SPEED-DSL 4.6

Ethernet connection over 4-wires
Up to 4.6 Mbit/s

Manual

SPEED-DSL 4.6

Notes

Before installing and putting the device into operation, please read the security guidelines at the end of this documentation!

Pan Dacom Direkt would like to point out that the information and notes contained in these documents are subject to technical changes. In particular, changes resulting from the continuing development of the products may not have been taken into account. Pan Dacom Direkt does not assume liability for print errors contained in this manual or other inaccuracies.

Pan Dacom Direkt explicitly points out that this manual only contains a general description of technical processes and notes, and that their implementation as described is not necessarily sensible in every individual case. In case of doubt, it is essential to confer with Pan Dacom Direkt.

CAUTION	Pan Dacom Direkt GmbH strongly recommends the use of proper electrostatic discharge (ESD) precautions when handling this equipment.

1.Installation

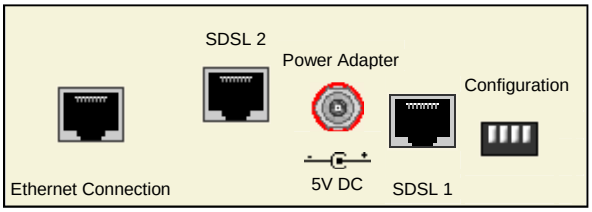
1.1. Unpack and Inspect the Equipment

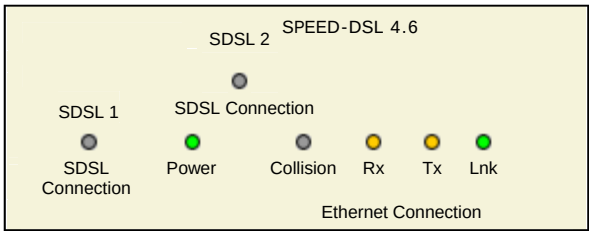
The following components should be included:

1 SPEED-DSL 4.6 or SPEED-DSL 4.6G
1 power supply

1.2. Power Up the SPEED-DSL 4.6

Plug the power supply into the back of the SPEED-DSL 4.6 and connect it to the power source. Verify that the Power LED on the front of the SPEED-DSL 4.6 is illuminated.

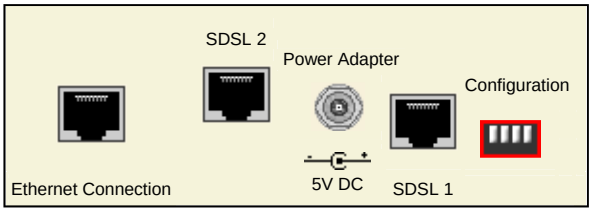




NOTE	Upon start up, the Ethernet link will remain disabled (as indicated by solid illumination of the Ethernet Rx, Tx, and Lnk LEDs) until at least one of the two SDSL connections has been established.

1.3. Configure the Switches

Configuration switches for the SDSL ports are on the back of the SPEED-DSL 4.6, numbered from left to right, 1-4.



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1.3.1 Bandwidth

Switches #1-3: SPEED-DSL 4.6-P and SPEED-DSL 4.6G-P ONLY

Switches 1-3 on the SPEED-DSL 4.6-P work in tandem with one another to provide eight bandwidth options for the two SDSL ports; bandwidth for the two ports cannot be configured individually. Distance capabilities listed in the following table assume the use of 26 American Wire Gauge (AWG) cable. Connections made with cable of a lesser gauge (e.g., 24 AWG) will link up at greater distances. Your SPEED-DSL 4.6 may not link up if the cable is in poor condition or if the cable distance is greater than a particular bandwidth will support; if link IS achieved under such conditions, traffic quality may be affected (e.g., packets may be dropped).

BANDWIDTH AND DISTANCE OPTIONS						
Switch Position			Bandwidth (kbps)		Distance	
1	2	3	Single Line Connection	Double Line Bonded Connection	Feet	Meters
down	down	down	2,320	4,640	11,000	3,353
down	down	up	2,064	4,128	11,900	3,627
down	up	down	1,552	3,104	12,600	3,840
down	up	up	1,040	2,080	15,500	4,724
up	down	down	784	1,586	16,000	4,877
up	down	up	528	1,056	17,900	5,456
up	up	down	400	800	18,900	5,761
up	up	up	**Adaptive***	**Adaptive***	varies	varies

***Adaptive** mode allows the SPEED-DSL 4.6-P to train up to the best possible speed supported by the SPEED-DSL 4.6-P, the remote modem to which it's connected, and the copper cable pair(s) connecting the two. The maximum reachable distance for a single line SPEED-DSL 4.6-P connection in Adaptive mode is 24,700 feet (at 144 kbps).

