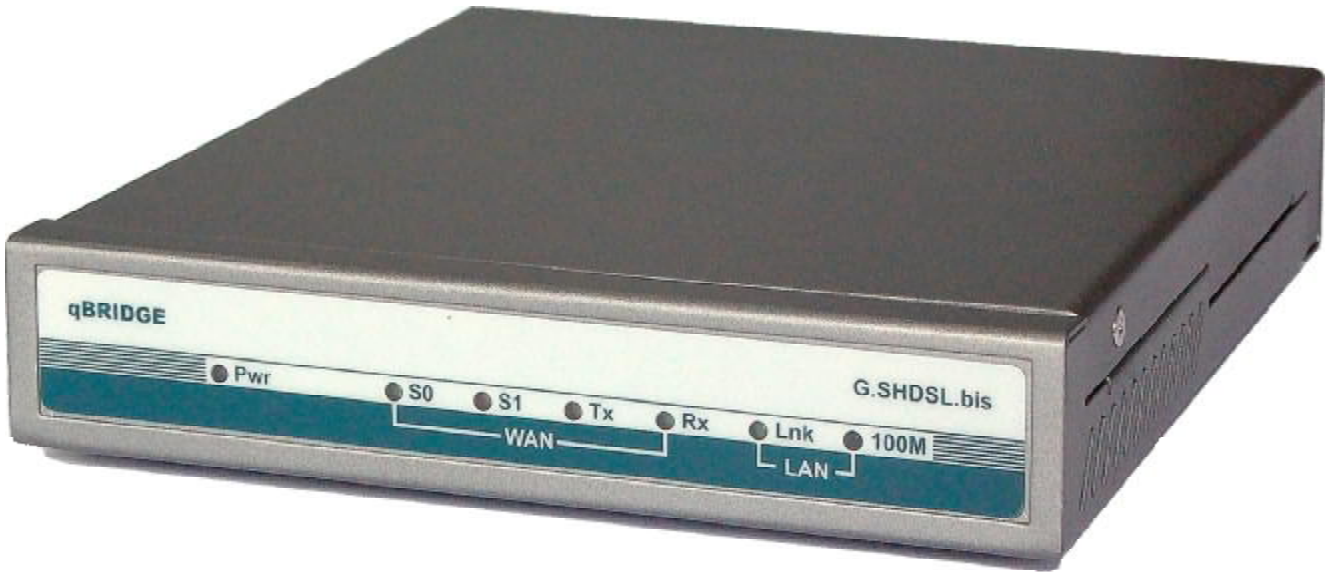
High performance access device NSG-200/B "qBRIDGE"

User's Manual

qBRIDGE-206



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Revision history

- 26.04.2006 First release of this document
- 17.08.2006 Added information about 4-wire operation

1. Introduction

1.1. Purpose and area of application

qBRIDGE – is a series of low cost and high performance access devices (modems / converters) functioning in "Bridge connection" mode. They are meant for connecting together distant segments of Ethernet 10/100Base-TX LANs using different technologies of data transmission over copper or fiber lines. qBRIDGE is a high performance bridge that encapsulates Ethernet frames into HDLC frames and visa versa. The "Bridge connection" mode provides transport for any protocol including TCP/IP, IPX and so on. qBRIDGE supports transparent transmission of "long" Ethernet frames with VLAN tag.

All qBRIDGE modifications can be used for point to point connection of distant LAN segments. Moreover it's possible to use some modifications for point-multipoint connection for example to connect remote users to ISP. qBRIDGE-105 [sdsl] can be used as a CPE for 8-port mini-DSLAM NSG-800/maxS-8. qBRIDGE-106 [g.shdsl] can be used as a CPE for 24-port Ethernet-based mini-DSLAM NSG-800/maxS-24.

