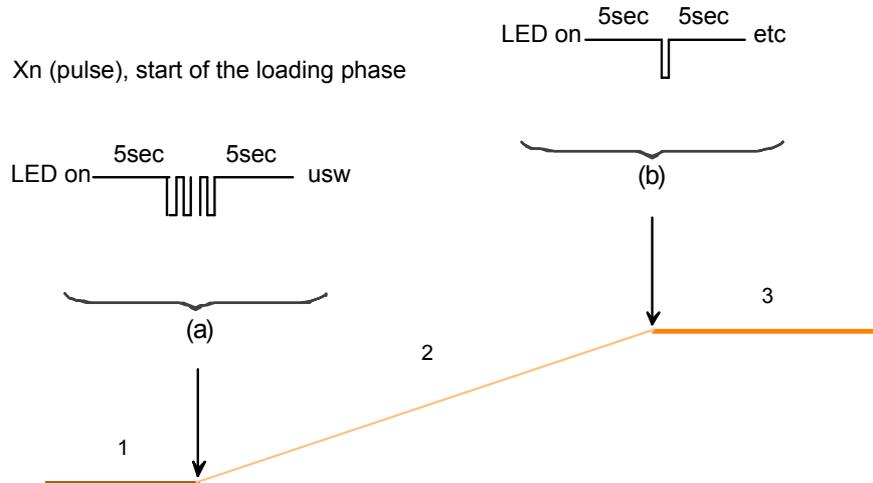
**The  $\mu$ P system measures all necessary times, states and voltages, controls charging and the need for discharging "for maintenance" and also battery testing.**

<b>Dangerous Voltages</b>	The plug-in mains unit is of protection class 2. Its output voltage is an innocuous SELV voltage. All voltages produced internally and sent to the PB1 module are also SELV voltages.
<b>LED to the Status Display</b>	The various states of the charging and discharging are signalled by the flashing LED. During charging, the signalling is via pauses in blinking. In the case of a power-cut, signalling is via pulses. A pause of 5 sec. follows a blink sequence to avoid ambiguity.
<p><b>* an external battery (e.g. car battery (lead gel)) requires its own charger.</b></p>	

## LED (flashing rhythm / signalling)

 The charging cycle always begins after inserting the plug-in mains unit

**Charging phase (charging time approx. 15 hr. with known NiCd batteries)** 1 pulse end of the loading phase



## Further information on the charging phase

**Further information on the charging phase**

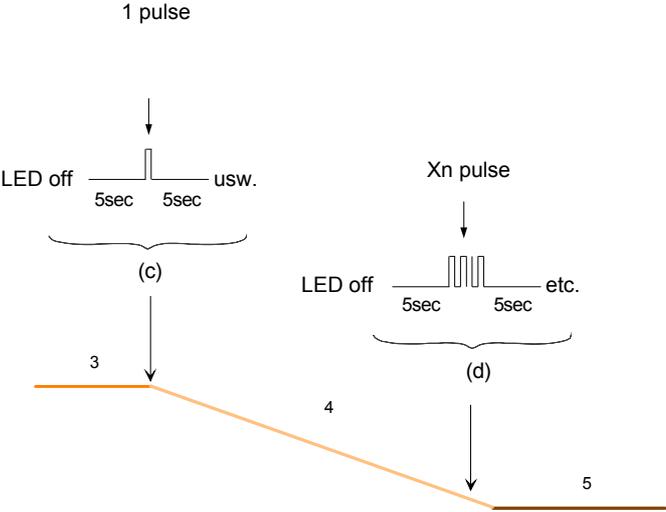
PB1 is installed, battery is connected, the **supplied, coded SV** cable between PB1 and BNx is plugged in:

**the status of the PB1 is signalled after inserting the plug-in mains unit as follows:**

- ▶ The initialization phase begins (phase 1)
- ▶ LED flashes very rapidly (duration approx. 10 sec.) -----> after which the LED
- ▶ in the case of a NiCd battery is unlit (also for approx. 10 sec.)
- ▶ in the case of a lead gel battery remains on -----> after which the LED starts to flash (pulse) once a second
- ▶ When it is detected that a battery is connected, the charging phase begins (phase 2); the number of flash pulses changes during the charging phase
- ▶ At the start of the charging phase (a) the number flash pulses is high ( $x_n$  pulses) LED 5sec. on >  $x_n$  pulses > LED 5 sec. on >  $x_n$  pulses etc. and decreases towards the end of the charging phase (b)

After the battery has been charged (phase 3), the LED flashes at a constant rate (b), i.e. **LED 5sec. on ---> 1 pulse ---> LED 5 sec. on ---> 1 pulse etc.**

**Discharge Phase**



**Further information on the charging phase**

In the event of power failure or removal of the plug-in mains unit, the PABX Integral 5 is powered from battery; the battery discharges.

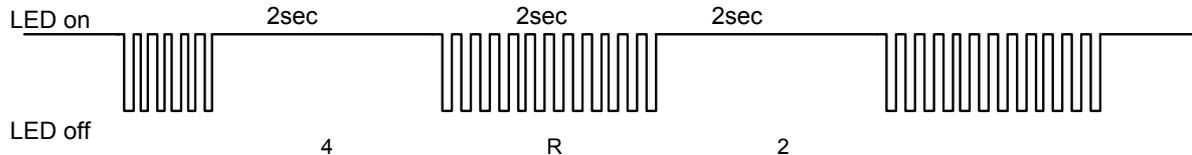
The discharge phase begins (4); the number of flash pulses changes during the discharge phase.

The start of the discharge phase (c) is signalled by a flash pulse, LED 5sec. off -> 1 pulse --> LED 5 sec. off -> 1 pulse etc.

The end of the discharge phase (d) is signalled by  $x_n$  pulses, LED 5 sec. off ->  $x_n$  pulses -> LED 5 sec. off ->  $x_n$  pulses etc.

If point d is reached, the PB1 switches off (protection against total discharge).

## Battery Test



### Testing of the charged battery

In network operation (i.e. plug-in mains unit inserted), the battery test is activated by a button accessible from outside.

Press key for approx. 2 sec. (release in area 4) ---> test starts (at present, preset test duration time is 15 min.)

if the reference voltage ( $U_{min}$ ) is not reached during the test duration time, the test is o.k., i.e. the PABX Integral 5 may be powered in the existing configuration for at least 15 min. with this battery in the case of power failure.

After the successful test, the PB1 begins again with charging of the battery automatically, i.e. with the initialization phase (see "Charging phase (1)").

If the reference voltage ( $U_{min}$ ) is reached during the test duration time, the test is not o.k., i.e. the PABX Integral 5 can no longer be powered in the existing configuration for at least 15 min. with this battery in the case of power failure.

This is signalled by needle pulses and the PB1 begins again with charging of the battery automatically

This needle pulse signalling remains visible until a reset of this display is executed

This reset is executed by pressing and holding the key approx. 4 sec. and releasing in area R.

## Re-charging Battery

### Re-charging Battery

- ▶ Under certain circumstances, it may be vital to restart the charging process, e.g. if a battery replacement during operation is required.
- ▶ To do this, press the button for approx. 6 sec (release in area 2).
- ▶ Charging process is started beginning with the initialization phase (see "Charging phase (phase 1)").

## Switching off the supply voltage (to BNx or IP module)

### Switching off the Integral 5 easy

Proceed as follows to switch off the supply voltage to the BUx or EUx or IP module:

#### Variant 1:

- ▶ Open the battery cover and unplug the battery plug (from all PB1 modules)
- ▶ Then unplug the plug-in mains units or switch off the multi-socket extension
- ▶ After reconnecting the mains supply, plug in the battery plugs again

#### Variant 2: (only if there is only 1 x PB1 in the system)

- ▶ First unplug the plug-in mains units or switch off the multi-socket extension from the socket, or switch off the main supply.
- ▶ Press button for approx. 6 sec. (release in area 2) ---> the power supply to the BUx or EUx or IP module will be switched off.
- ▶ Check whether the LED is really unlit.
- ▶ To switch the system back on, insert the plug-in mains unit back into the socket.

- ▶ Never remove the **supplied, coded** SV cable between PB1 and BNx or EXE or IP module during operation!
- ▶ Always carry out procedure for switching off! Never unplug or insert a live IOM or LAN extension cable!

## Battery/accumulator change

### Battery/accumulator change

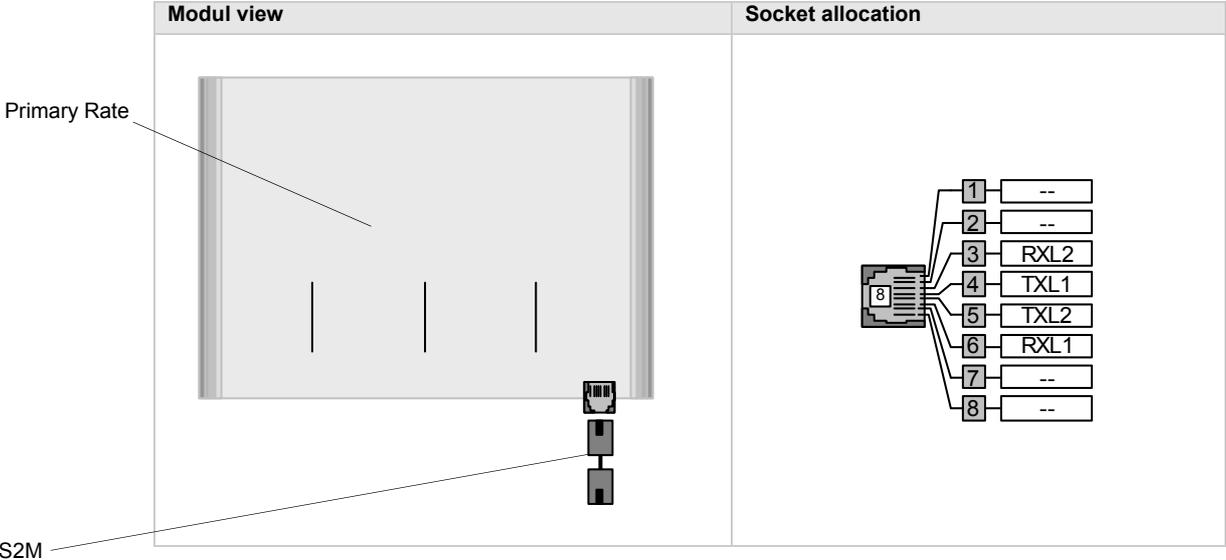
Changing NiCd battery (accumulator):

- ▶ Withdraw the flat plug (3) (of battery)
- ▶ Remove the rechargeable battery from its holder



# Plug-in module PRI (LAN, I5 E)

## Module view and socket allocation



## Short description PRI

Short description of PRI	
<b>Function</b>	The PRI (Primary Rate Interface) is an intelligent plug-in module which creates the connection within the system to a Primary Rate Connection (2 Megabit).
<b>Width</b>	4-slot width
<b>Connection options</b>	<ul style="list-style-type: none"> <li>▶ BND: no PRI</li> <li>▶ BND/BNS: max. 1 x per system</li> <li>▶ BNE, BNS, slot 4 or 8</li> <li>▶ EXE slot 2 or 4</li> </ul>
<b>Cables</b>	1 x patch cable

## Module-specific data

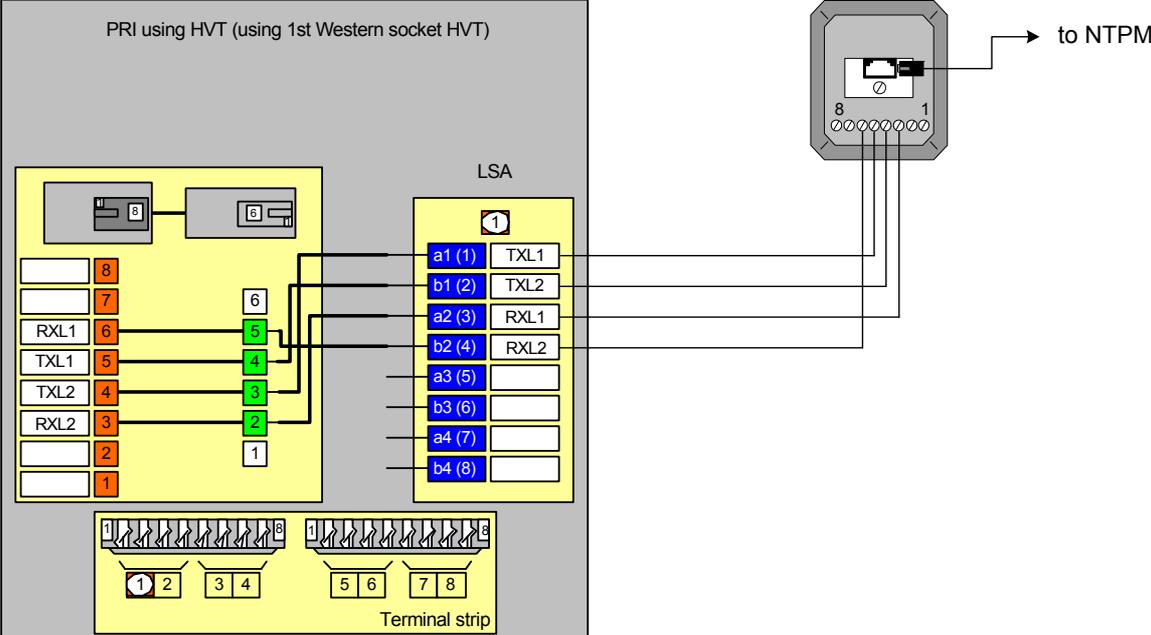
Module-specific data
▶ 32 channels each with 64 kbps (2048 kbps in total); 30 B channels, one D channel and one channel used for purposes of synchronisation
▶ Transmission medium: 2 symmetrical twin wires (screened)
▶ Range: approx. 100 m (6dB)
▶ Pure point to point connection
▶ Level 1 is always active (no up or down procedures)
▶ Constant automatic monitoring of the correct level 1 functions

Module-specific data (continued)	
	<ul style="list-style-type: none"> <li>▶ Two isolating transformers ensure the necessary electrical separation from the peripherals.</li> </ul>
	<ul style="list-style-type: none"> <li>▶ All the instructions for programming digital or analog exchange lines also apply to the PRI module. The code numbers correspond to the criteria for programming <math>T_0</math> lines.</li> </ul>
	<ul style="list-style-type: none"> <li>▶ The management of the lines is dynamic. The assignment of a line number proceeds independently of the B channel number. (I.e. line 4 can have the channel number 30 and line 30 the channel number 2).</li> </ul>
	<ul style="list-style-type: none"> <li>▶ In Germany the installation of an <math>S_2M</math> connection is always combined with the allocation of 30 B channels.</li> </ul>
	<ul style="list-style-type: none"> <li>▶ As the use of all 30 B channels of the PRI module corresponds to the maximum extension of the system from the exchange side, in this case no further <math>T_0</math> connections or analog exchange line junctions are allowed to be configured.</li> </ul>
	<ul style="list-style-type: none"> <li>▶ If nevertheless additional digital or analog exchange connection organs are configured, the useable number of B channels is reduced accordingly.</li> </ul>
<p><b>The synchronization of the Integral 5 clock generator to the reference pulse of the public network can be done:</b></p>	<ul style="list-style-type: none"> <li>▶ Using a <math>T_0</math> interface (MSN or TK)</li> <li>▶ Using a <math>S_2M</math> interface</li> <li>▶ In the case of an MSN connection, levels 1 and 2 of the <math>T_0</math> interface are deactivated if the <math>T_0</math> line is not busy.</li> <li>▶ In the case of a TK connection, levels 1 and 2 are activated.</li> <li>▶ For an <math>S_2M</math> interface, levels 1 and 2 remain activated. Consequently the synchronization is prioritized principally on the <math>S_2M</math> interface, since in the case of the <math>T_0</math> line (MSN) the synchronisation clock is switched off at the end of the connection.</li> <li>▶ If the PRI module fails or the <math>S_2M</math> path is interrupted, the synchronization takes place on an exchange plug-in module with <math>T_0</math> interface that has access to a <math>T_0</math> line. If no <math>T_0</math> line is available synchronization is internal. (as for <math>T_0</math> with MSN in inactive state, when there is no call connection)</li> <li>▶ When the PRI module reports back again, the system ends the synchronization process on the <math>T_0</math> interface and changes over to the <math>S_2M</math> interface.</li> </ul>

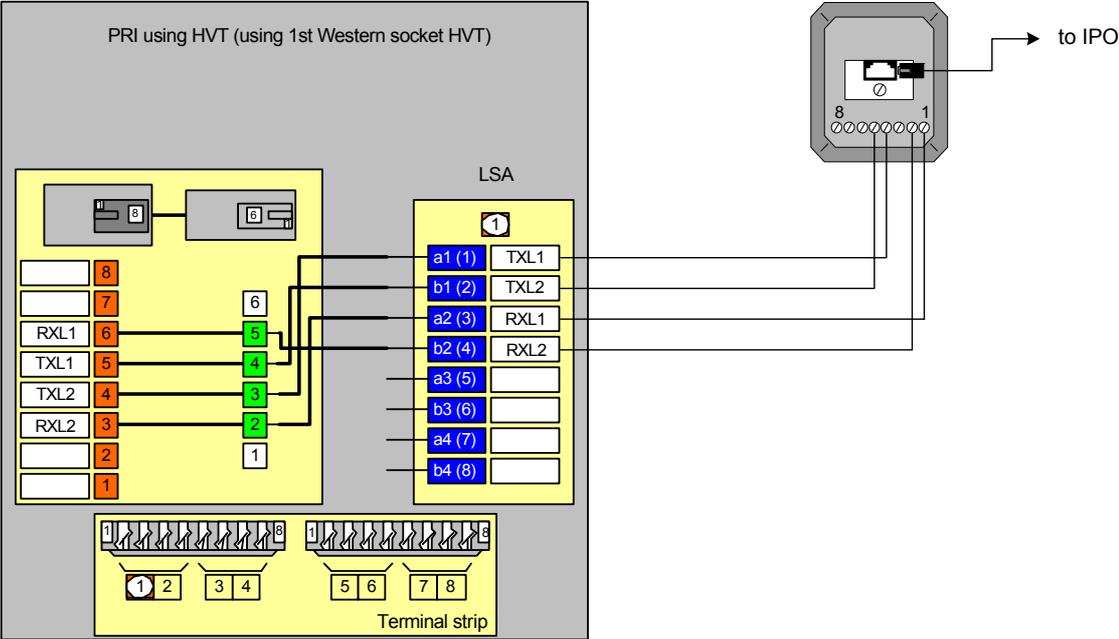
## Connection to NTPM using a UAE socket



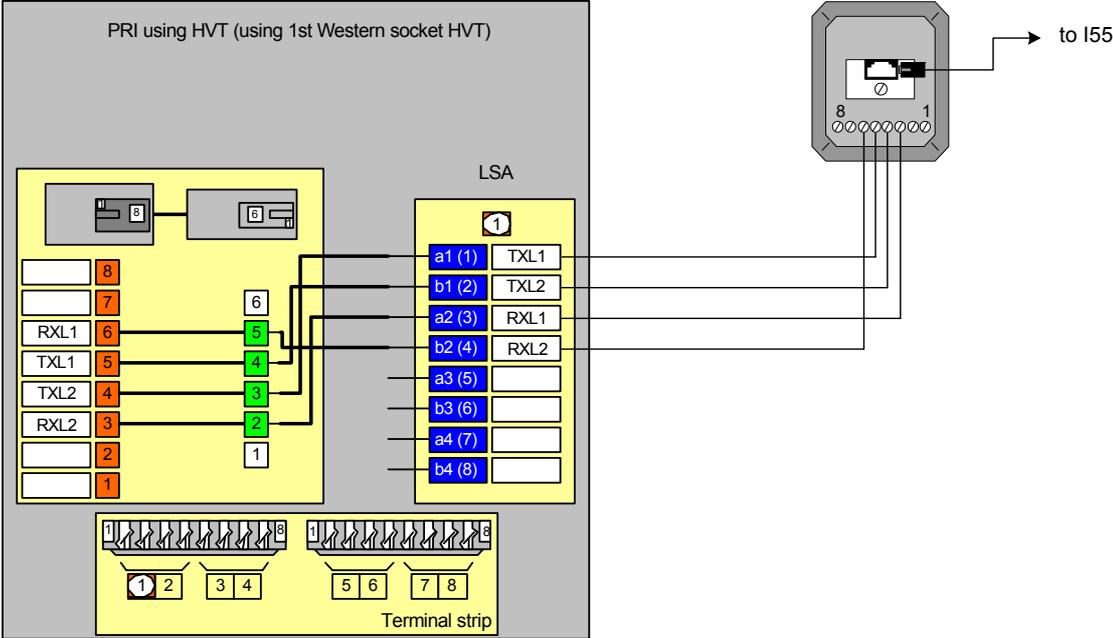
Connection to NTPM using the MDF



IPO <----> I5 connection via QSIG to/via PRI



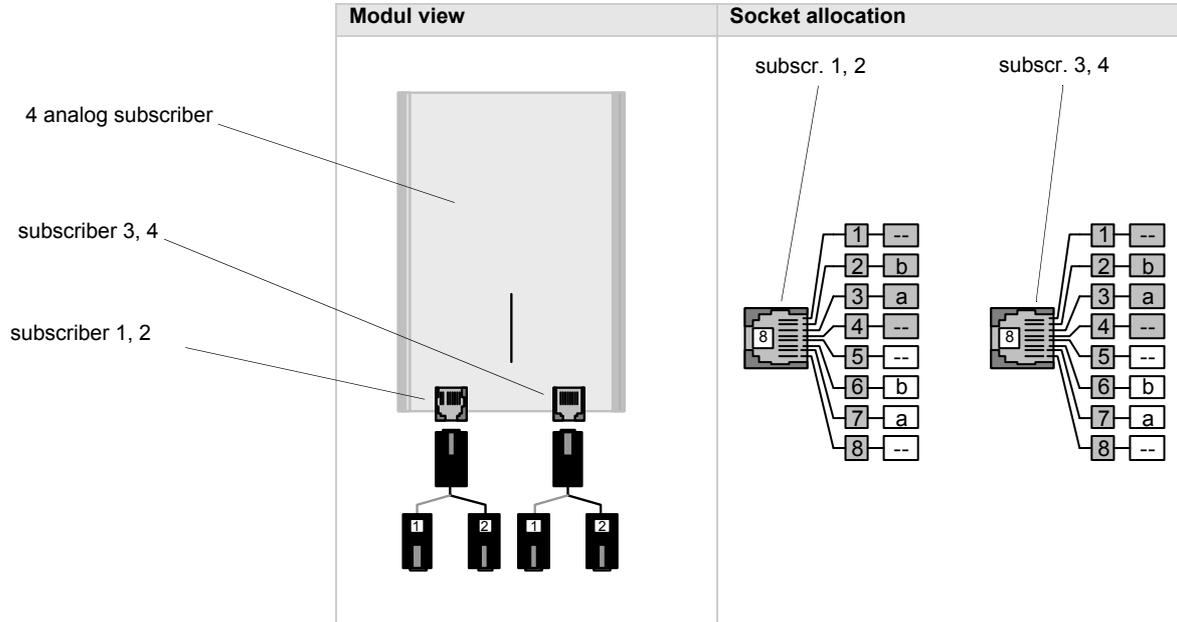
I55 <---> I5 connection via QSIG to/via PRI