NOTE Bandwidth cannot be configured on the SPEED-DSL 4.6-S; subscriber units determine bandwidth via communication with their partner SDSL provider unit.

1.3.2 Ethernet Duplex Mode

Switch 4: both provider and subscriber units

The Ethernet link can be configured at either Full Duplex or Half Duplex mode. Although both ends of the ETHERNET connection must have the same duplex mode configuration, it is not necessary for partner providers and subscribers to be configured the same; duplex mode does not apply to the SDSL link.

SWITCH 4	CONFIGURATION
down	Half Duplex
up	Full Duplex

1.3.2.1 Half Duplex Ethernet

Receive and transmit functions are mutually exclusive; data transmission occurs in only one direction at a time. Packet collisions are not unusual.

1.3.2.2 Full Duplex Ethernet

The Ethernet line can recieve and transmit simultaneously, effectively upping aggregate bandwidth from 10 mbps to 20 mbps and preventing packet collisions.

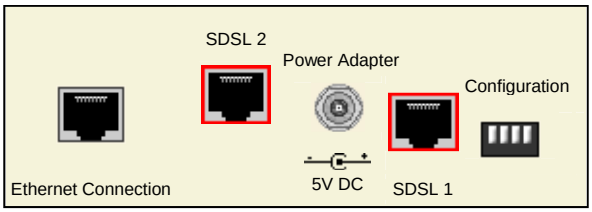
1.4. Connect the SDSL Line(s).

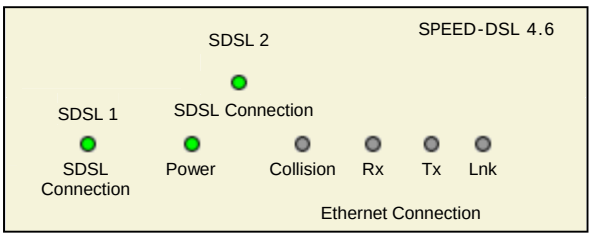
The primary feature of the SPEED-DSL 4.6 is loop bonding capability, though both the provider and subscriber units can also function with a single SDSL connection.

1.4.1 Loop Bonding

Using two SDSL lines for one network connection (loop bonding) will net twice the speed and data passing capability as a single SDSL connection. A second SDSL line can also be considered a backup for the first, and vice versa, should one of the lines become disabled.

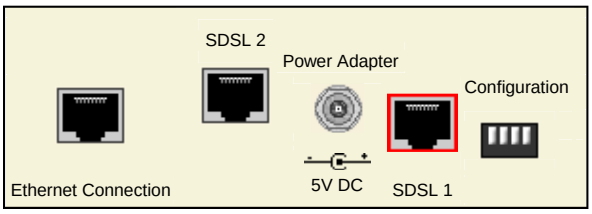
Plug the SDSL cables into the SDSL RJ45 ports (SDSL 1 and SDSL 2) on the back of the SPEED-DSL 4.6; the order of connection is not important. Verify both connections: the SDSL 1 and SDSL 2 LEDs on the front of the SPEED-DSL 4.6 will pulse green to indicate the connections are established and operational.

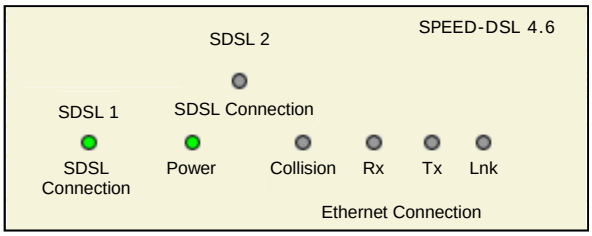




1.4.2 Single SDSL Connection

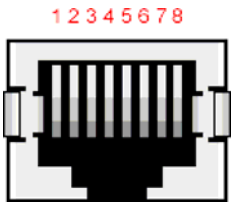
Plug the SDSL cable into one of the two SDSL RJ45 ports on the back of the SPEED-DSL 4.6; either port (SDSL 1 or SDSL 2) may be used. Verify the connection: the SDSL LED on the front of the SPEED-DSL 4.6 (SDSL 1 or SDSL 2 depending upon which port was connected) will pulse green to indicate the connection is established and operational.





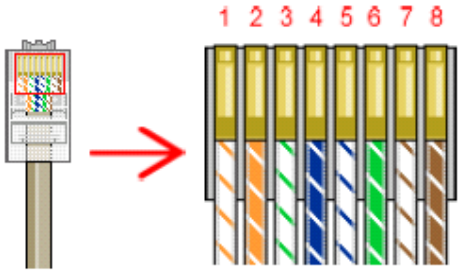
Link up time between local and remote SDSL network extenders can vary from one to five minutes depending on the quality, gauge and distance of the copper cable(s). If cable distance(s) is greater than a particular bandwidth will support, the units may not link up or, if they do achieve link, traffic quality may be affected (e.g., packets may be dropped).