qBRIDGE series include modifications listed below:

qBRIDGE-100 : Bridge with one port 10/100M Ethernet & one port G.703 (E1 Unframed)
qBRIDGE-101 : Bridge with one port 10/100M Ethernet & one port E1 (E1 Framed/ Unframed)
qBRIDGE-201 : Bridge with one port 10/100M Ethernet & two ports E1 (E1 Framed/ Unframed)
qBRIDGE-102 : Bridge with one port 10/100M Ethernet & one port E2
qBRIDGE-103 : Bridge with one port 10/100M Ethernet & one port E3
qBRIDGE-105 : Bridge with one port 10/100M Ethernet & one port SDSL
qBRIDGE-106 : Bridge with one port 10/100M Ethernet & one port G.SHDSL
qBRIDGE-206 : Bridge with one port 10/100M Ethernet & one/two/four ports G.SHDSL.bis

qBRIDGE-206 is a G.SHDSL.bis modem that provides low cost solution for the "last mile". It's suitable for connecting users to ISP and for joining distant Ethernet 10/100Base-TX segments using dedicated lines.

qBRIDGE-206 is a high performance bridge that encapsulates Ethernet frames into HDLC frames and visa versa. Depending on modification it has one or four Ethernet 10/100Base-TX ports with auto-negotiation & auto-MDIX and one/two/four G.SHDSL.bis WAN ports. The device has 5 DIP-switches for basic setup and HTTP interface for detailed configuration. qBRIDGE-206 is transparent for Ethernet frames with WLAN tag, VPN and so on and is used for point to point connection to unite distant LANs.

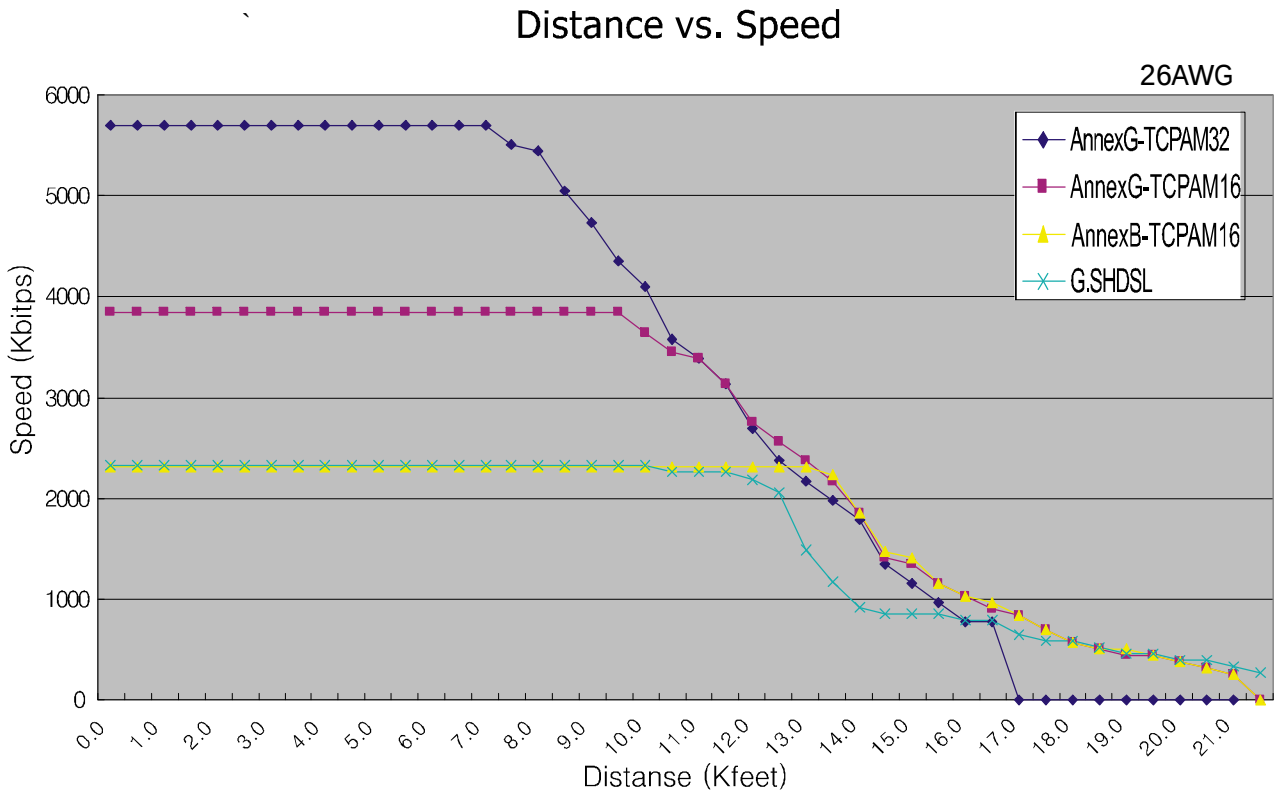
All qBRIDGE-206 modifications are listed in table below.