## Plug-in module S4A (IOM, I5 D/E)

### Module view and socket allocation

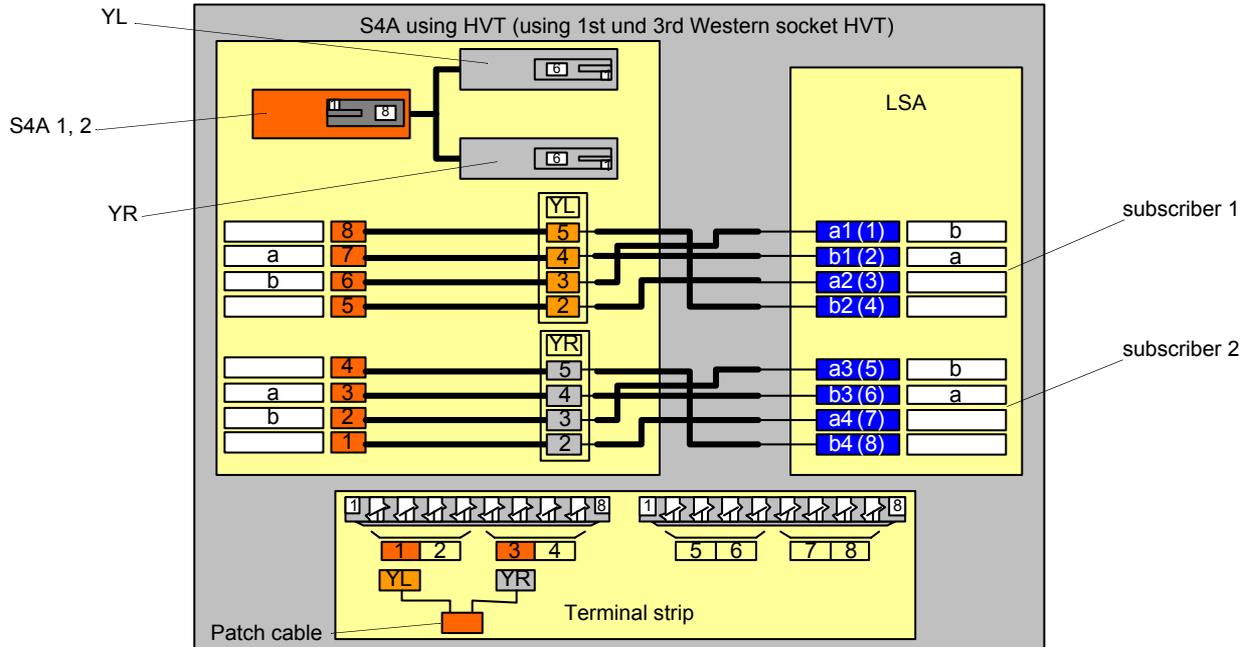


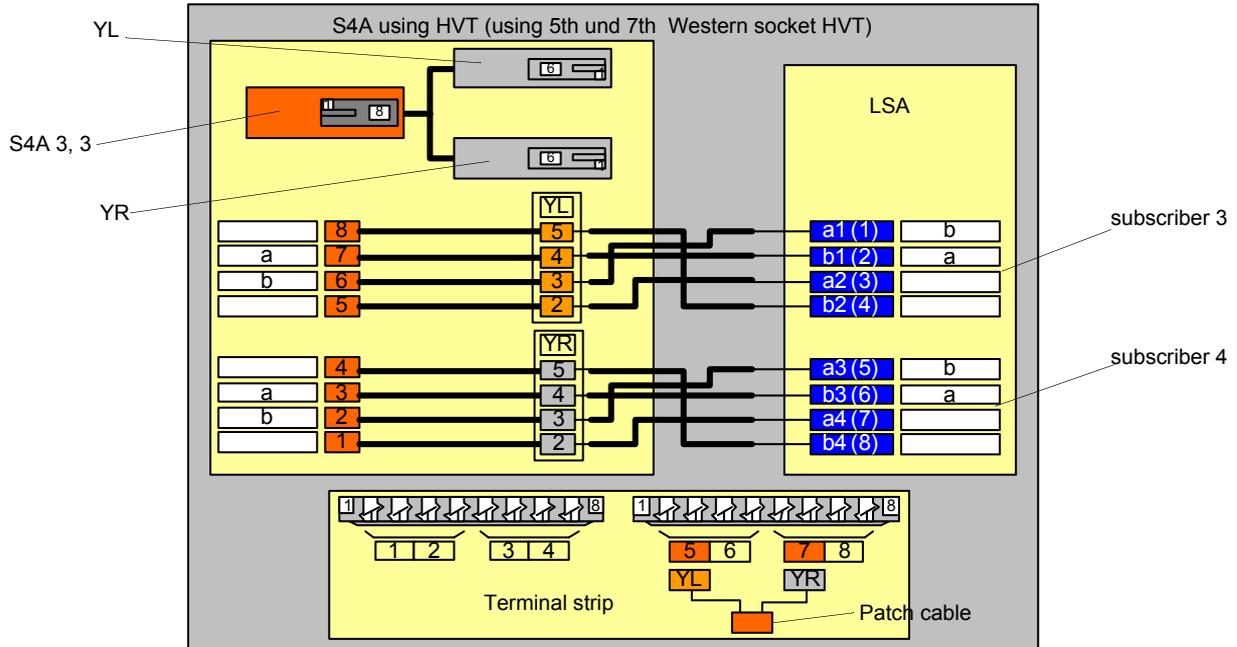
## Short description of S4A

Short description of module

Short description of module	
<b>Function</b>	4 x analog subscribers
<b>Width</b>	2-slot width
<b>Connection options</b>	BND, BNE, BNS, EXE all slots
<b>Cables</b>	2 x Y patch cables
<b>Note</b>	<ul style="list-style-type: none"><li>▶ Left hand socket: 2 x analog subscribers 1, 2</li><li>▶ Right hand socket: 2 x analog subscribers 3, 4</li></ul>

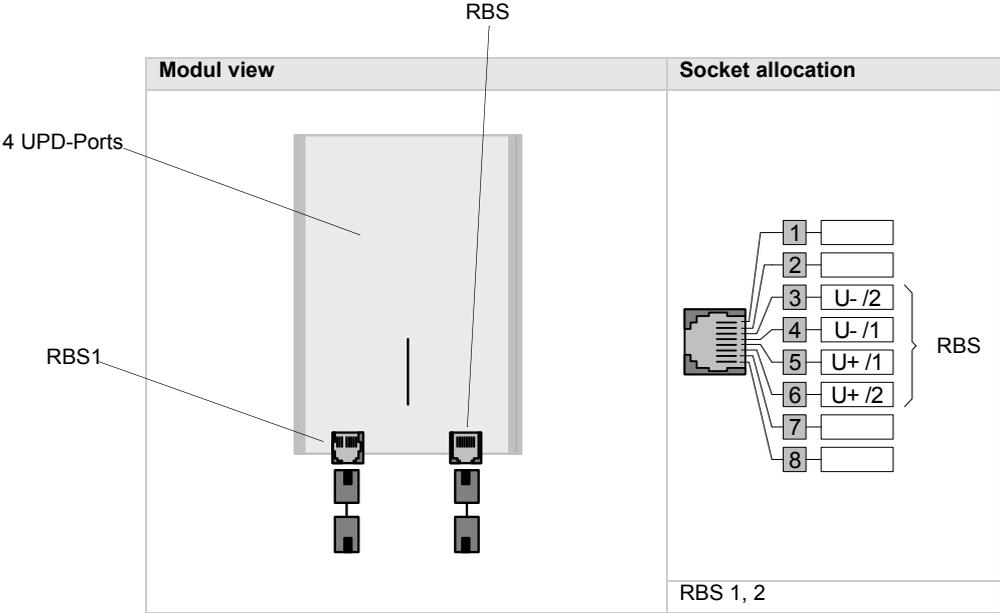
### Analog connection using MDF





# Plug-in module S4D (IOM, I5 D/E)

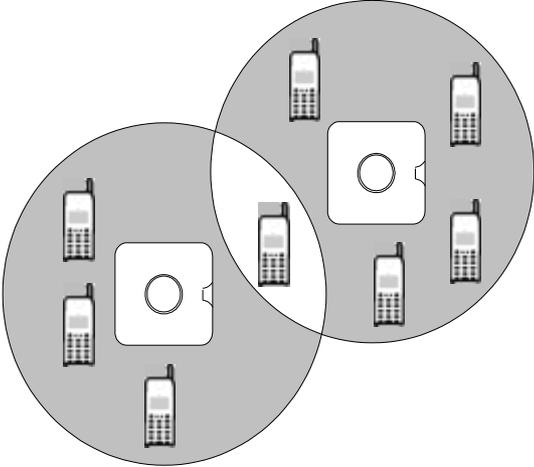
## Module view and socket allocation



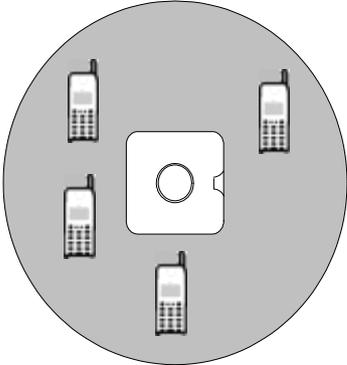
## Short description of S4D

Short description of S8D	
<b>Function</b>	<ul style="list-style-type: none"><li>▶ 4 UPD ports for connecting 2 DECT RBSs (4 B channels ADPCM per RBS)</li><li>▶ 1 digital signal processor (DSP), 8 simultaneous calls possible</li></ul>
<b>Width</b>	2-slot width
<b>Connection options</b>	BND: all slots, max. 4 x per system BNE, BNS, EXE: all slots, max. 4 x using IOM-EXE -> max. 8 x per system
<b>Cables</b>	<ul style="list-style-type: none"><li>▶ 2 x patch cables</li><li>▶ Installation cable 0.6 mm<sup>2</sup> (J-Y(St)Y2x2x0.6): length approx. 1,000 m</li></ul>
<b>Note</b>	<ul style="list-style-type: none"><li>▶ If an S4D is plugged into an EXE, the EXE must have its own plug-in mains unit</li></ul>

Summary of the radio ranges

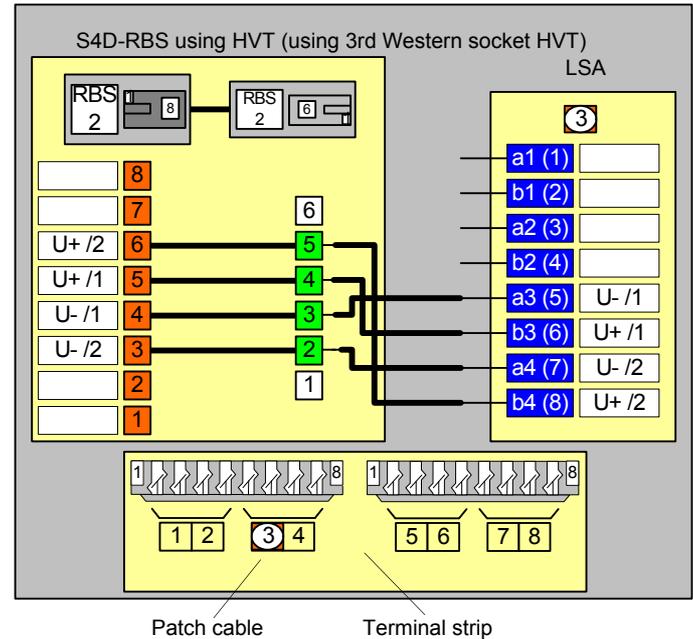
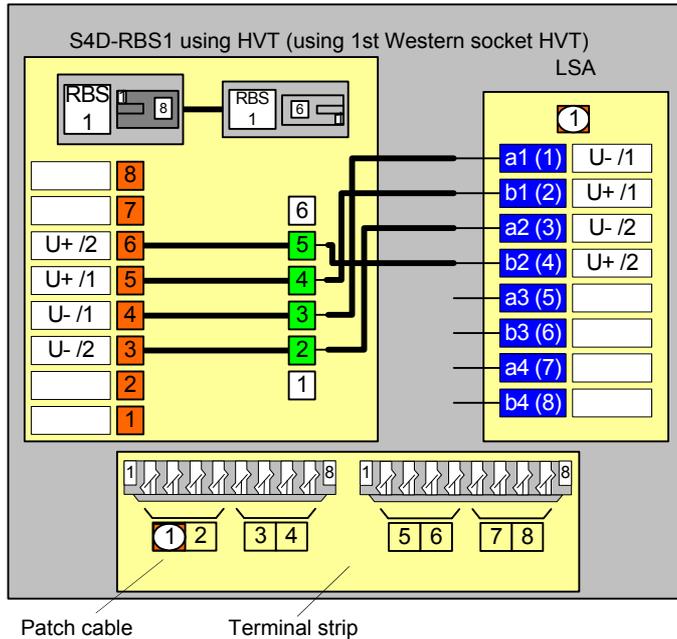


Overlapping radio range with automatic handover



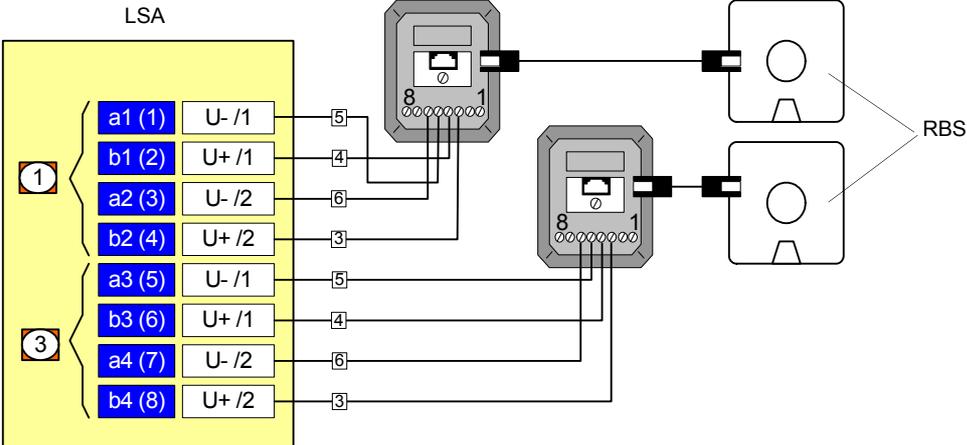
Non-overlapping radio ranges, no handover, connection is lost

### Connecting RBS1 and RBS2 using MDF



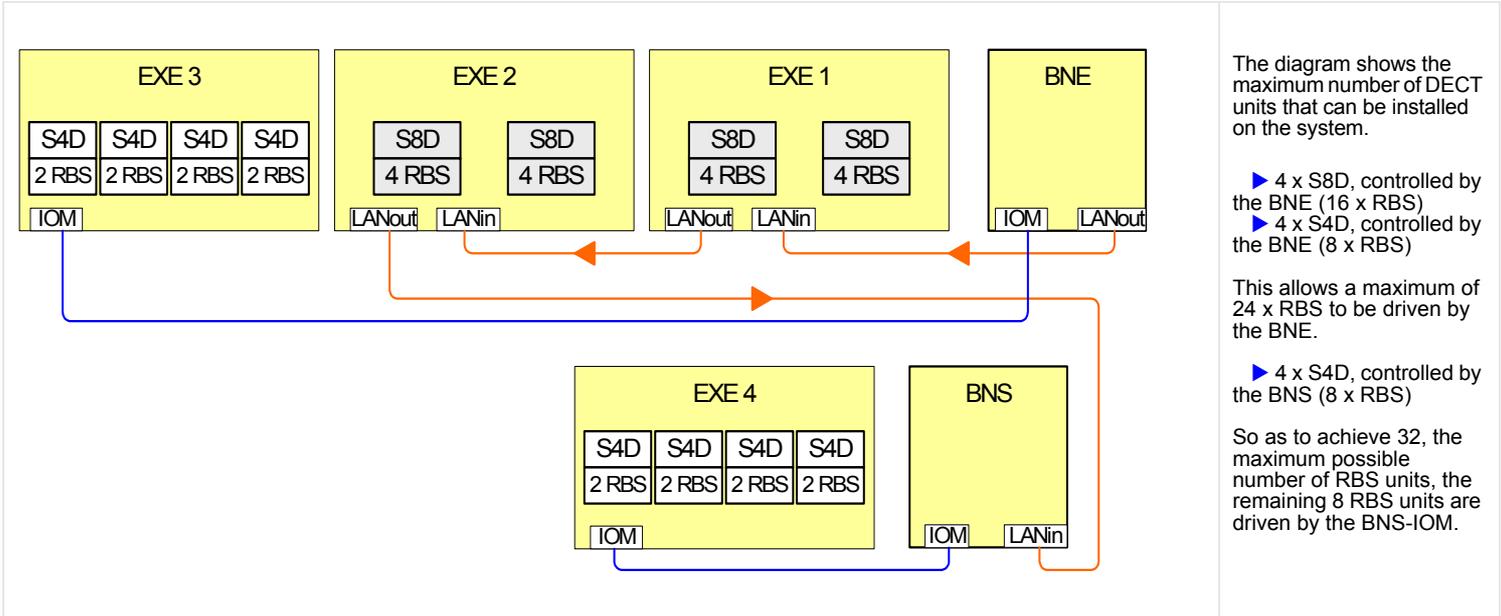
### Connecting RBS1 and RBS2 using MDF

Peripheral device connection - RBS using UAE



## Maximum number of DECT units that can be installed on the system

Definition			
<b>S8D (LAN)</b>	max. 4 x per system	4 x RBS per S8D	16 x RBS per 4 x S8D
<b>No S8D may be driven from a BNx</b>			
<b>S4D (IOM)</b>	max. 4 x per BNE/BND	2 x RBS per S4D	8 x RBS per 4 x S4D
<b>S4D (IOM)</b>	max. 4 x per BNS	2 x RBS per S4D	8 x RBS per 4 x S4D
<b>Max. total of all possible RBS units in the system</b>			<b>32 x RBS</b>



The diagram shows the maximum number of DECT units that can be installed on the system.

- ▶ 4 x S8D, controlled by the BNE (16 x RBS)
- ▶ 4 x S4D, controlled by the BNE (8 x RBS)

This allows a maximum of 24 x RBS to be driven by the BNE.

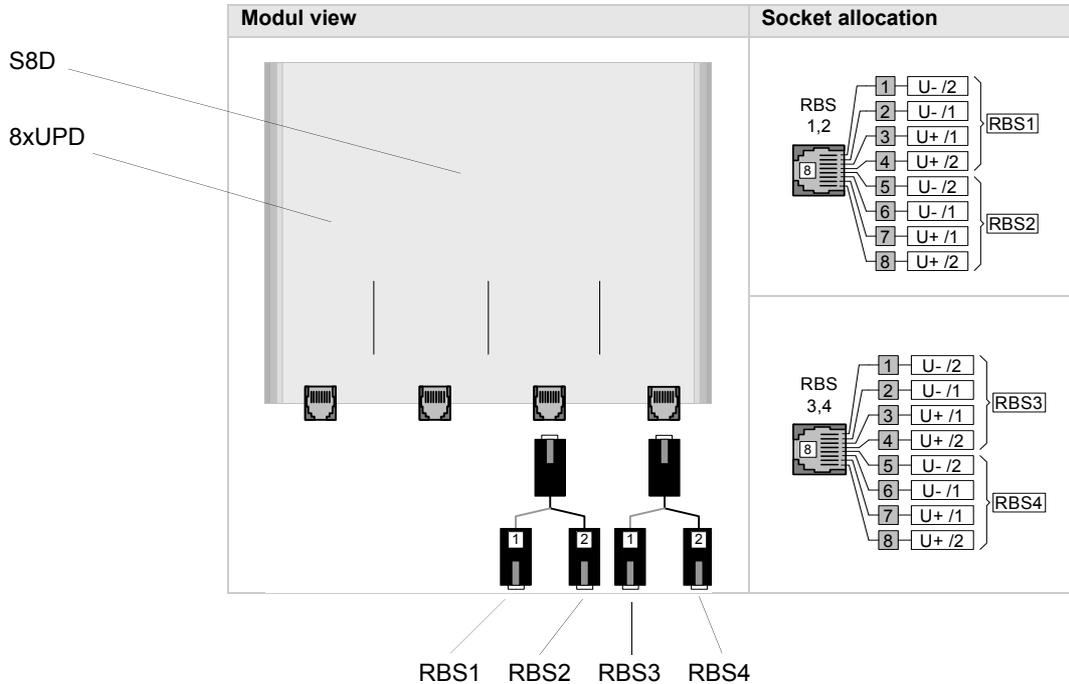
- ▶ 4 x S4D, controlled by the BNS (8 x RBS)

So as to achieve 32, the maximum possible number of RBS units, the remaining 8 RBS units are driven by the BNS-IOM.



