

# High performance access device "qBRIDGE"

User's Manual

**qBRIDGE-100**  
**Ethernet to G.703 Converter/Bridge**



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**Attention**           When you receive devices you need to check your box and make sure that all items are inside (see Appendix B). Especially check the presence of all required cables and certificate of guarantee. The absence of certificate of guarantee with mark of distributor is a reason for refusal in after-sales service and technical support from NSGate LTD.

## Revision history

- 10.05.2006 First release of this document
- Paragraph 2.3 has been reviewed
- 2.03.2007 Ordering information has been reviewed. DC power supply information has been added

## 1. Introduction

### 1.1. Purpose and area of application

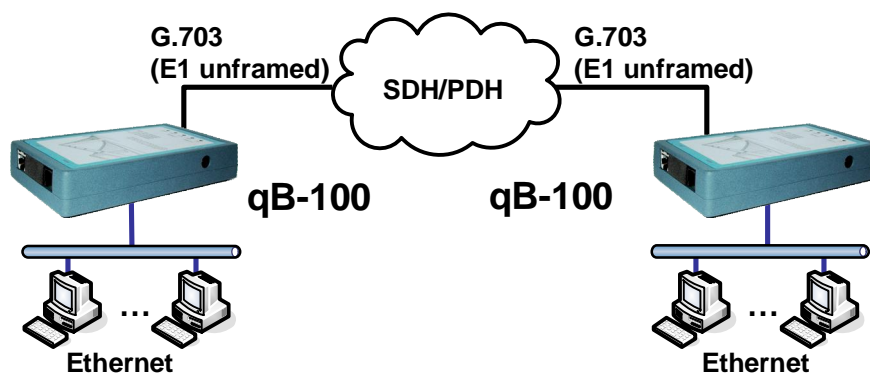
**qBRIDGE** is a series of low cost and high performance access devices (modems/ converters) functioning in "Bridge connection" mode. They are meant for connecting together distant segments of Ethernet 10/100Base-TX LANs using different technologies of data transmission over copper or fiber lines. qBRIDGE is a high performance bridge that encapsulates Ethernet frames into HDLC frames and visa versa. Peak performance is 90000 frames per second. Frame buffer capacity is 340 frames. It's possible to use any synchronous serial interface as a WAN port. WAN interface speed is up to 50 Mbps. User can choose WAN interface type from a set of already available interfaces. There is a possibility of manufacturing devices with WAN interface by customer request. 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 [sds1] can be used as a CPE for 8-port mini-DSLAM NSG-800/maxS-8. qBRIDGE-106 [g.shds1] can be used as a CPE for 24 or 12-port Ethernet-based mini-DSLAM NSG-800/maxS-24/12.

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-401 : Bridge with four ports 10/100M Ethernet & four ports E1 (E1 Framed)
- 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-100** is a high performance converter/bridge. It's suitable for connecting distant LAN segments using standard E1 channels. qBRIDGE-100 has unframed 2.048 Mbps G.703 interface with maximum reach 1.8 km over 24AWG cable. Furthermore it can be used on dedicated lines. Configuration is done using DIP-Switches. No terminal emulation program is needed.



Application 1. Connection of remote LANs over G.703 channel

## 1.2. Advantages

- Simple configuring using DIP-switches
- Ethernet 10/100Base-TX with auto-negotiation & auto-MDIX
- VLAN Support: VLAN tag pass-through
- High performance: Filtering and Forwarding- 90,000 pct/s; Frame Buffer- 340 frames
- Small-size plastic case

## 1.3. Features

### LAN

- IEEE 802.3/802.3u; IEEE 802.3x flow control
- Half / Full duplex: 10/100Mbps - Half Duplex / 20/200Mbps - Full duplex
- Auto-negotiation 10/100 Mbps & auto-MDIX
- Connector: RJ-45
- Automatic disabling when WAN link is broken (Link-Loss Forwarding)

### “Bridge connection” mode

- IEEE 802.1D transparent learning bridge
- 256MAC-address table
- IEEE 802.1q VLAN pass-through
- Filtering and Forwarding: 90,000 packets/sec; Delay: 1 frame
- Frame Buffer size – 340 frames