SDSL RJ45 PORT



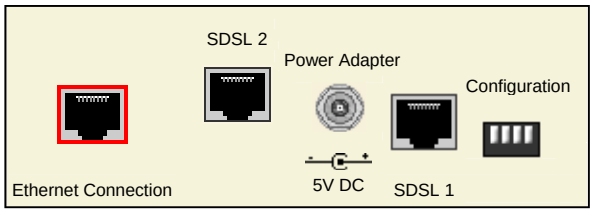
PIN	CONNECTION
1	not used
2	not used
3	not used
4	Ring
5	Tip
6	not used
7	not used
8	not used

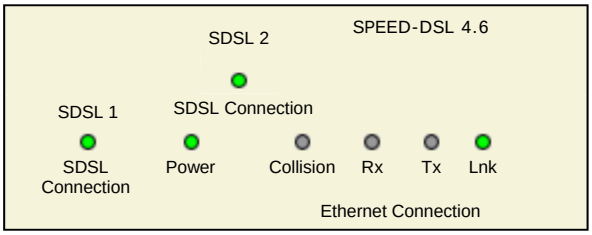
SDSL CABLE: RJ45 CONNECTOR



1.5. Connect the Ethernet Line

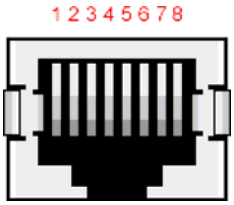
Plug the Ethernet cable into the Ethernet Connection RJ45 port on the back of the SPEED-DSL 4.6. Verify the connection: solid illumination of the Ethernet Connection Lnk LED on the front of the SPEED-DSL 4.6 indicates a link has been established, IF an SDSL connection has already been made. If an SDSL connection has NOT yet been made, the Ethernet link will remain disabled (as indicated by solid illumination of the Ethernet Rx, Tx and Lnk LEDs) until at least one of the two SDSL links has been established.





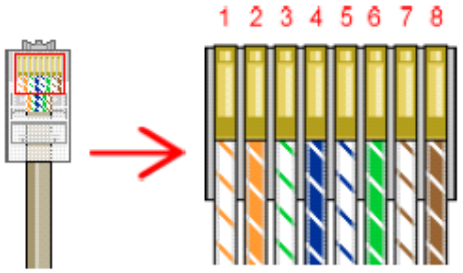
NOTE For most applications, the SPEED-DSL 4.6 connects to a PC using a **straight-through Ethernet cable** and to a hub or a switch using a **crossover Ethernet cable.** For any other connection combinations you must verify the pinout of the Ethernet device into which you are connecting the SPEED-DSL 4.6 in order to determine which type of cable is required.

ETHERNET RJ45 PORT



PIN	CONNECTION
1	Rx+
2	Rx-
3	Tx+
4	not used
5	not used
6	Tx-
7	not used
8	not used

ETHERNET CABLE: RJ45 CONNECTOR



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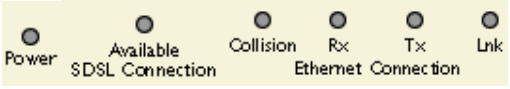
2. Additional Information

2.1. LED Indications

LED	State	Indication	Additional Information
Power	solid green 	unit is operational	If the Power LED is not illuminated, it is unlikely that the SPEED-DSL 4.6 is receiving power and therefore none of the LEDs will be illuminated. 
SDSL Connections 1 & 2	pulsing green 	SDSL connection is established and active	Traffic is flowing.
	solid green 	problematic SDSL connection	A connection exists but there is indication of a problem with the SDSL line.
	no illumination 	no SDSL connection	**If BOTH SDSL connections are lost, the Ethernet LEDs will present as follows (see NOTE on following page):** 
Ethernet Collision	no illumination 	standard	Either there is no traffic or traffic is flowing without any collisions. If there is no Ethernet connection, the Ethernet Collision LED will remain unlit by default.
	flashing red 	packet collision(s)	The Ethernet packet(s) will automatically be retransmitted.
	solid red 	warning	There is a potential traffic problem over the Ethernet segment. **Note:** A SPEED-DSL 4.6 in Full Duplex mode does not have collisions; the Ethernet Collision LED is only applicable in Half Duplex mode.