Ordering Code	Part number	G.991.2 support	Copper wires (Max speed)
qBRIDGE-206 (NSG-200/B-206)	36BLM206	Annex F&G / A&B, TC PAM-32/16	2 (11,4 Mbps)
qBRIDGE-206F (NSG-200/B-206F)	36BLF206	Annex F&G, TC PAM-32	2 (11,4 Mbps)
qBRIDGE-206S (NSG-200/B-206S)	36BLS206	Annex F&G / A&B, TC PAM-32/16	1 (5,7 Mbps)
qBRIDGE-206E (NSG-200/B-206E)	36BLE206	Annex F&G / A&B, TC PAM-32/16	4 (22,8 Mbps)

qBRIDGE-206 provides symmetric full duplex data transmission over one, two or four twisted pairs (depending on device modification). The speed range for each pair is 768-5696 Kbps (TCPAM-32) and 192-3840 Kbps (TCPAM-16).

ANNEX	TC-PAM	Line speed (Kbps) - 2Wire	Line speed (Kbps) - 4Wire	Line speed (Kbps) - 8Wire
F&G	32	5696 -768	11392 -1536	22784 -3072
	16	3840 - 192	7680 - 384	15360 - 768
A&B	16	2304 - 192	4608 - 384	9216 - 768

The figure below represents maximum line reach depending on line speed for one pair 26 AWG line. For comparison purpose the same dependence for G.SHDSL device is represented too.



1.2. Advantages

- Symmetric full duplex data transmission with speed up to 22784 Kbps
- Simple configuring using DIP-switches or HTTP interface
- One/four Ethernet 10/100Base-TX with auto-negotiation & auto-MDIX
- VLAN tag pass-through
- Small-size metal case

1.3. Features

LAN

- IEEE 802.3/802.3u; IEEE 802.3x flow control l
- Half / Full duplex: 10/100Mbps - Half Duplex / 20/200Mbps - Full duplex
- Auto-negotiation 10/100 Mbps & auto-MDIX
- Transparent MAC Bridging, Fast Aging, LAN/WAN Link Interlock
- IEEE 802.1q VLAN pass-through
- VPN (PPTP, L2TP, IPSec) pass-through
- Connector: RJ-45

G.SHDSL.bis

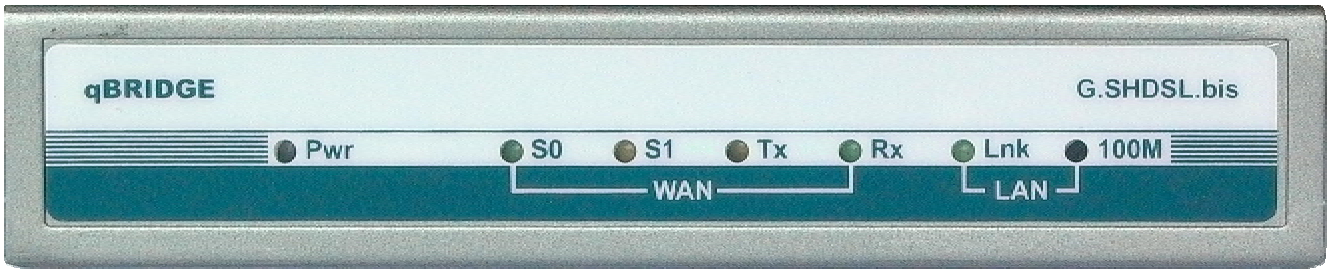
- ITU-T G.991.2 annex A,B,F,G (G.SHDSL.bis)
- Line speed: 192 - 22784 Kbps (full duplex)
- Line coding: TCPAM-16, TCPAM-32
- Line: single, two or four-pair 135-ohm twisted copper cable
- Encapsulation of Ethernet frames into HDLC frames
- Connector: RJ-45

Other features

- Remote SNMP and WEB management
- LED indicators
- Basic configuration is done using DIP-switches
- Dimensions: 142 x 159 x 30 mm, 0,6 kg
- Power source: external adapter 5V / 2A
- Power consumption: 6,5 W
- Temperature: 0 – 45 ºC
- Humidity: 0 - 95% without condensation