## Plug-in module S8D (LAN, I5 E)

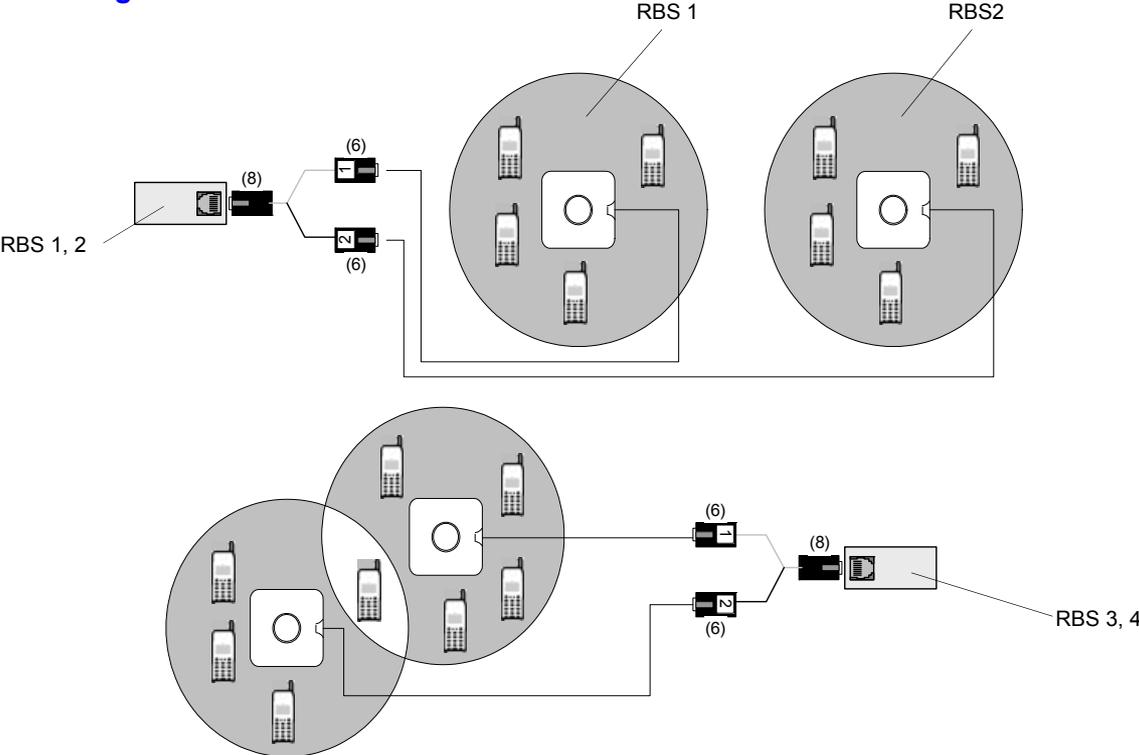
### Module view and socket allocation



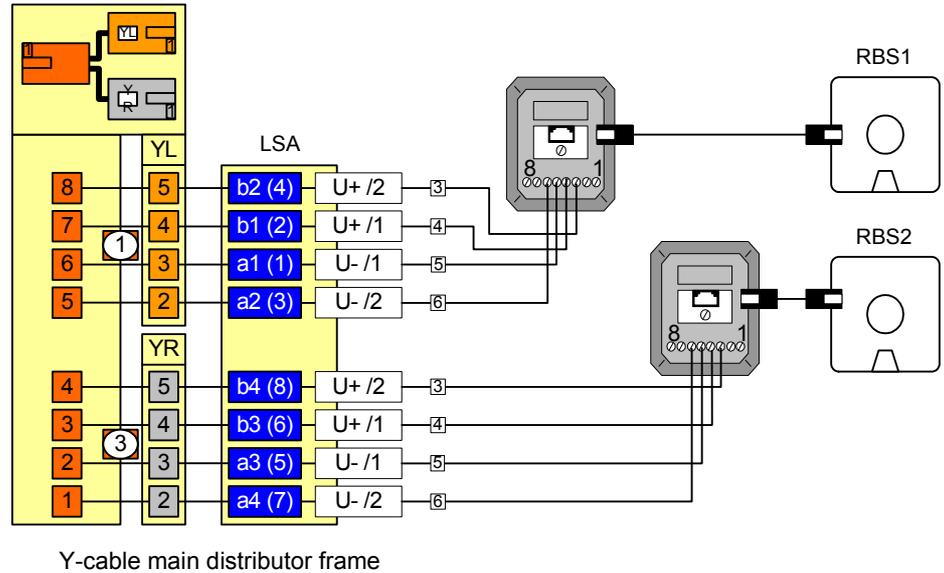
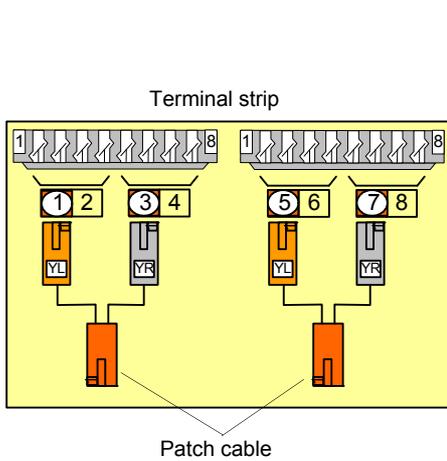
## Short description of S8D

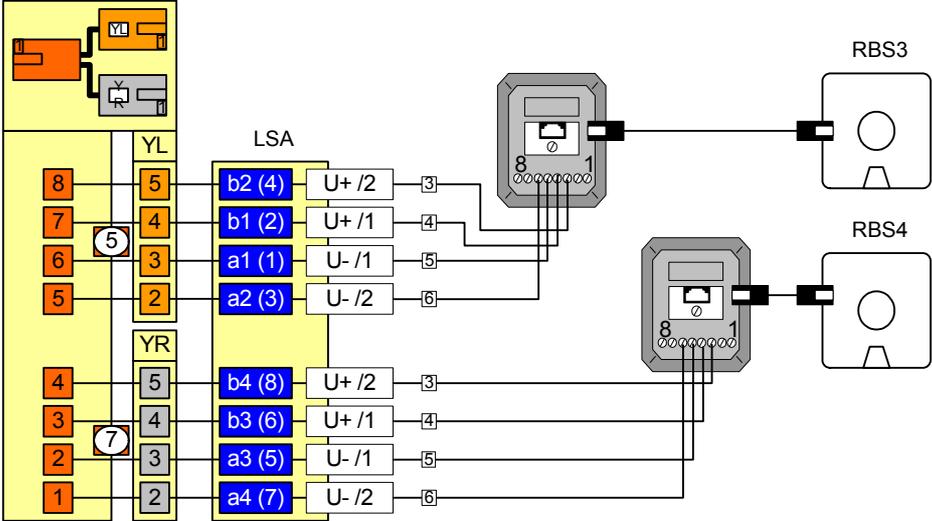
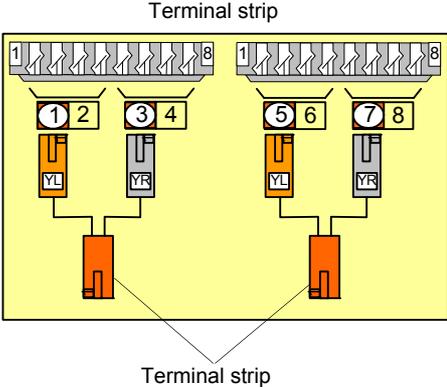
Short description of S8D	
<b>Function</b>	<ul style="list-style-type: none"><li>▶ 8 x UPD ports for 4 x DECT-RBS</li><li>▶ 7 B channels ADPCM per RBS</li><li>▶ 4 digital speech processors (DSP) allowing 28 simultaneously processed speech channels.</li><li>▶ Power supply, message exchange (LAN) as well as speech transmission (PCM highway) via D-sub plug.</li></ul>
<b>Width</b>	4-slot width
<b>Connection options</b>	<ul style="list-style-type: none"><li>▶ EXE slot 2 or 4, max. 1 x per system</li></ul>
<b>Cables</b>	2 x Y patch cables
<b>Note</b>	<ul style="list-style-type: none"><li>▶ If an S8D is plugged into an EXE, the EXE must have its own plug-in mains unit.</li><li>▶ The module become hot on the underside (metal cover) (approx. 60 °C). Please be careful when servicing (e.g. exchanging) the plug-in module, or wear gloves!</li></ul>

RBS connection using Y cable



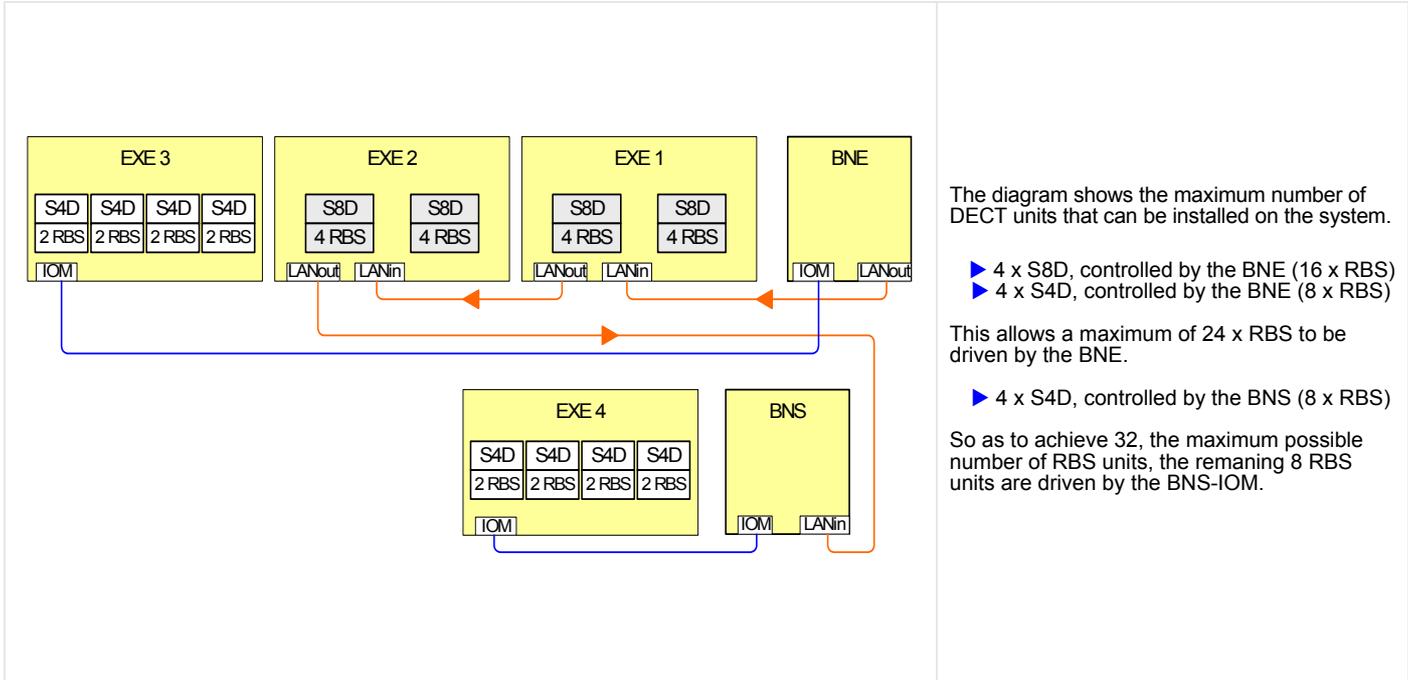
### RBS1 thro RBS4 – connection using MDF





## DECT mounting

Definition			
<b>S8D (LAN)</b>	max. 4 x per system	4 x RBS per S8D	16 x RBS per 4 x S8D
<b>No S8D may be driven from a BNx</b>			
<b>S4D (IOM)</b>	max. 4 x per BNE/BND	2 x RBS per S4D	8 x RBS per 4 x S4D
<b>S4D (IOM)</b>	max. 4 x per BNS	2 x RBS per S4D	8 x RBS per 4 x S4D
<b>Max. total of all possible RBS units in the system</b>			<b>32 x RBS</b>



The diagram shows the maximum number of DECT units that can be installed on the system.

- ▶ 4 x S8D, controlled by the BNE (16 x RBS)
- ▶ 4 x S4D, controlled by the BNE (8 x RBS)

This allows a maximum of 24 x RBS to be driven by the BNE.

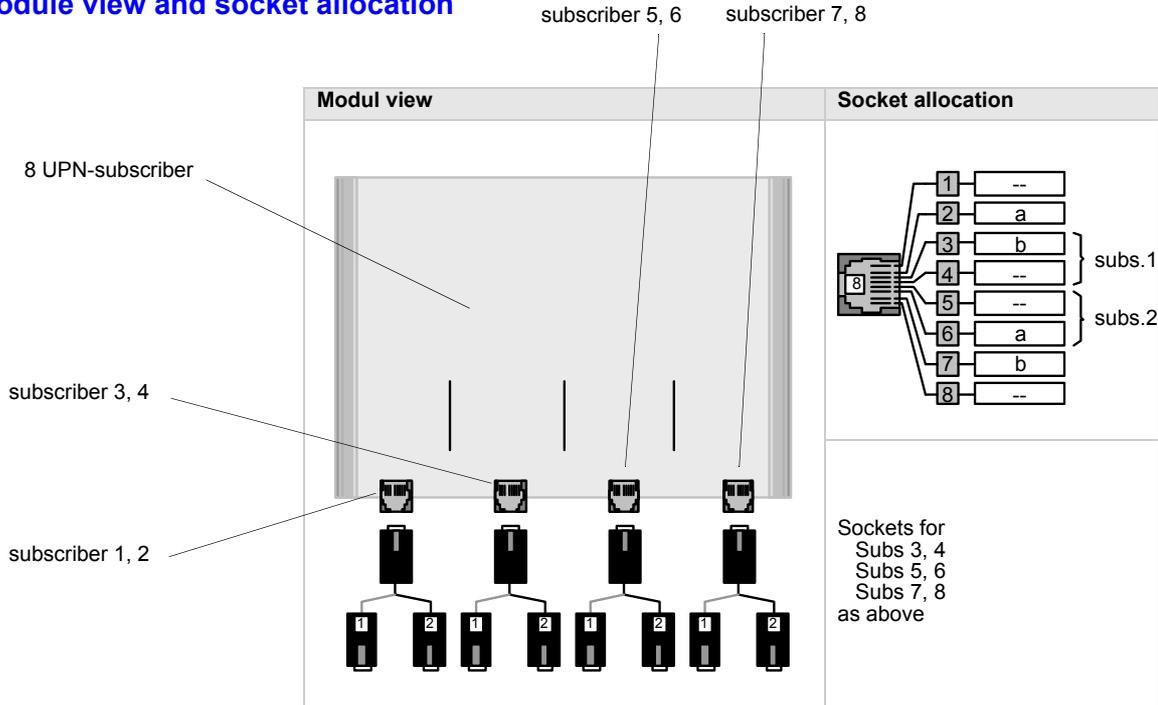
- ▶ 4 x S4D, controlled by the BNS (8 x RBS)

So as to achieve 32, the maximum possible number of RBS units, the remaining 8 RBS units are driven by the BNS-IOM.



## Plug-in module S8P (LAN, I5 E)

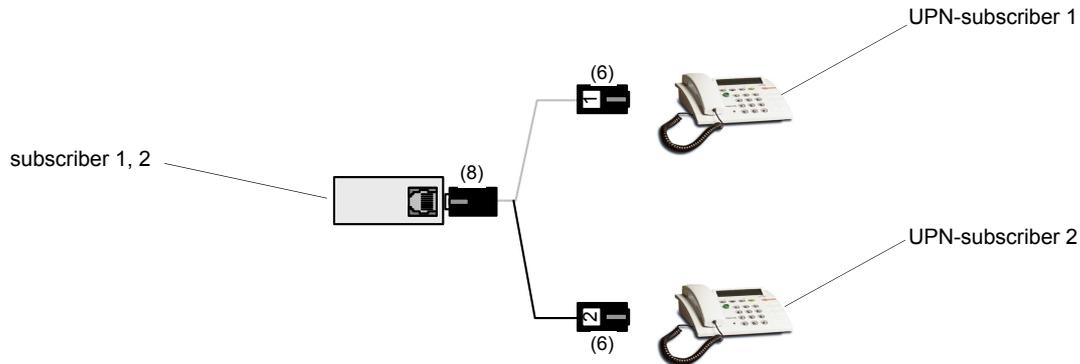
### Module view and socket allocation



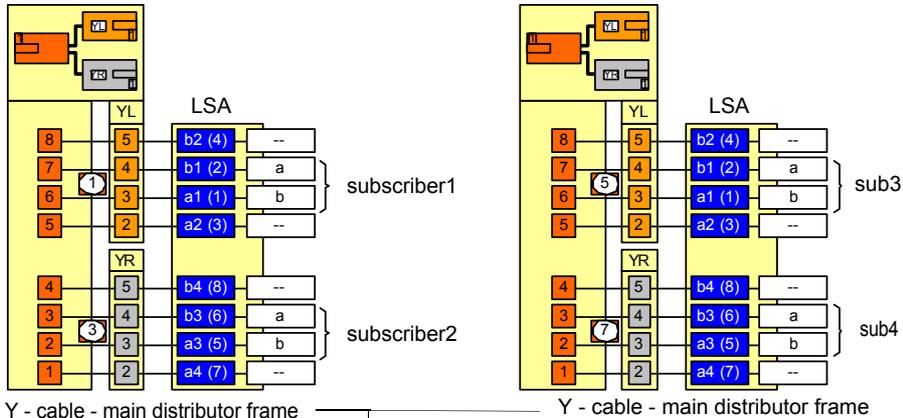
## Short description of S8P

Short description of S8P	
<b>Function</b>	Module for the connection of 8 digital subscribers with UPN interface:
<b>Width</b>	4-slot width
<b>Connection options</b>	<ul style="list-style-type: none"> <li>▶ BND, slot 4 and 8</li> <li>▶ BNE, BNS, slot 4 and 8</li> <li>▶ EXE slot 2 and 4</li> </ul>
<b>Cables</b>	4 x Y patch cable
<b>Note</b>	Ranges when powered with -40 V and installation cable 0.6 mm <sup>2</sup> (J-Y(St)Y2 x 2 x 0.6) approx. 1000 m

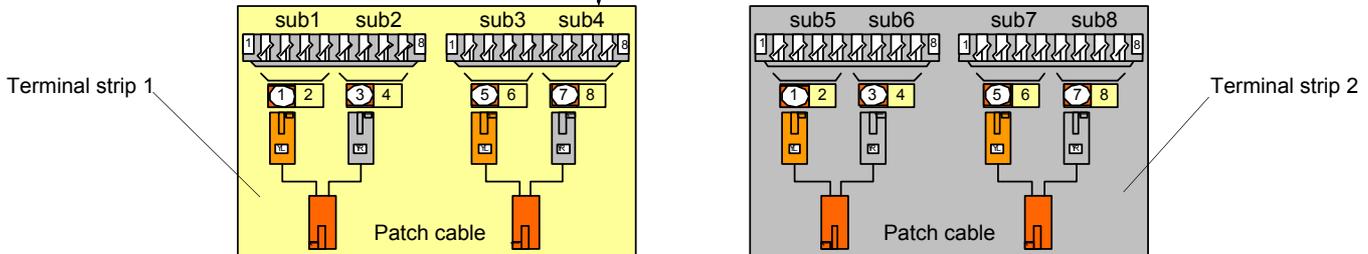
## Directly connecting UPN subscriber



Connecting UPN subs 1 to UPN subs 4 (UPN subs 5 to UPN subs 8) using distributor



Y - cable - main distributor frame



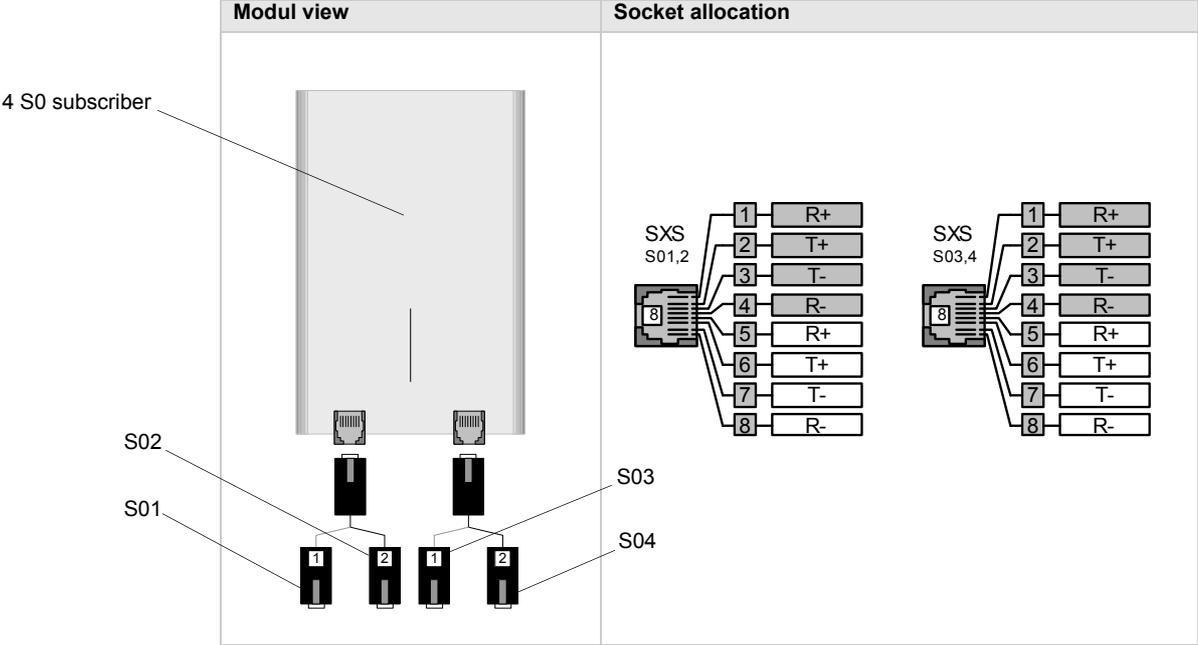
Terminal strip 1

Terminal strip 2



# Plug-in module SXS / S4S (IOM, I5 D/E)

## Module view and socket allocation

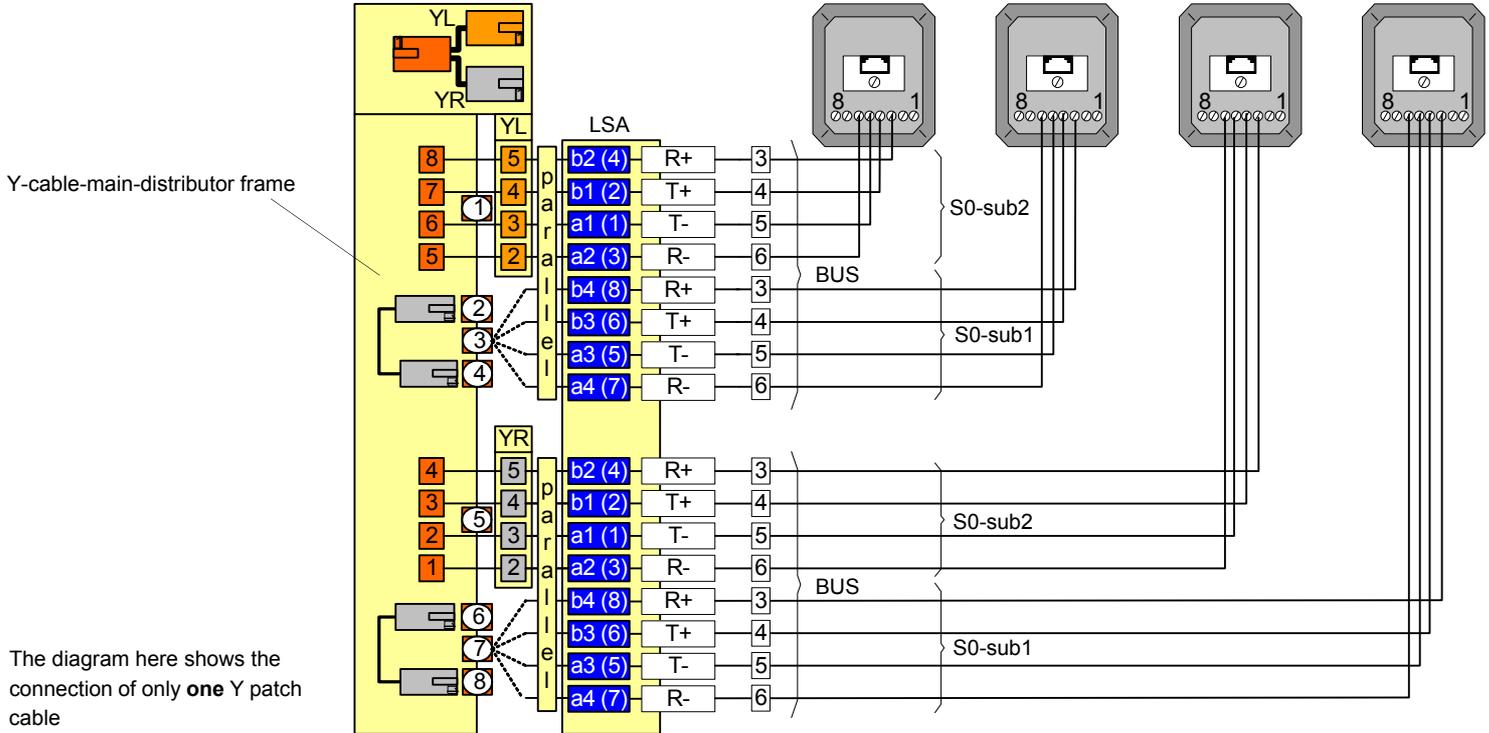


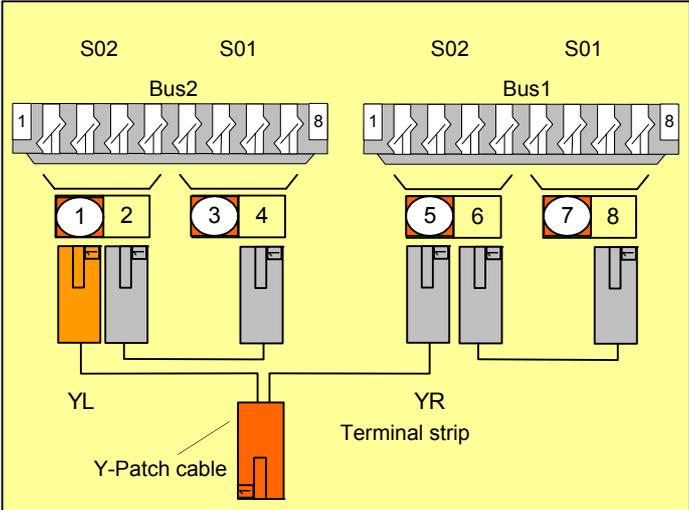
## Short description of SXS

Short description of SXS

Short description of SXS	
<b>Function</b>	4 x S0
<b>Width</b>	2-slot width
<b>Connection options</b>	BND, BNE, BNS, EXE all slots
<b>Cables</b>	2 x Y patch cables
<b>Note</b>	<ul style="list-style-type: none"><li>▶ Left hand socket: 2 x S0 (1, 2)</li><li>▶ Right hand socket: 2 x S0 (3, 4)</li></ul>