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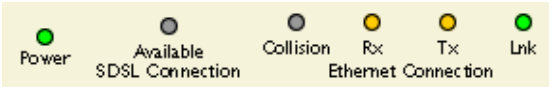
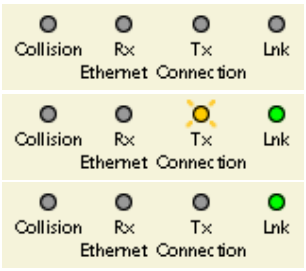
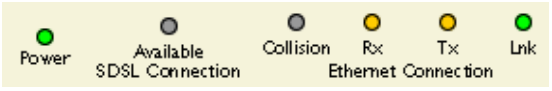
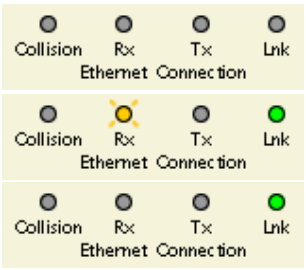
Ethernet Rx	flashing amber 	Ethernet activity	The SPEED-DSL 4.6 is receiving data from the Ethernet network.
	solid amber 	heavy Rx traffic	The SPEED-DSL 4.6 is receiving large amounts of data from across the Ethernet network. **A solid amber Ethernet Rx LED can also signify a lost SDSL connection when presented as follows (see NOTE on following page):** 
	no illumination 	no activity	Either there is no Ethernet link or a link exists but there is no activity.  OR
Ethernet Tx	flashing amber 	Ethernet activity	The SPEED-DSL 4.6 is transmitting data across the Ethernet network.
	solid amber 	heavy Tx traffic	The port is transmitting large amounts of data across the Ethernet network. **A solid amber Ethernet Rx LED can also signify a lost SDSL connection when presented as follows (see NOTE on following page):** 
	no illumination 	no activity	Either there is no Ethernet link or a link exists but there is no activity.  OR

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Ethernet Lnk	solid green 	Ethernet connection is established	A solid green Ethernet Lnk LED can also signify a lost SDSL connection; **see NOTE below**.
	no illumination 	no Ethernet connection	The Ethernet Rx and Tx LEDs will remain unlit by default.

(A pulsing LED blinks steadily at a rate of once per second. A flashing LED blinks at a more rapid, less constant rate.)

NOTE If both SDSL connections lose link, the Ethernet connection will automatically be disabled (as indicated by solid illumination of the Ethernet Rx, Tx and Lnk LEDs). Upon reestablishment of at least one of the SDSL links, the Ethernet connection will be reinstated and the Ethernet LEDs will reflect current Ethernet status.

2.2. Regulatory Compliance for Class B Equipment

2.2.1 FCC Regulatory Compliance Information for Class B Equipment

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment uses, generates and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase separation between the equipment and the receiver.
- Connect equipment to an outlet on a circuit different from the receiver.
- Consult the dealer or an experienced radio/TV technician for help.

2.2.2 Industry Canada Regulatory Compliance Information for Class B Equipment

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la Classe B est conforme à la norme NMB-003 du Canada.

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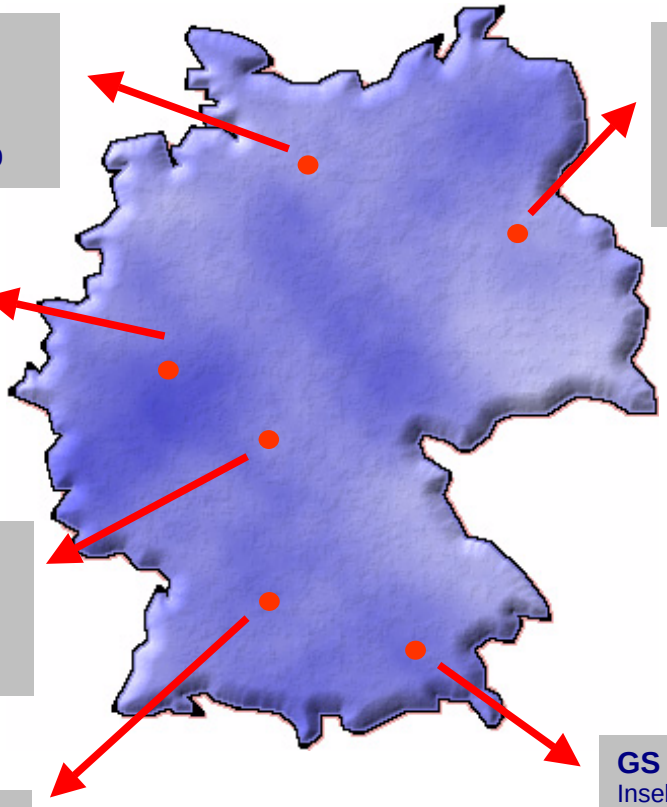

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