1.4. Connectors, LED indicators and DIP-switches

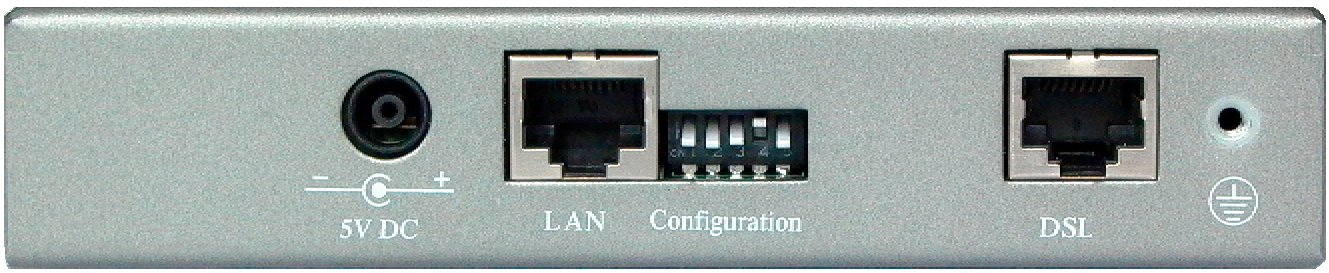
Front Panel: LED indicators show state of qBRIDGE.



LEDs description:

Pwr: ON when power is applied to the device
LAN Lnk: ON when LAN cable is connected. Blinking when data is transmitted through LAN port
LAN 100M: ON when LAN port is in 100 Mbps mode
WAN S0: ON when link is established on line 0. Blinking when device is establishing link through line 0 (all modifications)
WAN S1: ON when link is established on line 1. Blinking when device is establishing link through line 1 (all modifications except qBRIDGE-206S) For qBRIDGE-206S this indicator is always OFF.
WAN Tx: ON when data is transmitted through WAN (G.SHDSL.bis) port
WAN Rx: ON when data is received from WAN (G.SHDSL.bis) port

Rear Panel: Device has LAN connector (RJ-45), DSL (WAN) connector (RJ-45), 5V DC power connector and DIP-switches (Configuration) on the rear panel.



DC5V: 5 V DC power supply. Use only power adapter supplied with the device
LAN: Ethernet 10/100BaseT (RJ–45 connector)
Configuration: DIP-switches for basic device configuration (SW1 – SW5)
DSL: G.SHDSL.bis (WAN) port (RJ–45 connector)

2. Device Configuration

2.1. Powerup

1. Place your qBRIDGE-206 to suitable location with enough space to connect all required cables.
2. Connect LAN port of the device to HUB/Switch or to a PC using a Patch Cord. Device supports auto-MDIX therefore Patch Cords cable may be any type (cross or straight).
3. Connect WAN port (connector with "DSL" mark) to copper leased line. Use a cable with RJ–45 connector.
4. Make basic device setup using DIP-switches on rear panel. qBRIDGE-206 is used for point to point connection of distant LAN segments. One device must be configured as COE and the other must be configured as CPE. Both devices (local and remote) must be configured for working over the same amount

of copper pairs. If you want to make detailed setup configure both devices to work in HTTP mode and then use WEB browser to setup the device settings.

5. Connect power adapter (DC 5 V) to the connector with "5V DC" mark.
6. Inspect LED indicators of the device. **Pwr** indicator must be ON after connecting the power adapter. **LAN Lnk** indicator must be ON after Ethernet cable was properly connected. **WAN S0/S1** indicators must be ON after establishing link with remote device. If **WAN S0/S1** indicators are ON modems are ready to transmit data.

ATTENTION! You must turn off the power of the device before making any DIP-switch configuration changes. When configuration is completed turn the power on again.

ATTENTION! In order to avoid device overheating do not stack qBRIDGE-206 devices

2.2. G.SHDSL.bis interface: mode and speed selection.

When two qBRIDGE-206 are working in point to point mode one device must be in COE mode and the other must be in CPE mode. It's possible to setup COE/CPE mode and line speed manually using DIP-switches. qBRIDGE-206 and qBRIDGE-206F modifications support DIP-switch SW5 that is used to select 2-wire or 4-wire mode. When SW5 is ON device is in 2-wire, when OFF - in 4-wire mode. Both devices (local and remote) must be configured for working over the same amount of copper pairs.