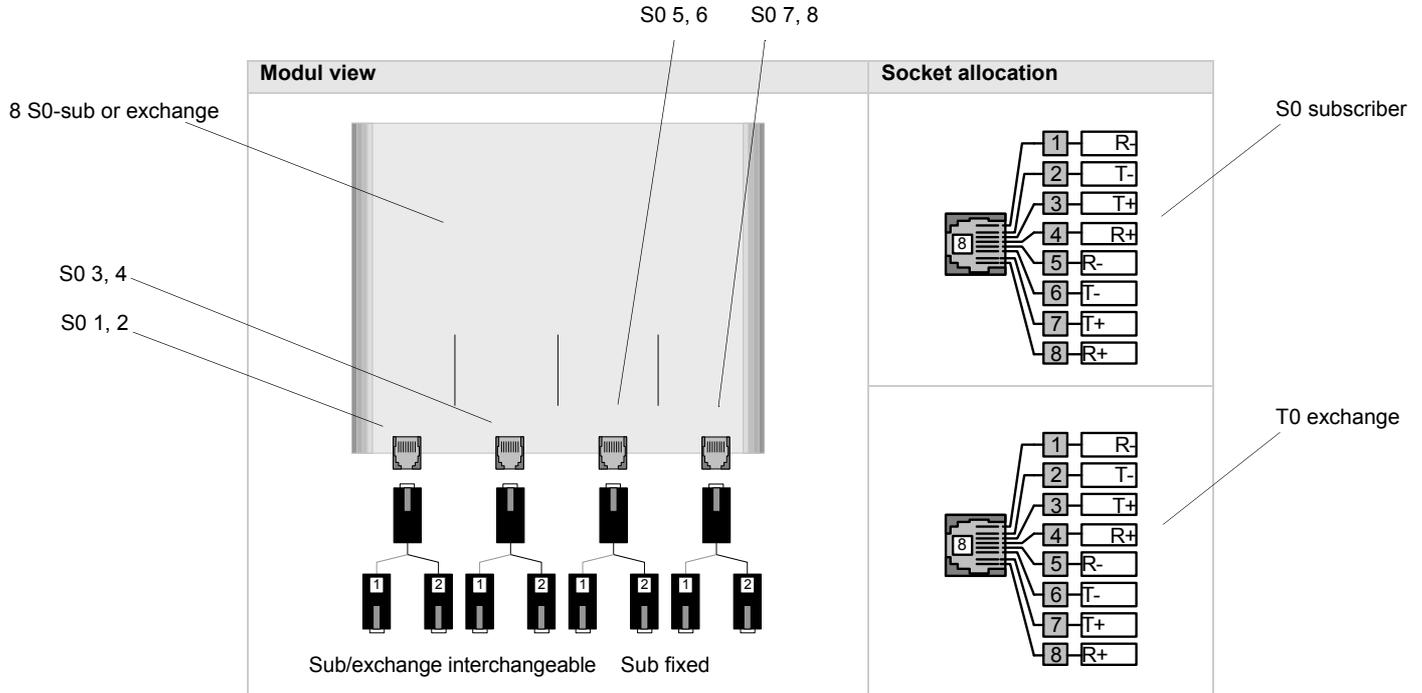
**S0 connection using MDF (usual) – 1**





## Plug-in module T8S (IOM, I5 D/E)

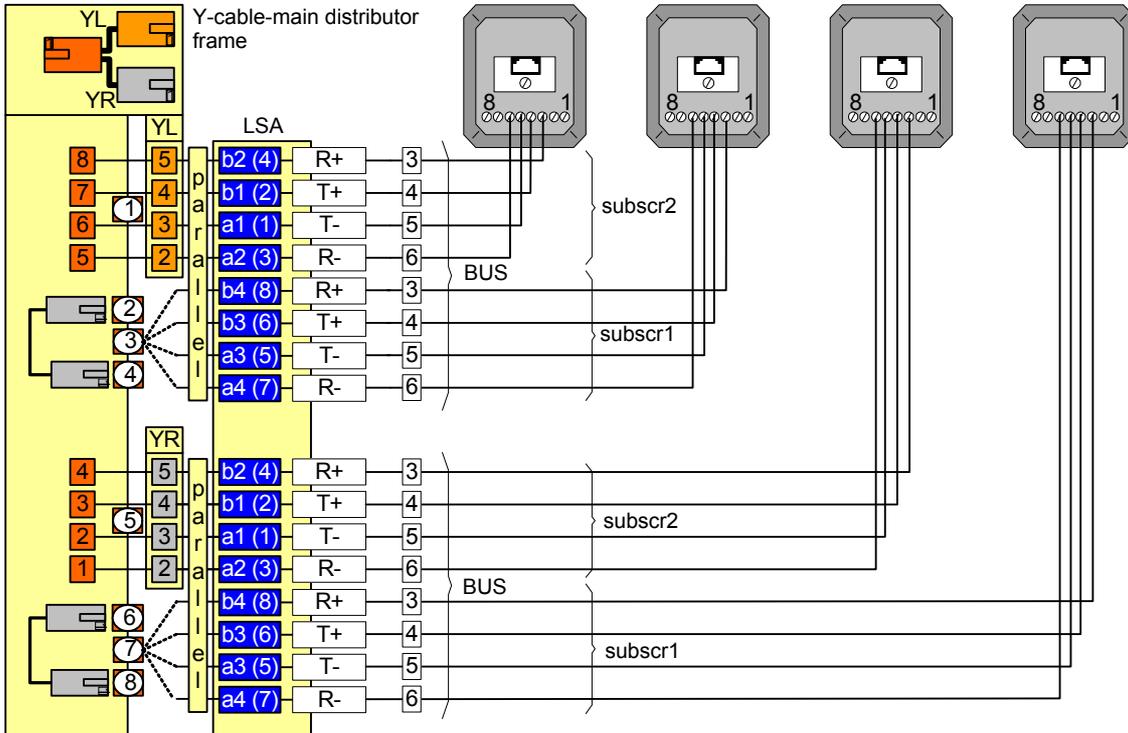
### Module view and socket allocation

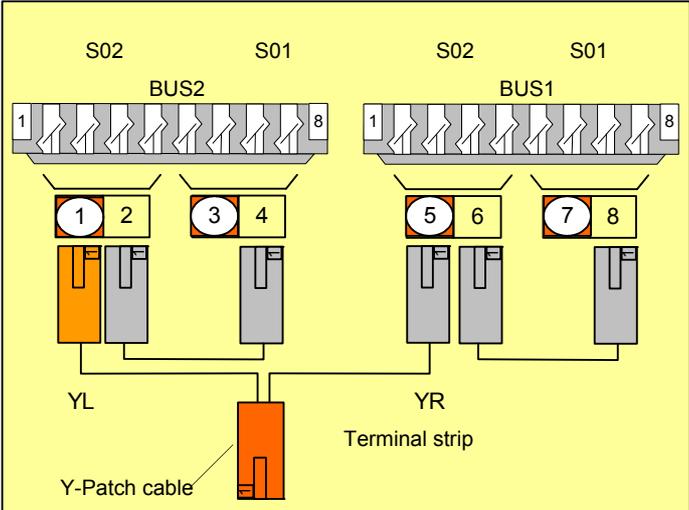


## Short description T8S

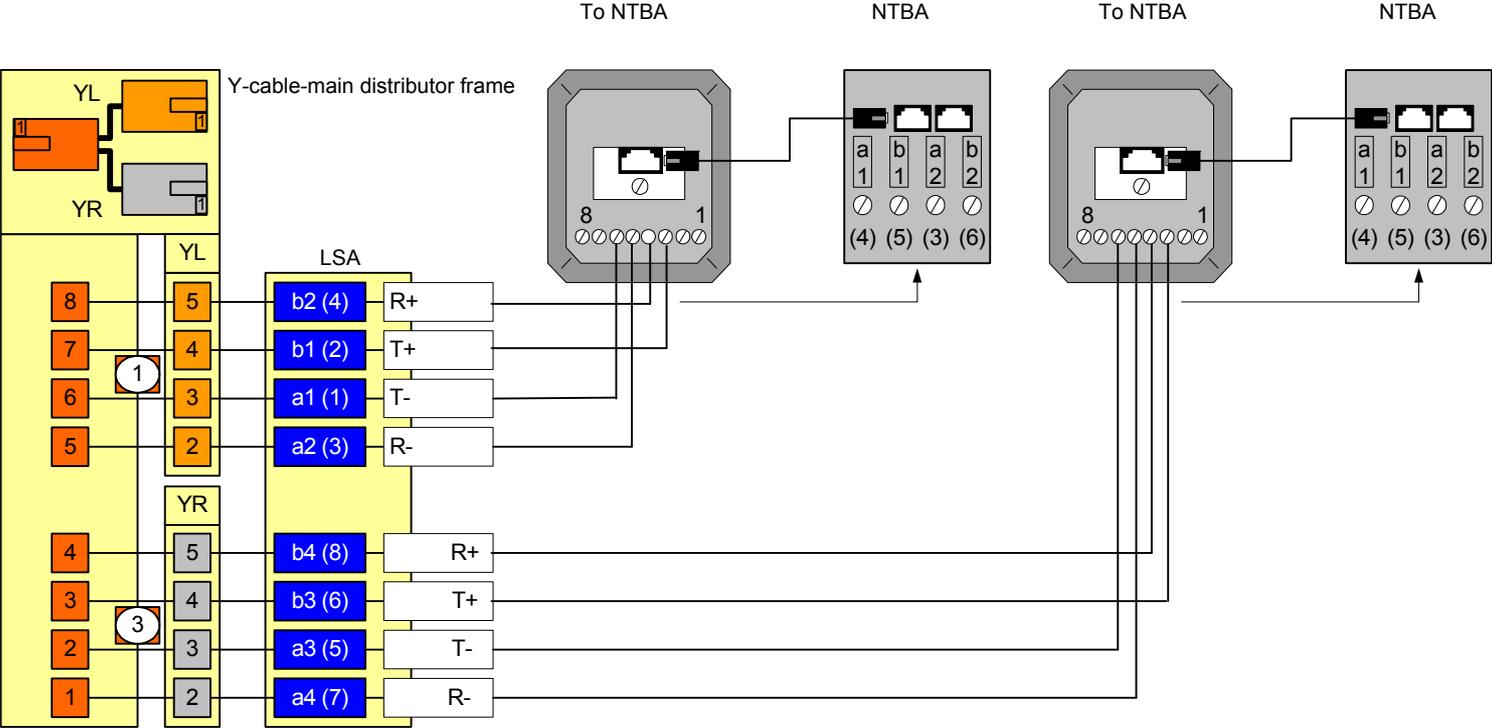
Short description of S8D																	
<b>Function</b>	<ul style="list-style-type: none"> <li>▶ 4 digital connection units each with 2 B channels, software configurable as T0 / S0               <ul style="list-style-type: none"> <li>▶ 8 S0 subs</li> <li>▶ 7 S0 subs and 1 T0 exchange line</li> <li>▶ 6 S0 subs and 2 T0 exchange lines</li> <li>▶ 5 S0 subs and 3 T0 exchange lines</li> <li>▶ 4 S0 subs and 4 T0 exchange lines</li> </ul> </li> <li>▶ On powering up the system, the T8S is always configured as 4 S0 subs and 4 T0 exchange lines</li> </ul> <table border="1" style="margin-left: 40px; margin-top: 10px;"> <tr> <td>S01</td><td>S02</td><td>S03</td><td>S04</td><td>S05</td><td>S06</td><td>S07</td><td>S08</td> </tr> <tr> <td>Exch</td><td>Exch</td><td>Exch</td><td>Exch</td><td>Sub</td><td>Sub</td><td>Sub</td><td>Sub</td> </tr> </table>	S01	S02	S03	S04	S05	S06	S07	S08	Exch	Exch	Exch	Exch	Sub	Sub	Sub	Sub
S01	S02	S03	S04	S05	S06	S07	S08										
Exch	Exch	Exch	Exch	Sub	Sub	Sub	Sub										
<b>Width</b>	4-slot width																
<b>Connection options</b>	<ul style="list-style-type: none"> <li>▶ max. 1 x on a BND, slot 4 and 8</li> <li>▶ BNE, BNS, slot 4 and 8</li> <li>▶ EXE slot 2 and 4</li> </ul>																
<b>Cables</b>	4 x Y patch cable																
<b>Note</b>	<ul style="list-style-type: none"> <li>▶ The attachment of the NTBA to terminals configured for S0 operation can lead to damage to the NTBA.</li> <li>▶ Care must be taken that the Western plug of an S0 subscriber is not inserted into the T0 exchange configured interface (Western socket).</li> <li>▶ T0 can be reprogrammed to S0 using codes #5 and #6 (see the manual under Data Entry).</li> <li>▶ Make absolutely sure prior to re-programming from T0 to S0 that there is no NTBA connected to the relevant Western sockets.</li> <li>▶ An NTBA may only be connected to (plugged into) those Western sockets that are configured for the T0 connection.</li> <li>▶ In order to be quite certain of this, attach the NTBA only after the system has been put into operation.</li> </ul>																

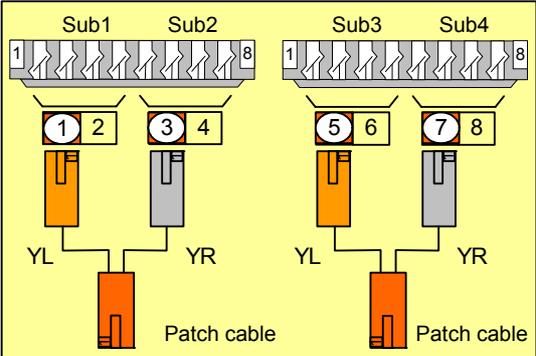
**S0 connection using MDF – 1**



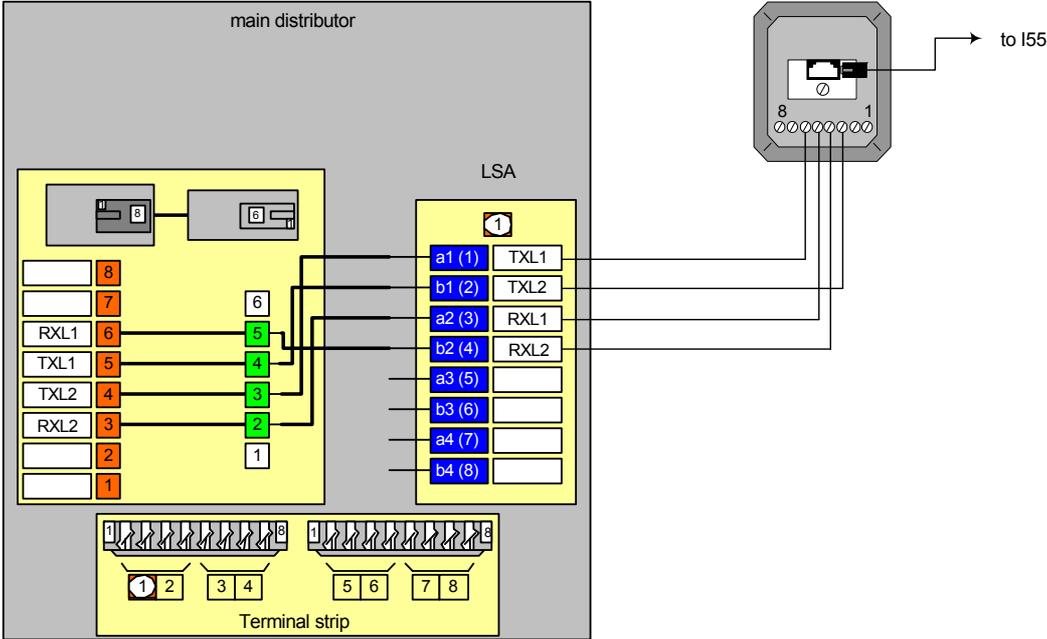


### T0 connection using MDF





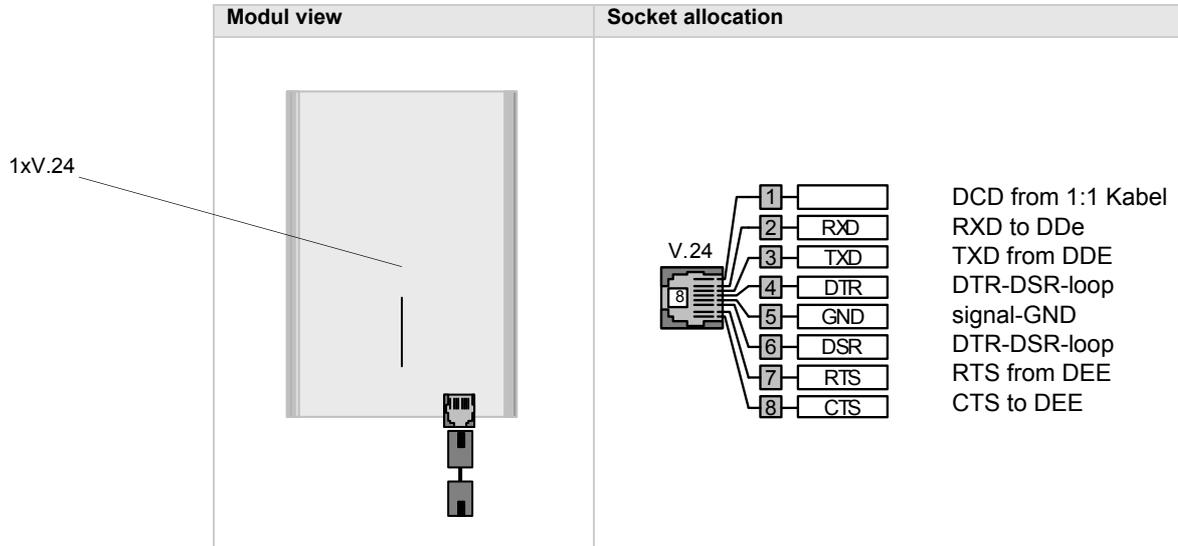
I55 <----> I5 connection via QSIG to/via T8S





## Plug-in module V.24

### Module view and socket allocation



## Short description of V.24

Short description of V.24	
<b>Function</b>	Serial interface
<b>Width</b>	2-slot width
<b>Connection options</b>	max. 1 x on BNE, slot 2
<b>Cables</b>	1 x V.24 cable
<b>Note</b>	<ul style="list-style-type: none"><li>▶ Even if plugged into the wrong slot X will not damage other modules.</li><li>▶ The plug-in module can be unplugged and plugged in whilst under power, however no connection using the V.24 cable should be made to the module from a PC which is switched on.</li></ul>

## Installation examples I5 D easy

The preceding chapters have given you information on:

- ▶ Earthing
- ▶ Power supply
- ▶ Cable channels
- ▶ Cables
- ▶ Basic modules
  - ▶ Plug-in modules

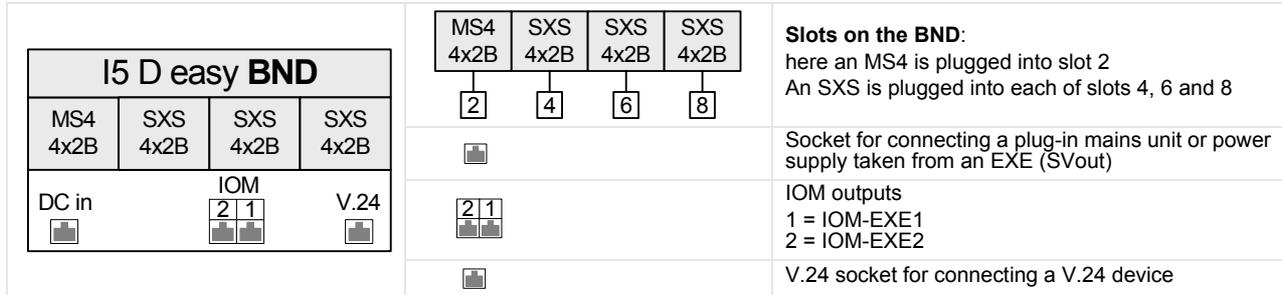
- ▶ You now know how plug-in modules can be connected to their peripherals, where applicable.

This chapter shows you how the Integral 5 D easy can be assembled using the available components; for this purpose the modules are represented schematically.

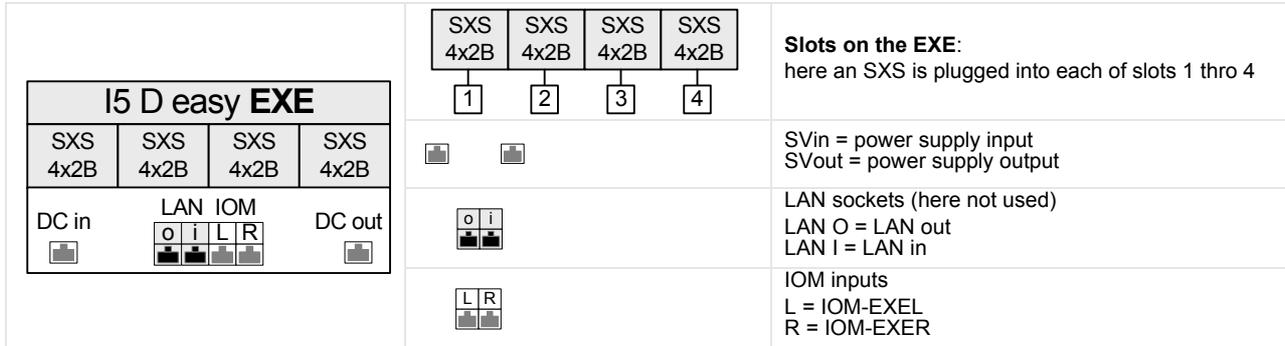
**An Integral 5 easy should always be configured using the "ISA" tool**, which will then automatically also generate the installation.

The following examples give information regarding the essentials of installation and what points must be specially complied with.