### WAN port: E1 Unframed

- ITU-T G.703
- Line speed: 2048 Kbps  $\pm$  0,005% full duplex
- Line coding: HDB3
- Line: 120 $\Omega$  two-pair twisted cable
- Jitter tolerance according to ITU-T G.823
- Improved receiver sensitivity: -43 dB at 1024 KHz
- Selectable G.703 transmit clock source: local oscillator or recovery from line
- Remote loopback
- Connector: RJ-45

### Other features

- LED indicators
- Dimensions: 80 $\times$ 135 $\times$ 27 mm
- Power: external 100 $\div$ 240V AC to 9V DC or 36 $\div$ 72V DC to 12 V DC adapter (see ordering information)
- Power consumption: 1,5 W
- Temperature: 0  $\div$  45 °C
- Humidity: 0  $\div$  95% without condensation

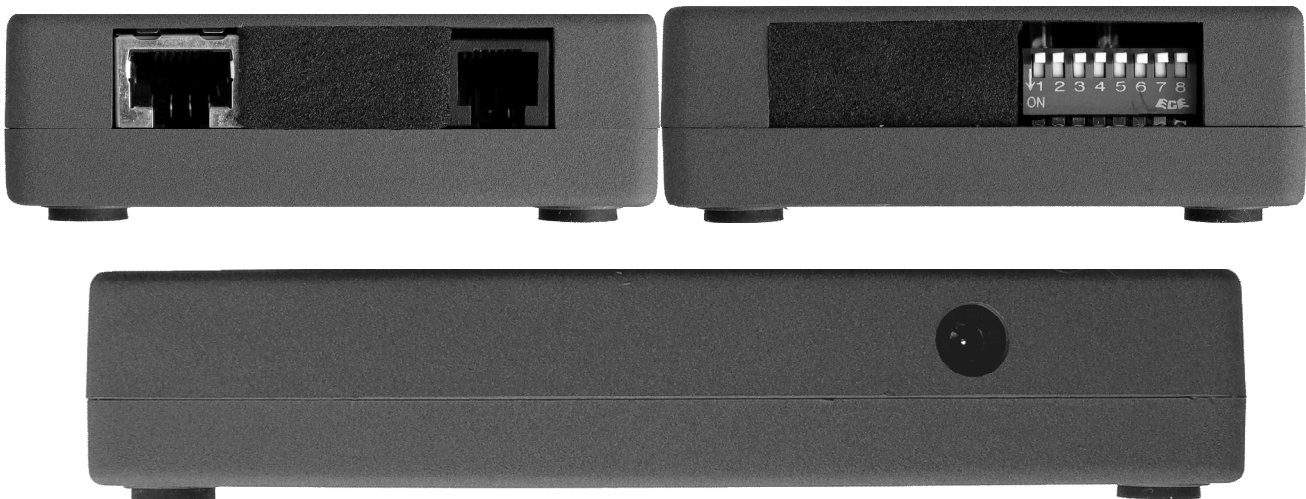
## 1.4. Connectors, LED indicators and DIP-switches



**LEDs:** LED indicators show state of qBRIDGE.

### LEDs state:

<b>PWR:</b>	On when power is applied to the device
<b>WAN LNK:</b>	On when link established on WAN port
<b>WAN ACT:</b>	Blinking when receiving/transmitting data through WAN port
<b>LAN 10M:</b>	ON/Blinking when LAN port is in 10 Mbps mode
<b>LAN 100M:</b>	ON/Blinking when LAN port is in 100 Mbps mode
<b>Connectors:</b>	Device has LAN connector (RJ-45), WAN connector (RJ-45), power connector and DIP-switches.



<b>DC-IN:</b>	7÷12 V DC power supply input for external power adapter
<b>LAN:</b>	Ethernet 10/100BaseT (RJ-45 connector)
<b>SW1:</b>	DIP-switches for device configuration (SW1.1 – SW1.8)
<b>WAN:</b>	WAN port (RJ-45 connector)

## 2. Device Configuration

### 2.1. Powerup

1. Configure qBRIDGE according paragraphs 2.2 – 2.7 of this manual.
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 “LINE” mark) to E1 channel. Use a cable with RJ-45 connectors.
4. Connect power adapter (DC 7÷12 V output) to the connector with “DC-IN” mark.