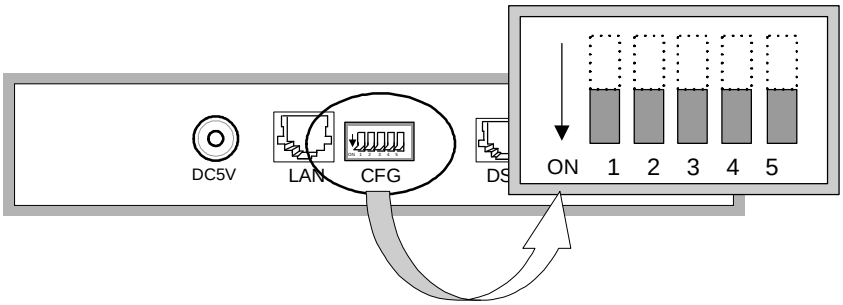
ATTENTION! To avoid unstable link when working in 4-wire mode connect twisted pair with higher quality to pins 4,5 and pair with lower quality to pins 1,2 of the DSL connector.

You must setup line speed only for COE device. Device in CPE mode selects the line speed automatically according to line speed of remote COE device. When configuration is done using DIP-switches **Annex F&G** and **TC PAM-32** line coding is used by default.

For detailed setup qBRIDGE-206 supports HTTP interface. The default IP address is **192.168.1.254**. When entering HTTP interface left user name field empty and type "**password**" in password field.

Using HTTP interface you can setup line coding (TC PAM-32 or TC PAM-16), G.991.2 Annex (Annex F&G or Annex A&B). It's also possible to select line speed more precisely than using DIP-switches. Moreover HTTP mode allows to setup SNMP settings, enable or disable IEEE 802.3x flow control, LAN/WAN Link Interlock and Fast Aging function. LAN/WAN interlock let STP equipment connected to qBRIDGE-206 to recognize link status of qBRIDGE-206 whether it is up or down. Aging time is related to MAC entry refreshing that can make STP equipment malfunction. In this case, normal aging time which is 300 sec can make STP malfunction so the fast aging is necessary in which MAC entry is refreshed every 800 us.

	CFG: DIP-switches (SW1 – SW4)					Comment
	1	2	3	4	Line speed (Kbps)	
CPE mode	ON	ON	ON	ON	AUTO	CPE Mode
HTTP Mode	ON	ON	ON	OFF	HTTP Mode	
	ON	ON	OFF	ON	HTTP Mode	Restore factory default settings
	ON	ON	OFF	OFF	Reserved	
COE mode	ON	OFF	ON	ON	768	COE Mode
	ON	OFF	ON	OFF	1024	
	ON	OFF	OFF	ON	1536	
	ON	OFF	OFF	OFF	2048	
	OFF	ON	ON	ON	2304	
	OFF	ON	ON	OFF	2560	
	OFF	ON	OFF	ON	3072	
	OFF	ON	OFF	OFF	3804	
	OFF	OFF	ON	ON	4096	
	OFF	OFF	ON	OFF	4608	
	OFF	OFF	OFF	ON	5056	
	OFF	OFF	OFF	OFF	5696	



Factory default DIP-switches settings.

Appendix A. Connector pin-outs

Pin-out of DSL RJ-45 connector (qBRIDGE-206 и qBRIDGE-206F)

Pin number	Description
4,5	Tip0, Ring0
1,2	Tip1, Ring1

Pin-out of DSL RJ-45 connector (qBRIDGE-206S)

Pin number	Description
4,5	Tip0, Ring0

Appendix B. Checking in the box

Device NSG-200/B-206	P/N: 36BLM206	(qBRIDGE-206)	1 (according to the order)
	P/N: 36BLF206	(qBRIDGE-206F)	1 (according to the order)
	P/N: 36BLS206	(qBRIDGE-206S)	1 (according to the order)
	P/N: 36BLE206	(qBRIDGE-206E)	1 (according to the order)
Power adapter (AC Adapter 5V; 2A)			1
Certificate of guarantee			1
User’s manual			1 for two devices
Patch Cord cable “Straight RJ-45” or “Crossover RJ-45”			1
Line cable RJ–45			1