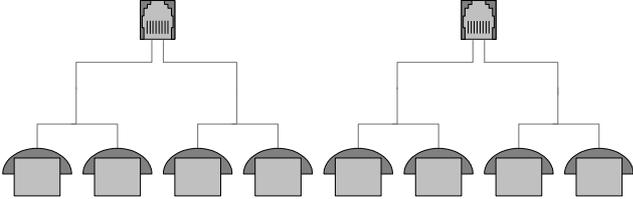
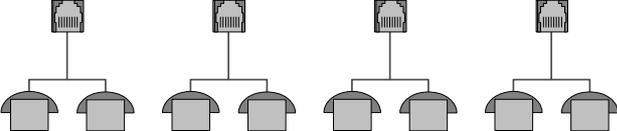
## Explanation of the BND block diagram

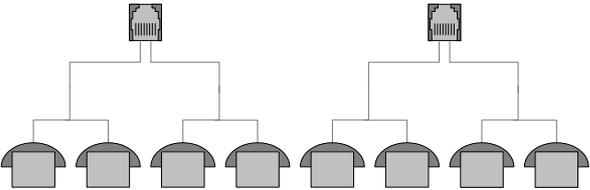


Explanation of the BND block diagram

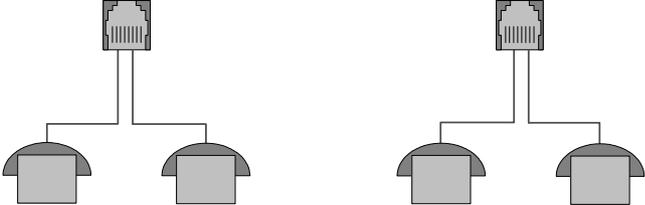
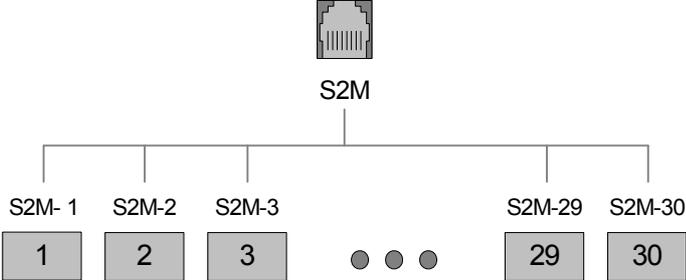


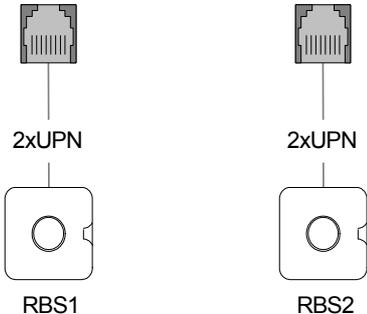
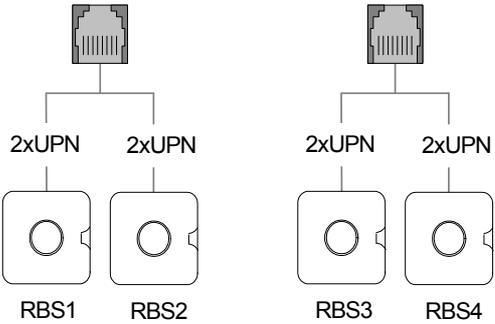
## Plug-in modules, B-channels, Arrangements in principle

Plug-in module	Function	B channels	Total B channels	Arrangements in principle
<b>SXS (IOM)</b>	<ul style="list-style-type: none"> <li>▶ 4 x S0 bus</li> <li>    ⇨ per bus 2 x subs</li> <li>▶ max. 8 S0 subs</li> </ul>	▶ 4 x (2 x B)	▶ = 8 x B	
<b>S8P (IOM)</b>	<ul style="list-style-type: none"> <li>▶ 8 x UPN</li> <li>    ⇨ per UPN 1 x UPN subs</li> <li>▶ = max. 8 UPN subs</li> </ul>	▶ 8 x (2 x B)	▶ 16 x B	

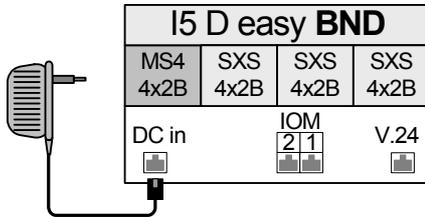
<b>MS4 (IOM)</b>	<ul style="list-style-type: none"><li>▶ 2 x S0 bus<ul style="list-style-type: none"><li>⇒ per bus 2 x subs</li><li>⇒ max. 4 S0 subs</li></ul></li><li>▶ 2 x T0 exchange<ul style="list-style-type: none"><li>⇒ per bus 2 x exchange</li><li>⇒ max. 4 x exchange</li></ul></li></ul>	<ul style="list-style-type: none"><li>▶ 2 x (2 x B) S0 subs</li><li>▶ 2 x (2 x B) T0 exchange</li></ul>	<ul style="list-style-type: none"><li>▶ 4 x B S0 subs</li><li>▶ 4 x B T0 exchange</li><li>▶▶ 8x B</li></ul>	 <p>The diagram illustrates a network topology for the MS4 (IOM) installation. It features two Ethernet switches at the top, each connected to two bus units. Each bus unit is connected to two terminal blocks, resulting in a total of 8 terminal blocks. The connections are shown as a tree structure starting from the switches and branching down to the terminal blocks.</p>
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Plug-in module	Function	B channels	Total B channels	Arrangements in principle
<b>T8S (LAN)</b>	<ul style="list-style-type: none"> <li>▶ 8 x S0 bus or</li> <li>▶ 7 x S0 bus 1x T0 bus or</li> <li>▶ 6 x S0 bus 2x T0 bus or</li> <li>▶ 5 x S0 bus 3x T0 bus or</li> <li>▶ 4 x S0 bus 4x T0 bus</li> </ul>	<ul style="list-style-type: none"> <li>▶ 8 x (2 x B)</li> </ul>	▶ 16 x B	
<b>M4A (IOM)</b>	<ul style="list-style-type: none"> <li>▶ 1 x analog subs</li> <li>▶ 3 x analog exchange</li> </ul>	<ul style="list-style-type: none"> <li>▶ 1 x (B)</li> <li>▶ 3 x (B)</li> </ul>	▶ 4 x B	
<b>MA2 (IOM)</b>	<ul style="list-style-type: none"> <li>▶ 1 x analog subs</li> <li>▶ 1 x analog exchange</li> </ul>	<ul style="list-style-type: none"> <li>▶ 1 x (B)</li> <li>▶ 1 x (B)</li> </ul>	▶ 2 x B	

Plug-in module	Function	B channels	Total B channels	Arrangements in principle
<b>S4A (IOM)</b>	▶ 4 x a/b subs	▶ 4 x (B)	▶ 4 x B	
<b>PRI (LAN)</b>	▶ 30 x Primary Rate	▶ 30 x B	▶ 30 x B	

Plug-in module	Function	B channels	Total B channels	Arrangements in principle
<b>S4D (IOM)</b>	▶ 4 x UPD	▶ 2 x (4 x B)	▶ 8 x B	 <p>The diagram shows two identical vertical connections. On the left, a 2xUPN port is connected to a single RBS1 unit. On the right, a 2xUPN port is connected to a single RBS2 unit.</p>
<b>S8D (LAN)</b>	▶ 8 x UPD	▶ 4 x (7 x B)	▶ 28 x B	 <p>The diagram shows two identical tree-like connections. On the left, a 2xUPN port is connected to two RBS units, RBS1 and RBS2. On the right, a 2xUPN port is connected to two RBS units, RBS3 and RBS4.</p>

### Example 1 – 1 x BND



Displ. module	B channels	Tele-phones	Exchanges
<b>1 x MS4</b>	8	4 x S0	4 x T0
<b>3 x SXS</b>	24	24 x S0	
<b>Total</b>	32	28 x S0	4 x T0

### Explanation of example 1

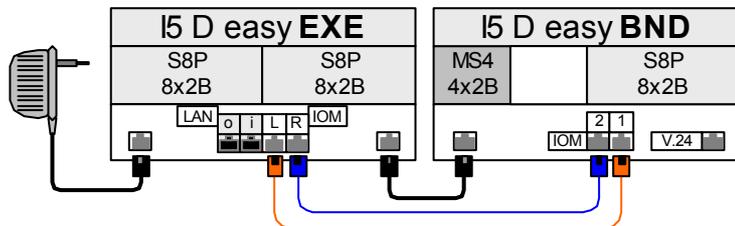
On to a **BND** it is possible to attach **IOM** plug-in modules and also **LAN** plug-in modules. Slots 2, 4, 6 and 8 are designed so that they can accept IOM plug-in modules (without switching matrix) or intelligent LAN plug-in modules (with switching matrix).

In the upper diagram an S0-T0 combination has been selected; other permutations can be found in the "Summary of items for fitting to BND/EXE".

The equipment must be earthed.

Externally the sole requirement is to plug the plug-in mains unit into the socket provided for it.

## Example 2 – BND plus EXE - maximum S0 expansion



Displ. module	B channels	Tele-phones	Exchanges
1 x MS4	8	4 x S0	4 x T0
7 x SXS	56	56 x S0	
<b>Total</b>	64	60	4 x T0

### Explanation of example 2

On a **BND** it is possible to drive **IOM** plug-in modules and also **LAN** plug-in modules. Slots 2, 4, 6 and 8 are designed so that they can drive IOM plug-in modules (without switching matrix) or intelligent LAN plug-in modules (with switching matrix).

On the EXE, IOM or LAN plug-in modules can be driven only if the EXE is also attached to the IOM and / or LAN connections of the BNx which is driving them. In the diagram the IOM channels of the BND are provided on the EXE, so that 2 x (8 x 2B) are available for IOM use. Since the BND has no LAN connection available, no LAN plug-in modules can be driven by the EXE, therefore here only IOM plug-in modules.

In the upper diagram the maximum S0 expansion has been selected; other permutations can be found in the "Summary of items for fitting to BND/EXE".

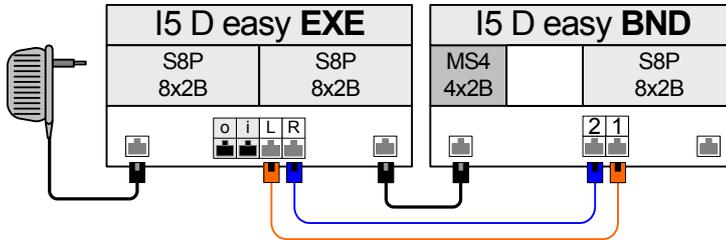
All modules must be earthed.

Since the BND has no power supply output, the plug-in mains unit is now plugged into the EXE. From there the BND is fed using a power cable from the EXE.



Except where the connections of the EXE are **purely analog**, **2 IOM connections** should always be made from the BND to the EXE.

### Example 3 – BND plus EXE - maximum UPN expansion



Displ. module	B channels	Telephones	Exchanges
<b>1 x MS4</b>	8	4 x S0	4 x T0
<b>3 x S8P</b>	24	24 x UPN	
<b>Total</b>	32	4 x S0 / 24 x UPN	4 x T0

### Explanation of example 3

The IOM and LAN designs from example 2 apply here also.

In the upper diagram the maximum UPN expansion has been selected; other permutations can be found in the "Summary of items for fitting to BND/EXE".

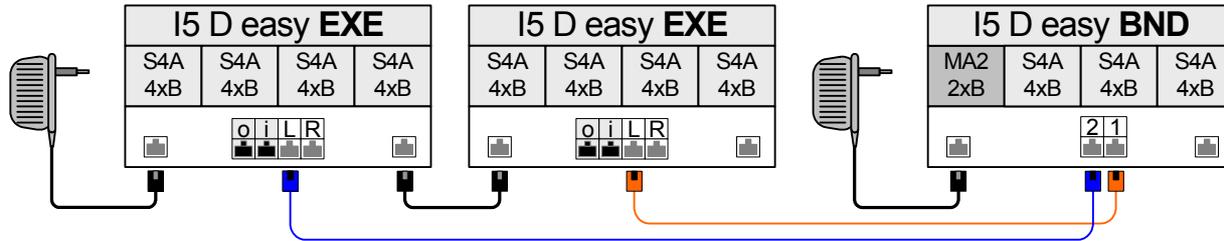
All modules must be earthed.

Since the BND has no power supply output, the plug-in mains unit is now plugged into the EXE. From there the BND is fed using a power cable from the EXE.



Except where the connections of the EXE are **purely analog**, **2 IOM connections** should always be made from the BND to the EXE.

**Example 4 – BND plus EXE - maximum analog expansion**



Displ. module	B channels	Tele-phones	Exchange s
<b>1 x MA2</b>	2	1 x analog	1 x analog
<b>11 x S4A</b>	44	44 x analog	
<b>Total</b>	46	45 x analog	1 x analog

## Explanation of example 4

Since the BND has no external LAN connection, no LAN plug-in modules can be driven by the EXE.

There is however one difference from example 3 in relation to the IOM connection:

An EXE into which 4 analog plug-in modules (S4A) are plugged requires 16 B channels for the four S4A plug-in modules. Since one IOM connection has 8 x 2 B channels, a single IOM connection is sufficient here. The second IOM connection from the BND can be used for a further EXE.

It applies here that:



Only are where the connections of the EXE **purely analog** is a **singleton** IOM connection BND-EXE permissible.

Except where the connections of the EXE are **purely analog**, **2 IOM connections** should always be made from the BND to the EXE.

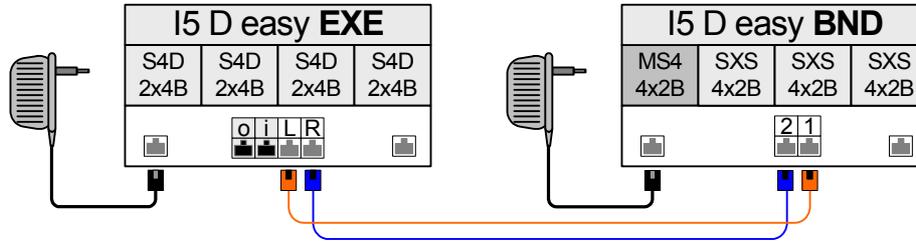
If in example 4 a purely analog connection were selected for a single EXE, and it was wished to extend this with a second EXE, this second EXE could still only carry analog plug-in modules.

In the upper diagram the maximum analog expansion is selected, and it is not permissible to mount other items.

All modules must be earthed.

Since each plug-in mains unit can feed only a maximum of 2 modules, the BND is now supplied using its own plug-in mains unit. Both the EXE units have a single plug-in mains unit of their own, which is plugged into the first EXE unit. The Vout on the first EXE provides the power to the second EXE (Vin).

**Example 5 – BND plus EXE - maximum DECT expansion**



Displ. module	B channels	Telephones	Exchange s
<b>1 x MS4</b>	8	4 x S0	4 x T0
<b>3 x SXS</b>	24	24 x S0	
<b>4 x S4D</b>	32	8 x RBS	
<b>Total</b>	64	28 x S0 / 8 x RBS	4 x T0

## Explanation of example 5

Since the BND has no external LAN connection, no LAN plug-in modules can be driven by the EXE.

The items attached to the EXE are here purely analog.

Therefore here also it applies that:



Only are where the connections of the EXE **purely analog** is a **singleton** IOM connection BND-EXE permissible.

Except where the connections of the EXE are **purely analog**, **2 IOM connections** should always be made from the BND to the EXE.

Furthermore, because of the DECT connections:



**Max. 8 x RBS are permissible within the system** (in the example there are also 8 x RBS).

One module with DECT module(s) requires its own power supply.

In the upper diagram the maximum DECT expansion has been selected; other permutations can be found in the "Summary of items for fitting to BND/EXE".

All modules must be earthed.



## Installation examples I5 E easy

The preceding chapters have given you information on:

- ▶ Earthing
- ▶ Power supply
- ▶ Cable channels
- ▶ Cables
- ▶ Basic modules
  - ▶ Plug-in modules

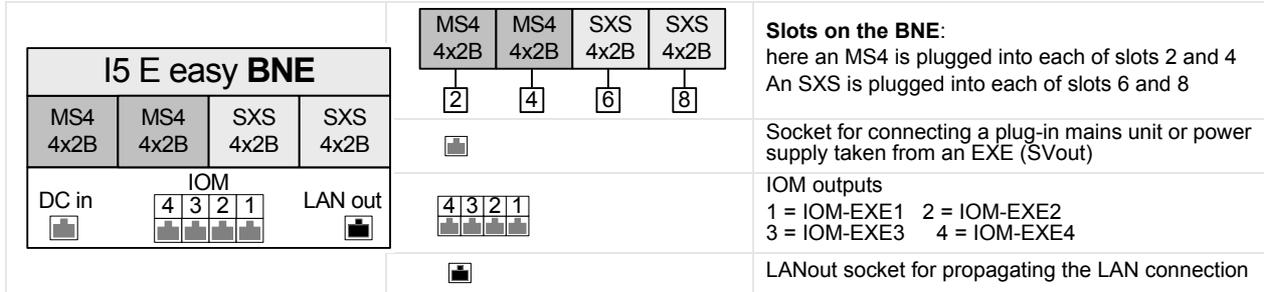
- ▶ You now know how plug-in modules can be connected to their peripherals, where applicable.

This chapter shows you how the Integral 5 E easy can be assembled using the available components; for this purpose the modules are represented schematically.

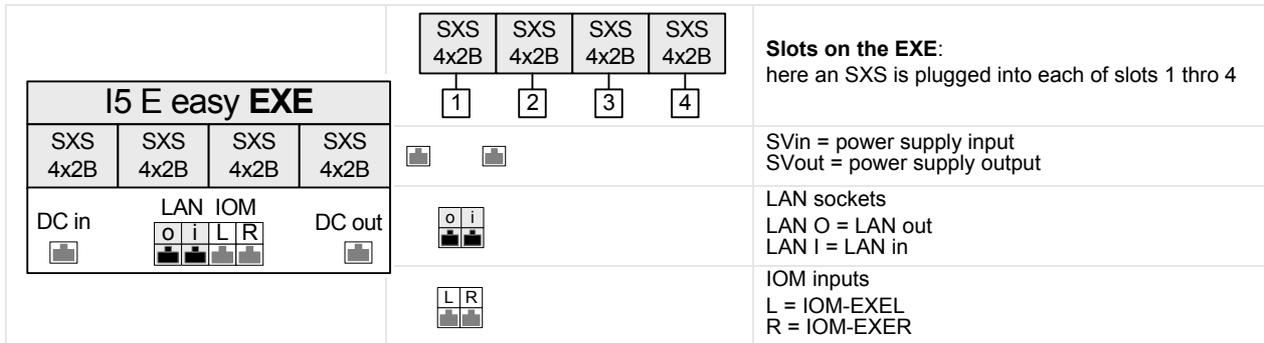
**An Integral 5 easy should always be configured using the "ISA" tool**, which will then automatically also generate the installation.

The following examples give information regarding the essentials of installation and what points must be specially complied with.

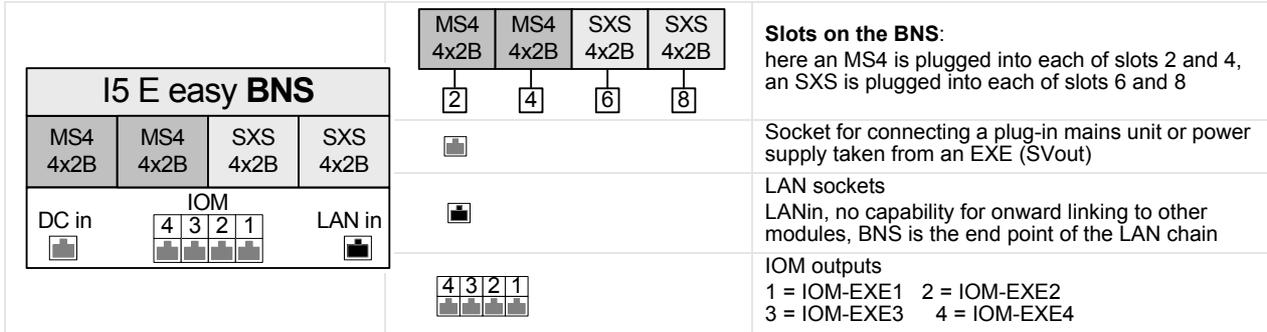
### Explanation of the BNE block diagram



### Explanation of the EXE block diagram



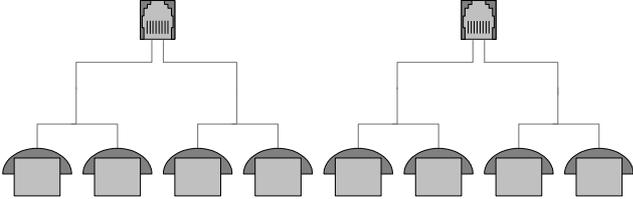
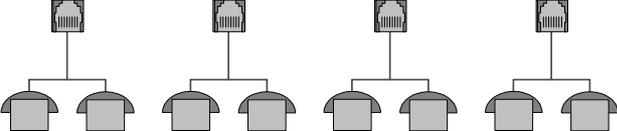
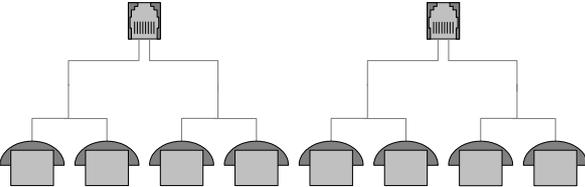
### Explanation of the BNS block diagram



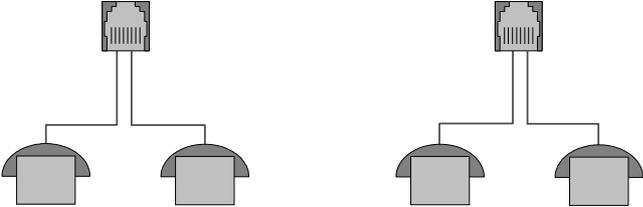
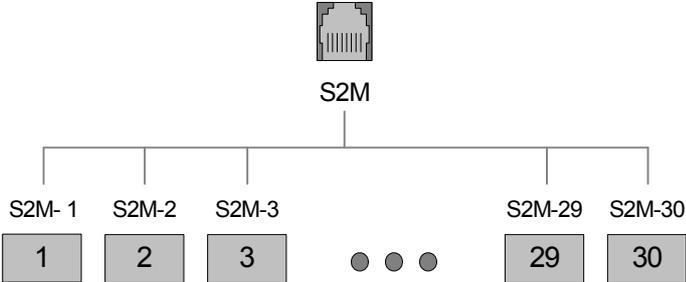
### Explanation of the IPU block diagram