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

### 2.2. LAN: Frame buffer configuration (SW1.7– SW1.8)

qBRIDGE has internal RAM (Frame Buffer) to store Ethernet frames. The entire Frame Buffer capacity is 340 frames. One part of the Frame Buffer is used to store frames passing from LAN to WAN port and the second part is used to store frames passing from WAN to LAN port. To increase device performance user can configure the way of dividing of the Frame Buffer. Use DIP-switches SW1.7-SW1.8 for this purpose.

SW1.7	SW1.8	LAN-to-WAN buffer capacity	WAN-to-LAN buffer capacity
on	on	308 packets	32 packets
on	off	170 packets	170 packets
off	on	32 packets	308 packets
off	off	reserved	reserved

### 2.3. LAN: Filtering mode (SW1.6)

qBRIDGE supports Real-time MAC-address filtering with 256 address table and Automatic address learning and aging. If filtering is enabled, only broadcast, multicast and destined for remote LAN frames are forwarded to WAN. The address table can store up to 256 MAC-addresses and is automatically updated. The individual address will be aged and deleted from address table if frames with this address have not been received within 5 minutes. User can enable or disable filtering using DIP-switch SW1.6.

SW1.6	Filtering
on	enabled (default value)
off	disabled

### 2.4. LAN: IEEE 802.3x flow control (SW1.5)

qBRIDGE provides IEEE 802.3x flow control for more effective packet forwarding. If the number of packets buffered in memory exceeds the predefined value qBRIDGE transmits the PAUSE frame to pause the data flow. When qBRIDGE receives the PAUSE frame it pauses the transmission until the requested time is expired. User can enable or disable flow control support using DIP-switch SW1.5.

SW1.5	Flow control
on	enabled
off	disabled (default value)

## 2.5. LAN: Disabling Ethernet port (SW1.2)

qBRIDGE-100 provides capability of automatic disabling of ethernet port when link on WAN port is not established. This feature is useful to let know to the equipment connected to LAN port of qBRIDGE-100 that WAN port link is broken or WAN cable is disconnected. User can enable or disable automatic disabling of ethernet port using DIP-switch SW1.2.

SW1.2	Automatic disabling of ethernet port
on	enabled
off	disabled (default value)

## 2.6. WAN: E1 transmit clock select (SW1.4)

qBRIDGE-100 supports two modes of operation. Mode 1: E1 transmit clock is driven by local oscillator. Mode 2: E1 transmit clock is driven by recovered receive clock. User can select mode of operation using DIP-switch SW1.4. User should choose Mode 2 (default) when connecting qBRIDGE-100 to E1 channels. When using two qBRIDGE-100 to communicate over media transparent in terms of synchronization or over dedicated copper line one of them must be in Mode 1 and another – in Mode 2.

SW1.4	E1 Transmit clock mode
off	Mode 1 (internal): E1 Transmit clock is driven by local oscillator
on	Mode 2 (recovered): E1 transmit clock is driven by recovered receive clock

## 2.7. WAN: Remote loopback (SW1.1)

qBRIDGE-100 provides capability of remote loopback. Use DIP-switch SW1.1 to enable or disable remote loopback functionality. When remote loopback is enabled all data received from G.703 interface is looped back into the line. This feature is used for testing and troubleshooting and isn't enabled normally.

SW1.1	Remote loopback
on	disabled (default value)
off	enabled

## Appendix A. Connector pin-outs

### WAN (RJ-45)

Pin	Name	Description
1,2	XMT (tip, ring)	Transmit Data - out
4,5	RCV (tip, ring)	Receive Data - in
3,6	Chassis	

## Appendix B. Ordering information

P/N: 36BEU100 (qBRIDGE-100)	100÷240V AC to 9V DC adapter
P/N: 36BED100 (qBRIDGE-100-DC)	36÷72V DC to 12 V DC adapter

## Appendix C. Checking in the box

qBRIDGE-100 Ethernet to G.703 Converter/Bridge	1
Power adapter 100~240V AC to 9V DC	1 (see ordering information)
Power adapter 36~72V DC to 12 V DC	1 (see ordering information)
Certificate of guarantee	1
User's manual	1 for two devices
Patch Cord cable "Straight RJ-45" or "Crossover RJ-45"	1