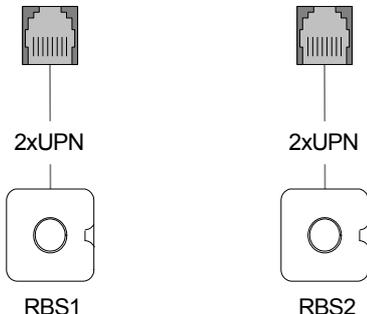


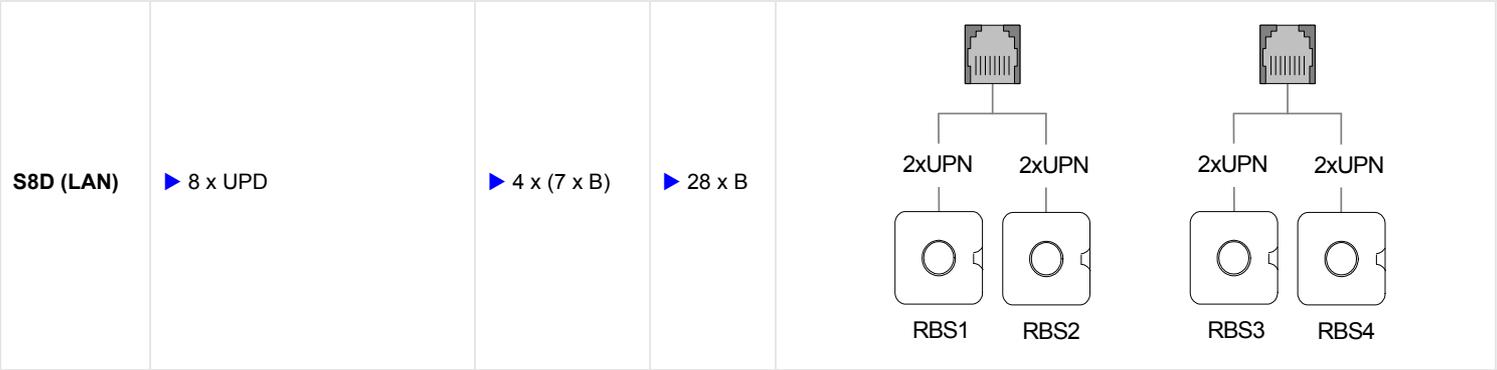
## Plug-in modules, B channels, arrangements in principle

Plug-in module	Function	B channels	Total B channels	Arrangements in principle
<b>SXS (IOM)</b>	<ul style="list-style-type: none"> <li>▶ 4 x S0 bus</li> <li>    ⇨ per bus 2 x subs</li> <li>▶ max. 8 S0 subs</li> </ul>	▶ 4 x (2 x B)	▶ = 8 x B	
<b>S8P (IOM)</b>	<ul style="list-style-type: none"> <li>▶ 8 x UPN</li> <li>    ⇨ per UPN 1 x UPN subs</li> <li>▶ = max. 8 UPN subs</li> </ul>	▶ 8 x (2 x B)	▶ 16 x B	
<b>MS4 (IOM)</b>	<ul style="list-style-type: none"> <li>▶ 2 x S0 bus</li> <li>    ⇨ per bus 2 x subs</li> <li>    ⇨ max. 4 S0 subs</li> <li>▶ 2 x T0 exchange</li> <li>    ⇨ per bus 2 x exchange</li> <li>    ⇨ max. 4 x exchange</li> </ul>	<ul style="list-style-type: none"> <li>▶ 2 x (2 x B) S0 subs</li> <li>▶ 2 x (2 x B) T0 exchange</li> </ul>	<ul style="list-style-type: none"> <li>▶ 4 x B S0 subs</li> <li>▶ 4 x B T0 exchange</li> <li>▶ 8x B</li> </ul>	

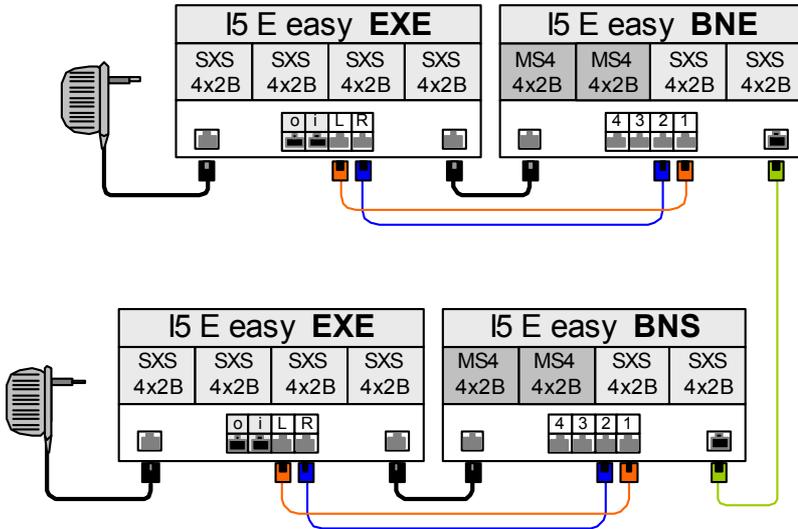
Plug-in module	Function	B channels	Total B channels	Arrangements in principle
<b>T8S (LAN)</b>	<ul style="list-style-type: none"> <li>▶ 8 x S0 bus or</li> <li>▶ 7 x S0 bus 1x T0 bus or</li> <li>▶ 6 x S0 bus 2x T0 bus or</li> <li>▶ 5 x S0 bus 3x T0 bus or</li> <li>▶ 4 x S0 bus 4x T0 bus</li> </ul>	<ul style="list-style-type: none"> <li>▶ 8 x (2 x B)</li> </ul>	▶ 16 x B	
<b>M4A (IOM)</b>	<ul style="list-style-type: none"> <li>▶ 1 x analog subs</li> <li>▶ 3 x analog exchange</li> </ul>	<ul style="list-style-type: none"> <li>▶ 1 x (B)</li> <li>▶ 3 x (B)</li> </ul>	▶ 4 x B	
<b>MA2 (IOM)</b>	<ul style="list-style-type: none"> <li>▶ 1 x analog subs</li> <li>▶ 1 x analog exchange</li> </ul>	<ul style="list-style-type: none"> <li>▶ 1 x (B)</li> <li>▶ 1 x (B)</li> </ul>	▶ 2 x B	

Plug-in module	Function	B channels	Total B channels	Arrangements in principle
<b>S4A (IOM)</b>	▶ 4 x a/b subs	▶ 4 x (B)	▶ 4 x B	
<b>PRI (LAN)</b>	▶ 30 x Primary Rate	▶ 30 x B	▶ 30 x B	

Plug-in module	Function	B channels	Total B channels	Arrangements in principle
<b>S4D (IOM)</b>	▶ 4 x UPD	▶ 2 x (4 x B)	▶ 8 x B	 <p>2xUPN</p> <p>RBS1</p> <p>2xUPN</p> <p>RBS2</p>



**Example 1 – max. S0 expansion**



Displ. module	B channels	Tele-phones	Exchanges
<b>4 x MS4</b>	32	16 x S0	16 x T0
<b>12 x SXS</b>	96	96 x S0	
<b>Total</b>	128	112 x S0	16 x T0

## Explanation of example 1

On a **BNE** it is possible to drive **IOM** plug-in modules and also **LAN** plug-in modules. Slots 2, 4, 6 and 8 are designed so that they can drive IOM plug-in modules (without switching matrix) or intelligent LAN plug-in modules (with switching matrix).

On the EXE, IOM or LAN plug-in modules can be driven only if the EXE is also attached to the IOM and / or LAN connections of the BNx which is driving them. In the diagram the IOM channels of the BNE are provided on the EXE, so that 2 x (8 x 2B) are available for IOM use.

Since the BNE has no LAN connection available on its EXE, no LAN plug-in modules can be driven by the EXE, therefore here only IOM plug-in modules. The BNE offers the availability of the LAN connection of the BNS. This allows LAN plug-in modules to be driven also by the BNS.

The EXE, which is connected to the BNS through the IOM, can drive only IOM plug-in modules.

In the upper diagram the maximum S0 expansion has been selected; other permutations can be found in the "Summary of items for fitting to BNE/BNS/EXE".

All modules must be earthed.

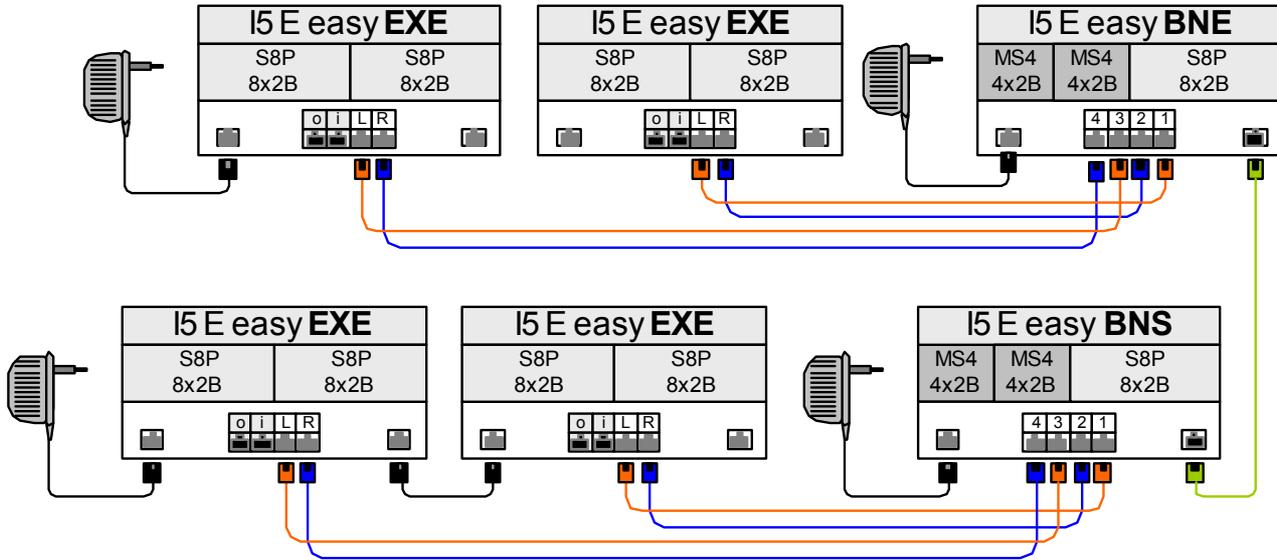
Since the BNE has no power supply output, the plug-in mains unit is now plugged into the EXE. From there the BNE is fed using a power cable from the EXE.

Since the BNS has no power supply output, the plug-in mains unit is now plugged into the EXE. From there the BNS is fed using a power cable from the EXE.



Except where the connections of the EXE are **purely analog, 2 IOM connections** should always be made from the BND to the EXE.

**Example 2 – max. UPN expansion**



Displ. module	B channels	Telephones	Exchanges
<b>4 x MS4</b>	32	16 x S0	16 x T0
<b>10 x S8P</b>	80	80 x UPN	
<b>Total</b>	112	16 x S0 / 80 x UPN	16 x T0

## Explanation of example 2

In principle, the layout of example 2 is similar to that of example 1, the difference lies in the connection of a further EXE to the BNE and the BNS.

Each EXE takes up the max. possible number of IOM channels from the BNE/BNS.

No LAN operation is possible on the EXE.

In the upper diagram the maximum UPN expansion has been selected; other permutations can be found in the "Summary of items for fitting to BNE/BNS/EXE".

All modules must be earthed.

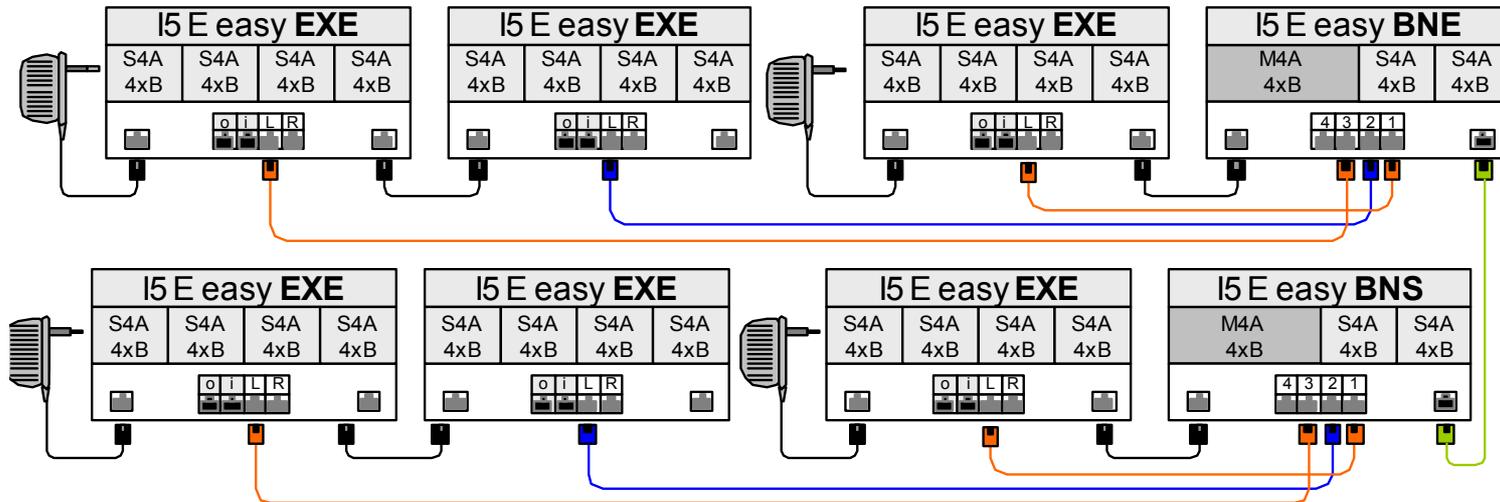
Since each plug-in mains unit can feed only a maximum of 2 modules, the BNE/BNS is now supplied using its own plug-in mains unit. Both EXE units share their own plug-in mains unit, which is plugged into the first EXE unit. The Vout on the first EXE provides the power to the second EXE (Vin).



Except where the connections of the EXE are **purely analog**, **2 IOM connections** should always be made from the BND to the EXE.



**Example 3 – max. analog expansion**



Displ. module	Ports	Telephones	Exchanges
<b>2 x M4A</b>	8	2 x analog	6 x analog
<b>28 x S4A</b>	112	112 x analog	
<b>Total</b>	120	114 x analog	6

In principle the layout of this example is similar to that of the previous example.

The difference lies in that 3 EXE are connected to each BNE and BNS using IOM, with each EXE connected to only one IOM.

An EXE into which 4 analog plug-in modules (S4A) are plugged requires 16 B channels for the S4A plug-in modules. Since one IOM connection has 8 x 2 B channels, a single IOM connection is sufficient here. Further IOM connections from the BNE/BNS can be taken from further EXE units.

No LAN operation is possible on the EXE.

In the upper diagram the maximum analog expansion is selected, and it is not permissible to mount other items.

It applies here that:

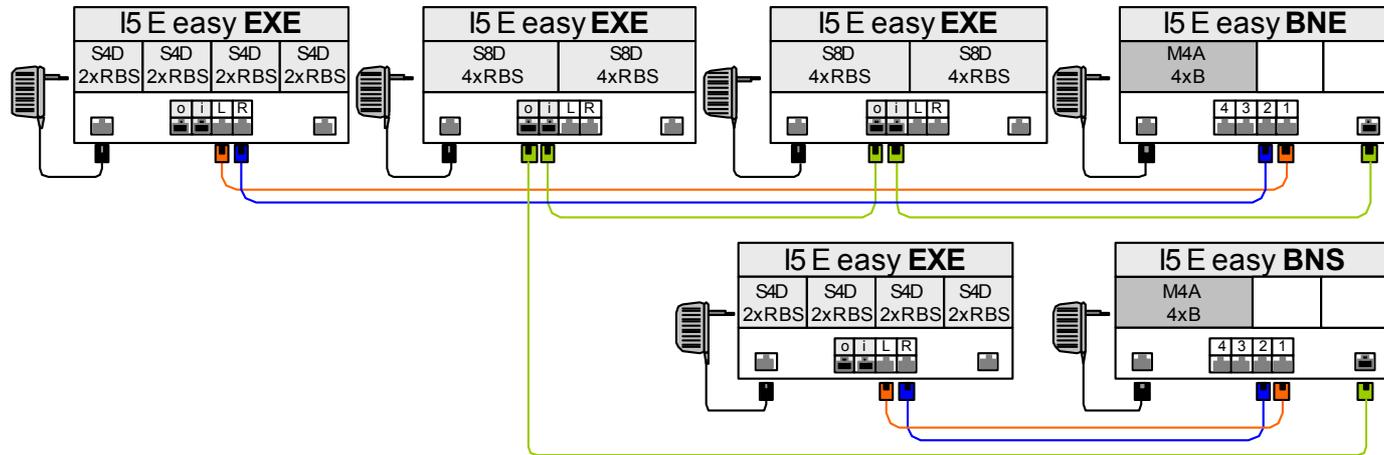


Only are where the connections of the EXE **purely analog** is a **singleton** IOM connection BND-EXE permissible.

Except where the connections of the EXE are **purely analog, 2 IOM connections** should always be made from the BND to the EXE.

Since each plug-in mains unit can feed only a maximum of 2 modules, the combination BNE-EXE / BNS-EXE is now supplied using its own plug-in mains unit. Both the additional EXE units on the BNE and BNS have a single plug-in mains unit of their own. The Vout on the first EXE provides the power to the second EXE (Vin).

### Example 4 – max. DECT expansion



Displ. module	B channels	Telephones	Exchanges
<b>4 x S8D</b>	128	16 x RBS	
<b>8 x S4D</b>	64	16 x RBS	
<b>2 x M4A</b>	8	2 x analog	6 x analog
<b>Total</b>	200	32 x RBS / 2 x analog	6 x analog

## Explanation of example 4

The BNE is connected to the first two EXE by LAN, so the 4 LAN S8D plug-in modules can also be driven from the EXE. This enables 16 RBS connections. All further RBS connections must be achieved using IOM plug-in modules, 3 x EXE on BNE and 1 x EXE on BNS.

The rule here for DECT is:

	<p><b>Max. 32 x RBS are permissible within the system (in the example there are 32 x RBS).</b></p> <p><b>No S8D modules are permitted on the BNE and BNS control modules.</b></p> <p><b>One module with DECT module(s) requires its own power supply.</b></p>
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An additional rule applies:

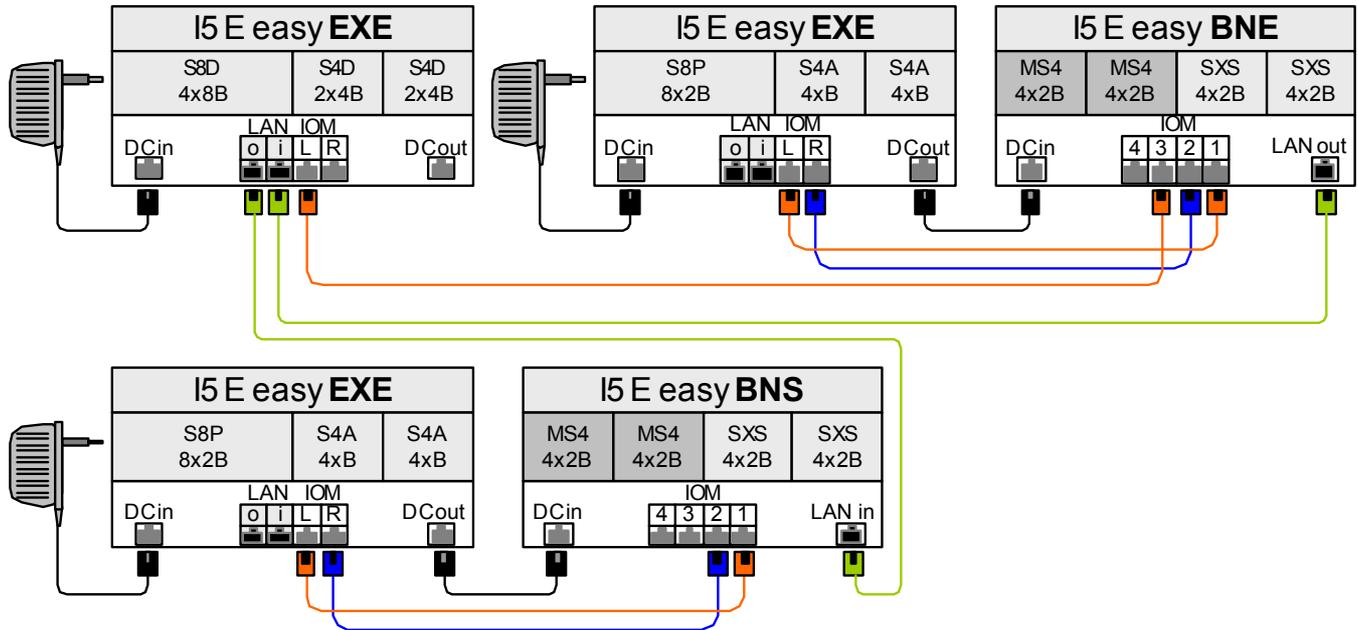
	<p>Only where the connections of the EXE <b>purely analog</b> is a <b>singleton</b> IOM connection BND-EXE permissible.</p> <p>Except where the connections of the EXE are <b>purely analog</b>, <b>2 IOM connections</b> should always be made from the BND to the EXE.</p>
-----------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

In the upper diagram the maximum DECT expansion has been selected; other permutations can be found in the "Summary of items for fitting to BND/EXE".

All modules must be earthed.



**Example 5 – mixed expansion (T0, S0, DECT, UPN))**



## Explanation of example 5

The example shows a mixture of attached items.

Certain restrictions apply here:



**Max. 32 x RBS are permissible within the system (in the example there are 32 x RBS).**

**No S8D modules are permitted on the BNE and BNS control modules.**

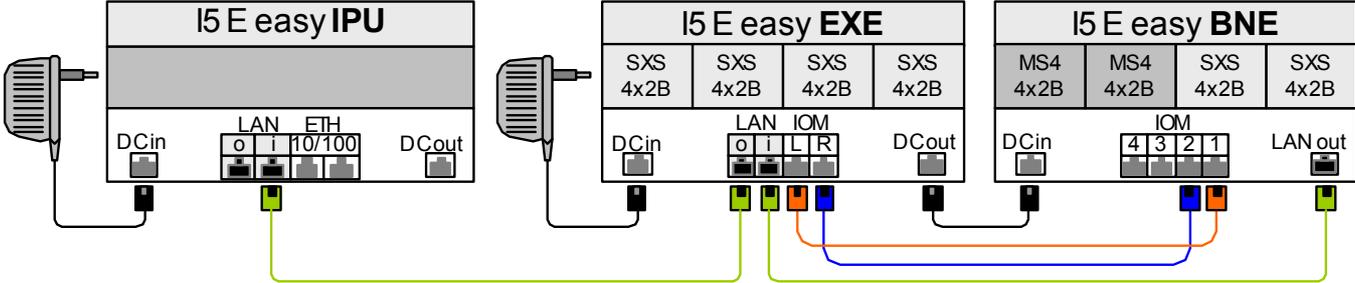
**One plug-in mains unit supplies 1 x BNx plus 1 x EXE, or 2 x EXE.**

**One module with DECT module(s) requires its own power supply.**

**An EXE with one LAN module attached, requires only one IOM connection**  
(See previous diagram, upper).

All modules must be earthed.

**Example 6 – Expansion with IPU**

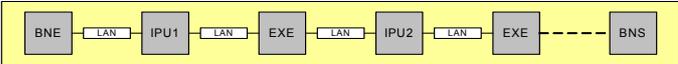


**Conditions for IPU connection**

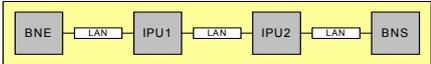


IPU units require a driver module in series (BNE, EXE)

Allows possibility of larger LAN expansion



Further possibilities



## Commissioning



Before you switch on the system and begin to operate it, it is essential to carry out the earthing procedures (the green-yellow earth wires must be stripped and connected).

### Check List

#### Check List

**Before commissioning the system, run through the check list to ensure that all preparations have been completed correctly:**

- ▶ System modules connected correctly?
- ▶ Connection cables to the UAE sockets and exchange lines (a/b) connected correctly on the LSA+ strips of the distributor according to diagram?
- ▶ Patch cables connected correctly?
- ▶ System earthed properly?
- ▶ UAE sockets connected correctly and telephones connected?

**For S<sub>0</sub> bus operation:**

- ▶ Termination resistances fitted and connected at each final bus-UAE connection socket?
- ▶ Bus cable lengths correct?

## Start up the system

### Start up the system

- ▶ Before starting up the system, ensure that the mains socket to which the system is connected is at 230 V AC.
- ▶ Observe the instructions in the section on earthing
- ▶ Insert the common multi-socket extension (with the plugs of the units inserted) into the appropriate mains socket or switch multi-socket extension on
- ▶ The operating software is loaded.

## Reset

### Reset - warm start

Warm start the PABX Integral 5 as follows:

- ▶ Use **either** ISA **or** ▶ Terminal code

**or**

#### ▶ **Integral 5 without battery (PB1):**

- ▶ Unplug the common multi-socket extension
- ▶ Wait approx. 15 seconds and plug the common multi-socket extension in again

#### **Integral 5 with battery (PB1):**

- ▶ Remove the cover of PB1 (open PB1)
- ▶ Disconnect the (battery) low-profile plug
- ▶ Unplug the common multi-socket extension
- ▶ Wait approx. 15 seconds and plug the common multi-socket extension in again
- ▶ Reconnect the (battery) low-profile plug
- ▶ The system will start up with the customer data

## Cold start

Cold start	
<b>A backup should always be done before a cold start!</b>	
	▶ Press the cold start switch on the BNx.
	▶ The system will boot up, loading the default data.
	▶ During this time (approx. four minutes), the system is not ready to operate. ▶ The customer data is lost.
	▶ <b>When the system is once again operational, input the saved customer backup data into the system.</b>

## Switch-on test

Switch-on test	
Standard devices:	▶ The standard devices are functioning correctly if feed current flows and the dial tone is heard when the receiver is lifted
System telephone:	▶ The system telephones are functioning correctly (i.e. feed current flows, S <sub>0</sub> interface is operational and the date and time appear in the display), if the following appear in the display in rapid succession before the date and time appear: 3. Software status and 4. TEI setting

## Upgrading / reconfiguring modules

Every time a change is made (unplugging a module / plugging a module in), the system configuration should be read in again using code 0

Upgrading / reconfiguring modules	
<b>Connecting and Disconnecting Under Voltage:</b>	
Using code *0	<p>Code *0 is a code number issued to the customer, it allows the software version identities to be displayed.</p> <p>The system data is displayed in the form Lx Ty by pressing the speed dialling key. (x = number of lines; y = number of subscribers.)</p> <p>The CD function is extended at this stage.</p> <p>If the CD function is called up by service data input (service registration with CD**), the PSW is activated after the Lx Ty output. The message described above is sent to the PSW of the BUxs.</p> <p>The PSW sends acknowledgement when the configuration data has been read.</p> <p>When the acknowledgement is received, (the cursor is positioned at the 10th position in the display and) the Lx Ty output is repeated.</p> <p>If no acknowledgement is received, it is still possible to operate the CD function or to leave it.</p> <p>So that this function can be used from an end terminal without a speed dialling key, the function can also be activated using the redial key.</p>

## Example

Example	
<p><b>The system is configured for 4 lines and 15 subscribers.</b></p>	<p>The service technician connects an additional M2A plug-in module with one line and one subscriber.</p> <p>The programming mode is activated at a system terminal (menu option or function *48). The service data input commences (CD **). After the service password has been entered, the code digit function *0 must be executed.</p> <p>The identification of all software appears in the display (e.g. ZE5009DE)</p> <p>After pressing key  or key  , the display shows: L4 S15 L5 S16</p> <p>The text L4 S15 is displayed before activation, L5 S16 appears in the display after the PSW acknowledgement has been received.</p> <p>If the service technician once again presses key  or key  the display shows: L5 S16 L5 S16</p>

## Extending with EXE, BNS, IPU / substituting a BNx, EXE, IPU

### Extending with EXE, BNS, IPU / substituting a BNx, EXE, IPU

**If the customer wishes to expand the system by an EXE or BNx or IP module or replace a BNx/EXE or an IP module, it is essential to comply with the following instructions / steps:**

- ▶ The entire system must be disconnected from the power supply before it is expanded by an EXE, a BNx or an IP module, or before an EXE / BNx or an IP module is exchanged.
- ▶ Never unplug or plug in a live IOM or LAN extension cable.

▶ **General information:**

The Integral 5 easy must always be connected via a common power outlet (individual EXE and BNx components and IP modules may be damaged if they are connected to different power circuits)

All plug-in modules can be unplugged and plugged whilst they are electrically live, and they will not be damaged thereby – but the functionality of the system can be deranged by plugging and unplugging modules!

## Technical Data

### Power supply (plug-in mains unit)

Power supply (plug-in mains unit)
▶ <b>Protection class 2</b>
▶ <b>Input voltage 230 V AC <math>\pm 10\%</math>, 50 Hz</b>
▶ <b>Input voltage 110 V AC <math>\pm 10\%</math>, 50/60 Hz</b>
▶ <b>Input current 450 mA DC</b>
▶ <b>Output voltage 40 V DC</b>
▶ <b>Output current 1 A</b>

### PB1 (converter module)

PB1 (converter module)
▶ <b>Input voltage: 40 V DC</b>
▶ <b>Output voltages / currents: 40 V DC / 850 mA</b>
▶ <b>Battery: 9.6 V / 2 Ah</b>

## Connection specification for a/b subscriber

Connection specification for a/b subscriber	
<b>a/b Interface</b>	<ul style="list-style-type: none"> <li>▶ Feed voltage: -40 V</li> <li>▶ Feed current: approx. 20 mA</li> <li>▶ Permissible line resistance: 550 Ohm (incl. device)</li> </ul>
<b>Ranges for 2 x 130 Ohm line resistance:</b>	<ul style="list-style-type: none"> <li>▶ Installation cable 0.4 mm<sup>2</sup> (J-Y(St)Y2x2x0.4): approx. 1350 m</li> <li>▶ Installation cable 0.6 mm<sup>2</sup> (J-Y(St)Y2x2x0.6): approx. 2900 m</li> </ul>

## Connection specifications for DECT subscriber

Connection specifications for DECT subscriber	
<b>UPD Interface (4-wire):</b>	<ul style="list-style-type: none"> <li>▶ Feed voltage: -40 V</li> <li>▶ Transmission rate: 4xB per 64 kBit/s and 2xD per 16 kBit/s</li> <li>▶ Bit rate on lines: 384 kBit/s in send and receive directions</li> </ul>
<ul style="list-style-type: none"> <li>▶ Ranges with 4 x 100 Ohm, installation cable 0.6 mm<sup>2</sup> J-Y(St)Y2 x 2 x 0.6)</li> <li>▶ Point to point connection: approx. 1,000 m</li> </ul>	

## Connection specification for S0 Telephone

Connection specification for S0 Telephone	
<b>S0 Interface (4-wire):</b>	<ul style="list-style-type: none"> <li>▶ Feed voltage: -40 V</li> <li>▶ Transmission rate: 2xB per 64 kBit/s and 1xD 16 kBit/s</li> <li>▶ Bit rate on the line: 192 kBit/s in send and receive directions</li> </ul>
<b>Ranges for 4 x 100 Ohm, Installation cable 0.6 mm<sup>2</sup> (J-Y(St)Y2 x 2 x 0.6)</b>	<ul style="list-style-type: none"> <li>▶ Point to point connection: approx. 750 m</li> <li>▶ Point-to-multipoint connection (bus): approx. 150 m</li> </ul>

## Connection specification for UPN subscribers

Connection specification for UPN subscribers	
<b>UPN Interface (2-wire):</b>	<ul style="list-style-type: none"> <li>▶ Feed voltage: -40 V</li> <li>▶ Transmission rate: 2xB per 64 kBit/s and 1xD 16 kBit/s</li> <li>▶ Bit rate on the line: 384 kBit/s in send and receive directions</li> </ul>
<b>Ranges for 2 x 100 Ohm, Installation cable 0.6 mm<sup>2</sup> (J-Y(St)Y2 x 2 x 0.6)</b>	<ul style="list-style-type: none"> <li>▶ Point to point connection: approx. 1000 m</li> </ul>

## Dimensions

Module / Module	Slot width	Width (mm)	Height (mm)	Depth (mm)
<b>BND</b>		245	145	30
<b>BNE</b>		245	145	30
<b>BNS</b>		245	145	30
<b>IPU</b>		245	145	30
<b>EXE</b>		245	145	30
<b>PB1</b>		123	145	30
<b>T8S</b>	4	120	125	25
<b>PRI</b>	4	120	125	25
<b>M2A</b>	2	60	125	25
<b>SXS</b>	2	60	125	25
<b>S8P</b>	4	120	125	25
<b>S4A</b>	2	60	125	25
<b>M4A</b>	4	120	125	25
<b>S4D</b>	2	60	125	25
<b>S8D</b>	4	120	125	25
<b>DIA</b>	1	30	125	25
<b>CV1</b>	4	120	125	25
<b>MDF</b>		123	180	35
<b>V.24</b>	1	30	125	25
<b>DSI</b>	2	60	125	25
<b>MS4</b>	2	60	125	25

## Heat dissipation

### Heat dissipation per plug-in mains unit

- ▶ max. 20 W (at maximum expansion and least favourable circuitry)

## Ambient conditions

### Connection specification for S0 Telephone

- ▶ Area of application in standard living and work space
- ▶ Permissible room temperature: 0 to max. +40°C
- ▶ Permissible limit values for relative humidity of air: 5 to max. 93% at 30 °C
- ▶ **Condensation during operation: Not permissible**

## Transmission Technical Values of the Data Connection

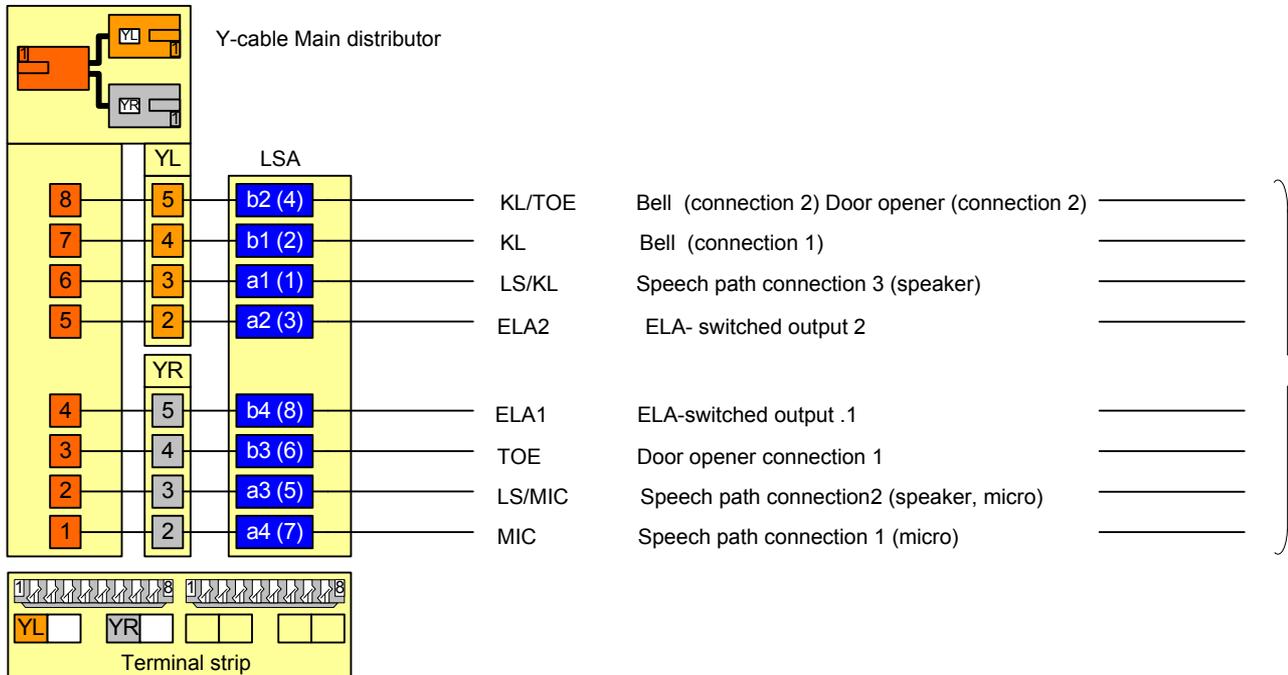
### Transmission Technical Values of the Data Connection

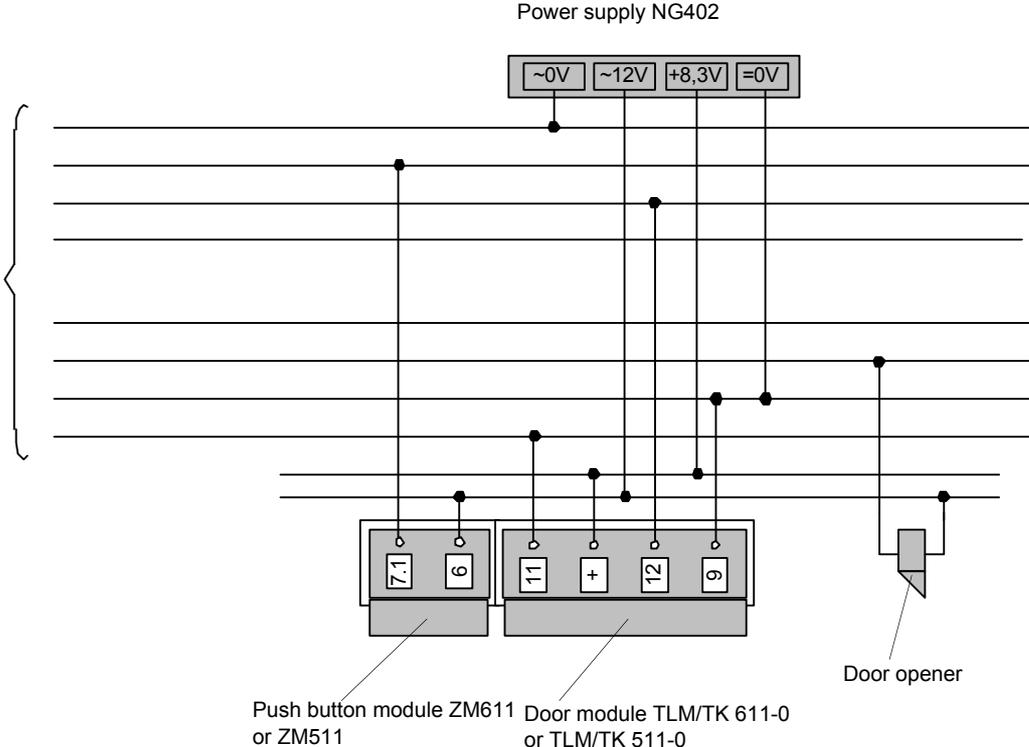
- ▶ These are established according to:  
ITU-T (CCITT)...., ETS...and corresponding to the individual national circumstances



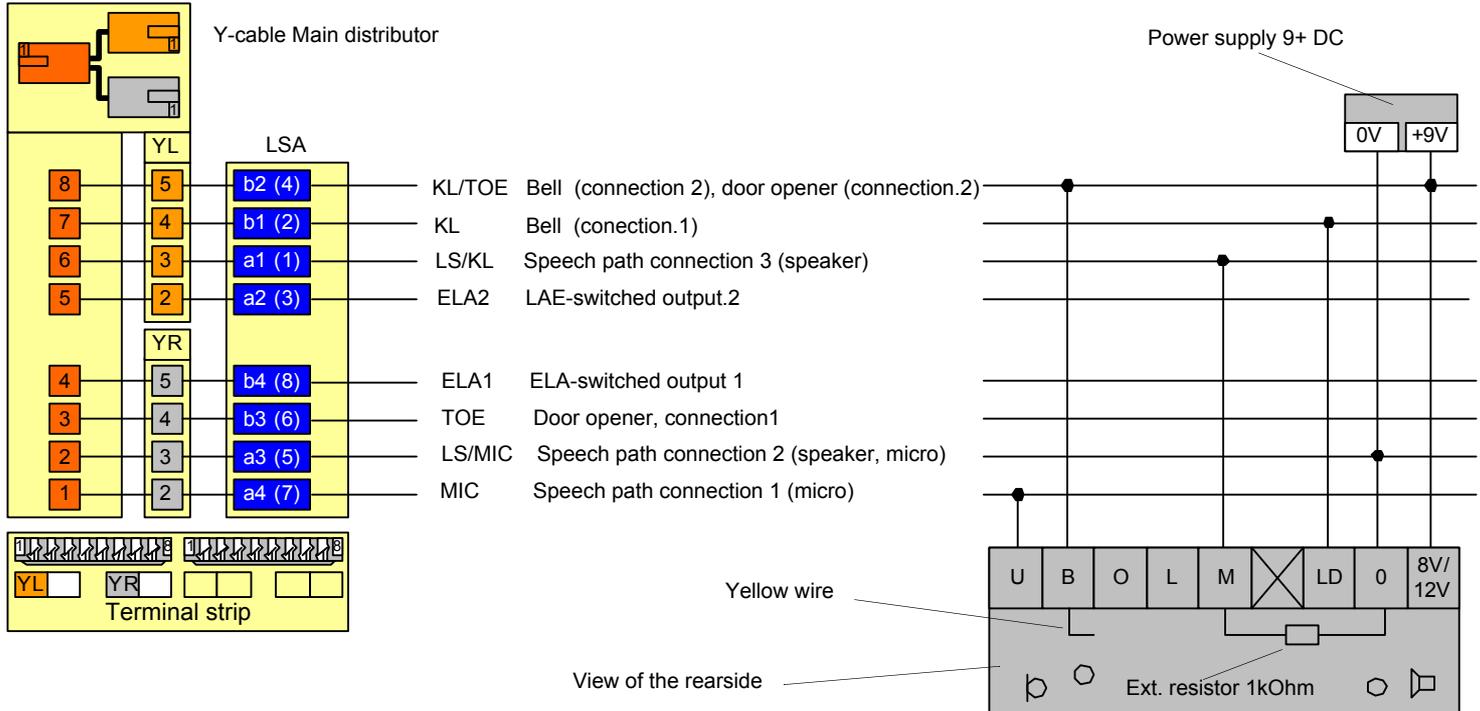
## Connection for door station

### Connection for Siedle TLM/TK 511-0 (4-wire) TLM 611-0 (4-wire)



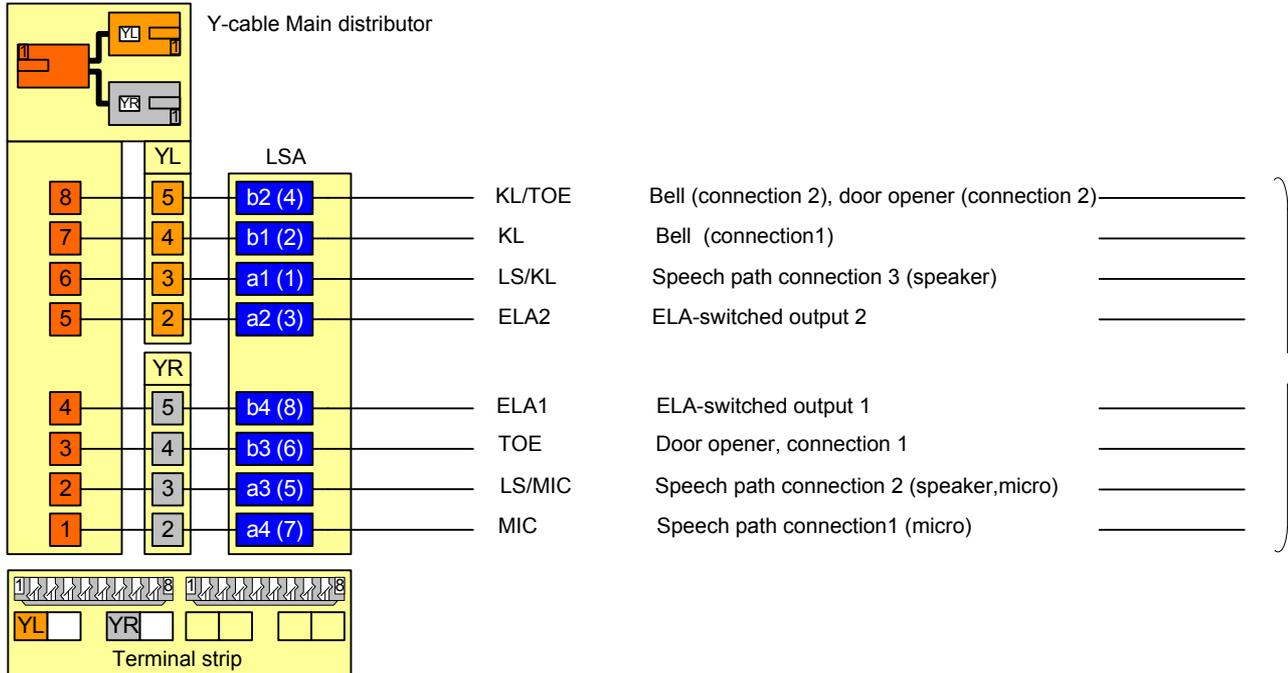


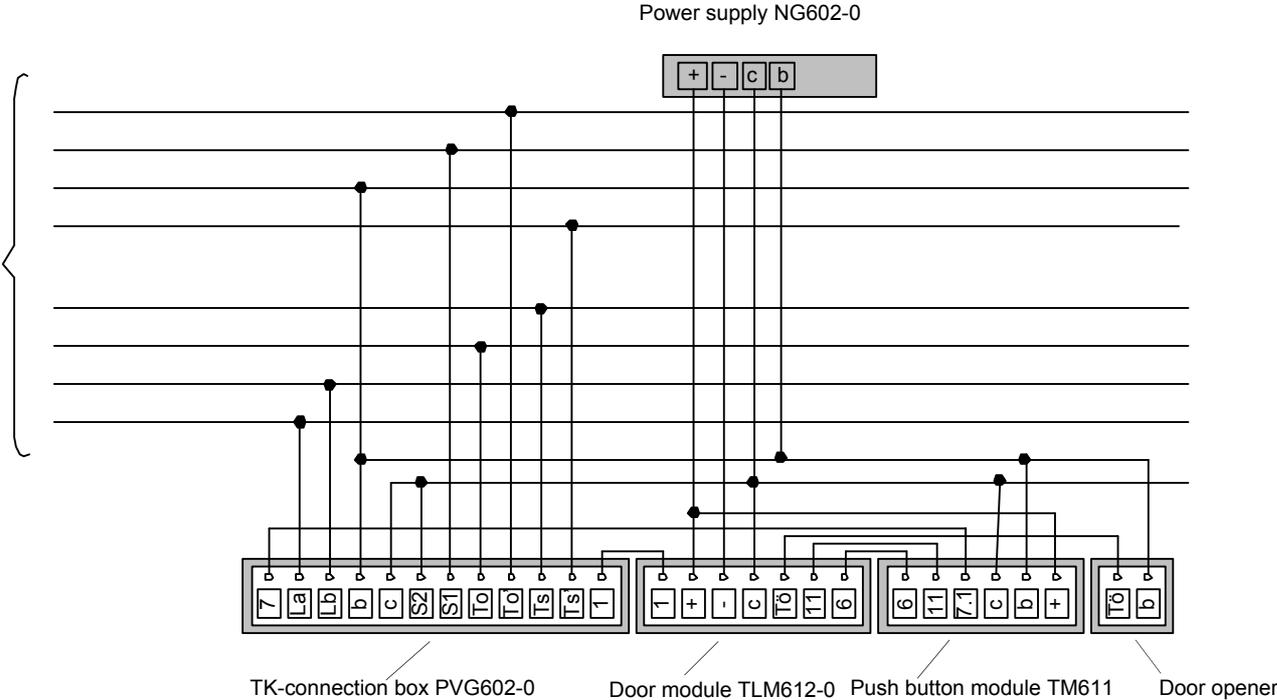
### Grothe door station (4-wire)



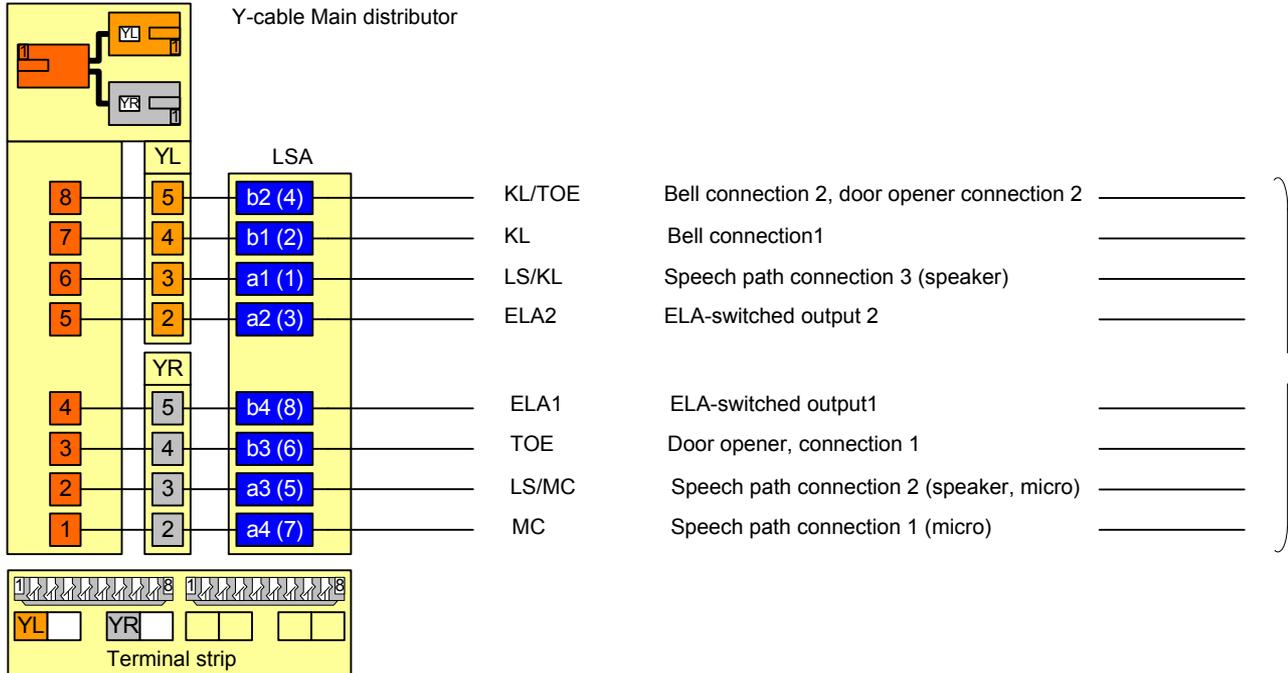
- ▶ An external resistor of 1 kOhm must be connected between terminals 0 and M.
- ▶ A bridge must be inserted from 8 V/12 V to terminal B.
- ▶ The yellow wire that comes from the rear of the module must be connected to terminal B.
- ▶ Pins 3, 4 and 5 are used for connecting to the door opener and are not shown here.

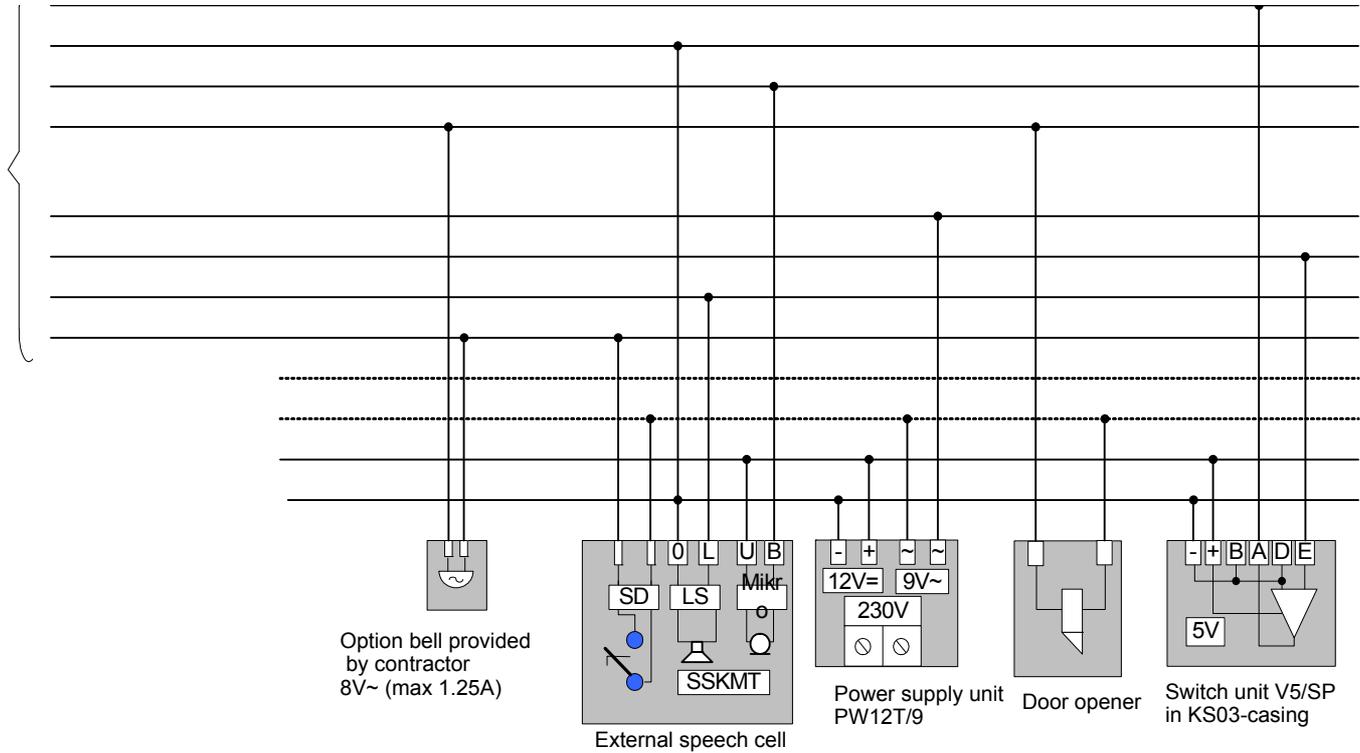
**Connection for Siedle PVG 601 (FTZ 123 D) (2-wire)**



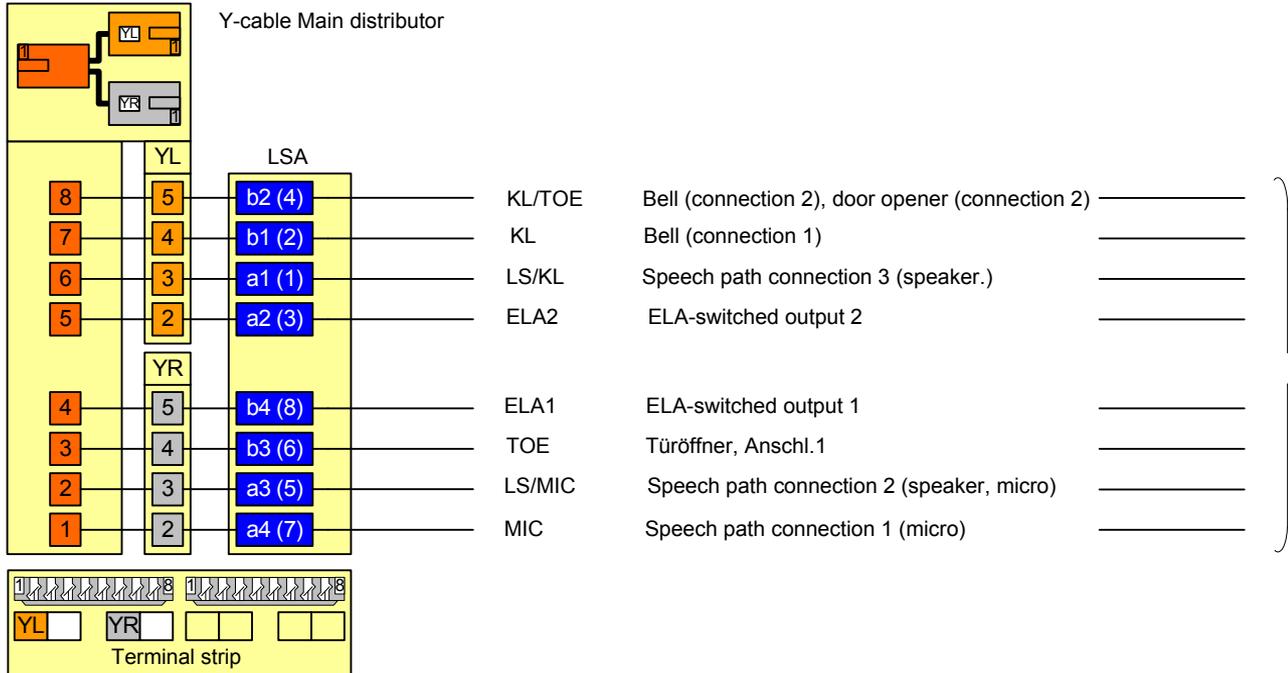


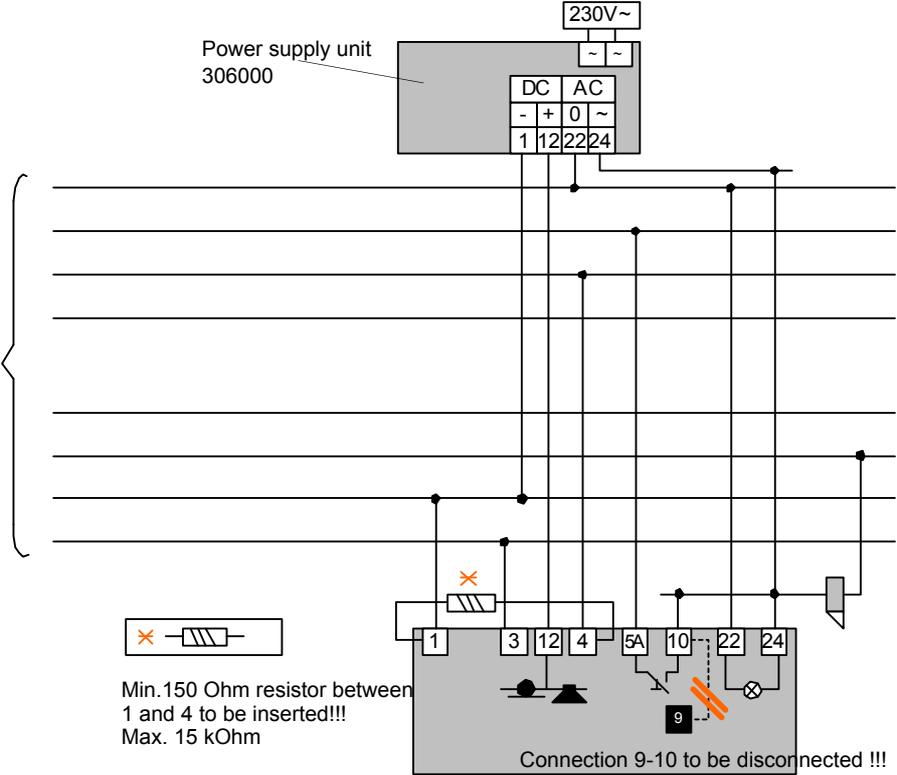
**Connection for telephone-door intercom system / telephone-interphone porter (Koch)**



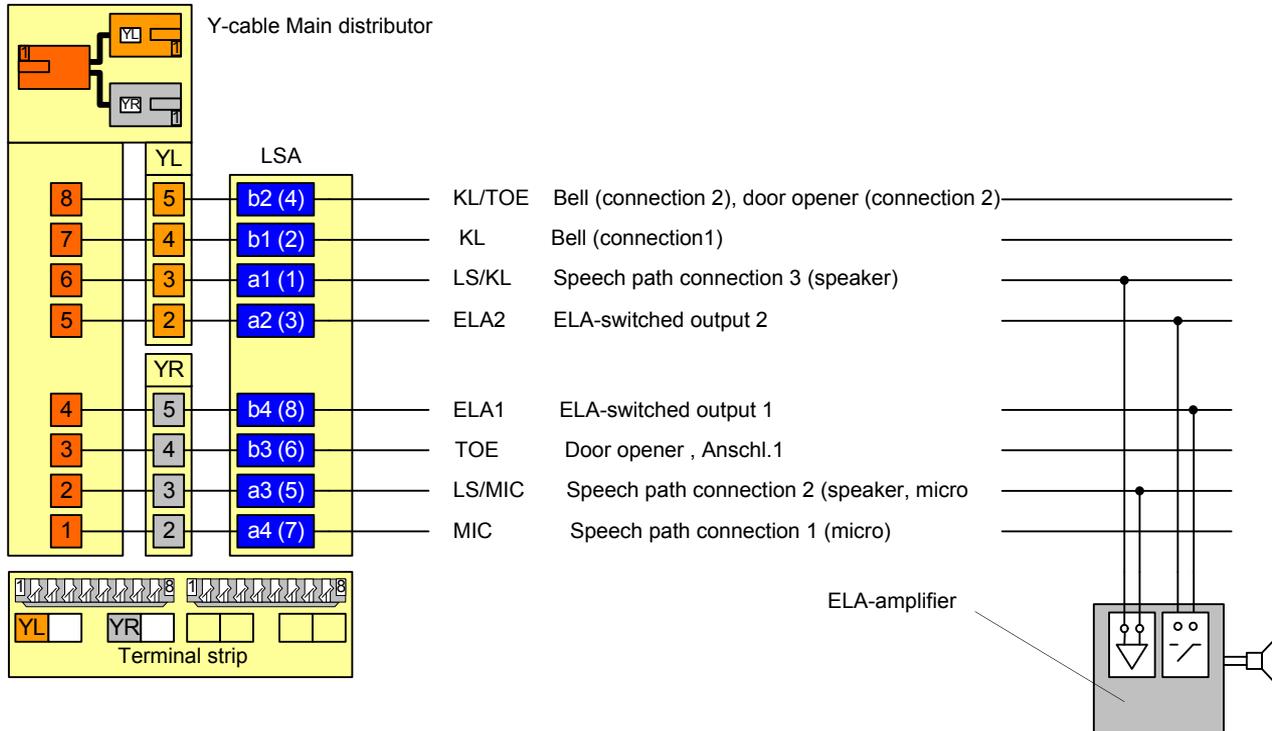


**Connection for Seko-BTicino, Sfera door speaker 302120 (4-wire)**



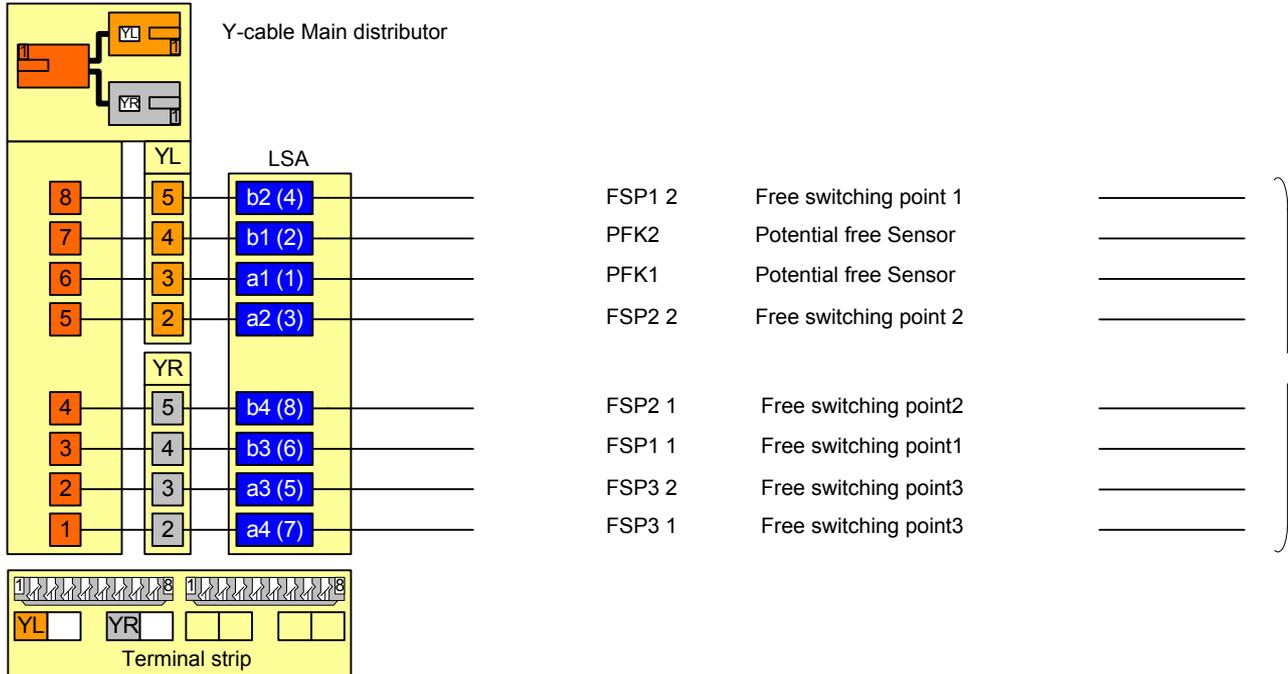


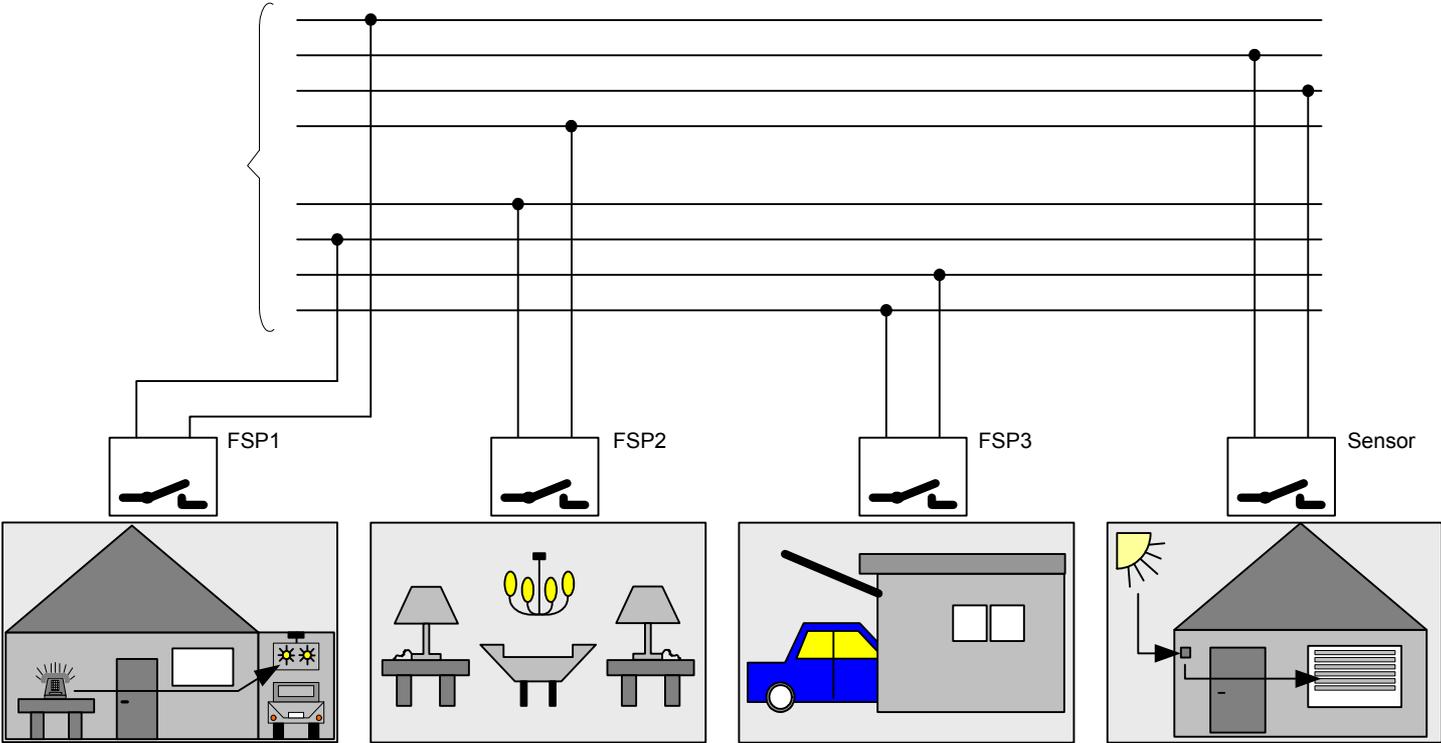
Connection for ELA (4-wire)





Potential-free contacts, sensor contact





## Compatibility I5 easy and I5

Module I5 easy	I5E easy	I5D easy	I5E	I5D	I5C auf BXC
BNE	X				
BND		X			
BNS	X				
EXE	X	X	X	X	
MS4	X	X			
DSI	X	X			
MA2	X	X			
V24	X	(integr.)	(integr.)	(integr.)	(integr.)
SXS	X	X	X ab R1.5	X ab R1.5	X
S4S	X	X	X	X	X
S4A	X	X	X	X	X
M4A	X	X	X	X	X
S8P	X	X	X	X	X
S4D	X	X	X	X	X
DIA	X	X	X	X	X
S8D	X		X		
PRI	X		X		
T8S	X	X	X		
CV1	X	X	X		

## I5easy- Module



The modul EXE can be used to replace the moduls EUE or EUD or for extension business. In this case it can be used instead of EUE or EUD.

In application instead of a EUD please consider that the EXP-L plug has to be connected.

The software supports only valid configuration rules (e.g. nur 1x S8D or CC1).

Module	I5E easy	I5D easy	I5E	I5D	I5C auf BXC
T1S			X	X	X
S1S			X	X	X
M2S			X	X	X
M2A			X	X	X
DHI			X	X	X
FSP			X	X	X
LNK			X		
BUS			X		
EUE			X		
EUD				X	
CC1			X		

## I5 Module





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