LB0100AA-4W	**LB0100A-V35M**
LB0100A-530	**LB0100A-V36**
LB0100A-V24	**LB0100A-X21F**
LB0100A-V35F	**LB0100A-X21M**

Miniature Remote Fast Ethernet Bridges

Safety

Safety Instructions

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

IMPORTANT

North American Users

The TinyBridge-100 is powered by an external power supply. To reduce the risk of electric shock, fire and injury to persons:
Use only with a UL-listed and CSA Certified Class 2 power supply rated 5 VDC, 600 mA or more.

Instructions de Sécurité

Le point d'exclamation dans le triangle équilatéral alerte l'utilisateur d'importantes instructions concernant le fonctionement et l'entretien mentionées dans le livre qui accompagne l'appareil.

IMPORTANT

Pour les utilisateurs Nord Américains

Le TinyBridge-100 est renforcé par un transformateur extérieur. Afin de réduire le risque d'électrocution, de feux ou de blessure:
Utiliser seulement avec le UL listé et le CSA Certifié Classe 2 le transformateur de 5 VDC, 600 mA, ou plus.

CAUTION

European Users

To reduce the risk of electric shock, fire and injury to persons:

Use only with a power supply which complies with EN 60950.

Sicherheitshinweise

Das Ausrufezeichen innerhalb des gleichschenkligen Dreiecks soll den Benutzer auf wichtige Bedienungs- und Wartungshinweise in der dem Gerät beiliegenden Dokumentation aufmerksam machen.

ACHTUNG

Europäische Benutzer

Um das Risiko eines elektrischen Schlages oder Brandes so weit wie möglich zu vermeiden:

Verwenden Sie nur ein Netzteil, das gemäß des Standards EN 60950 zugelassen ist.

Telecommunication Safety

The TinyBridge-100 is not intended to be connected directly to long telecommunication wires, which are subjected to strong transient phenomenea and surges.

LB0100A

1. Features

The LB0100A miniature remote Fast Ethernet bridges feature the following:

- High performance miniature remote bridge for Fast Ethernet extension

- Wire-speed WAN throughput: 19,700 pps at 10 Mbps

- 10/100BaseT interface

- Synchronous WAN interfaces:

  - 4-wire modem

  - V.24

  - V.35

  - V.36

  - RS-530

  - X.21

- Two priority queues according to 802.1p or IP ToS bits

- Fault propagation of WAN error conditions to LAN port

- Automatic MDIX support

- Compatible with applicable parts of IEEE 802.3.

Versions

WAN Interface Options

The following WAN interface options are available:

- 4-wire (LB0100A-4W).

- V.24/RS-232 (LB0100A-V24)

- V.36 (LB0100A-V36)

- V.35F (LB0100A-V35F)

- V.35M (LB0100A-V35M)

- X21F (LB0100A-X21F)

- X21M (LB0100A-X21M)

Power Supply

The LB0100A is optionally supplied with a 100–240 VAC switching power supply with integral AC connector.

Applications

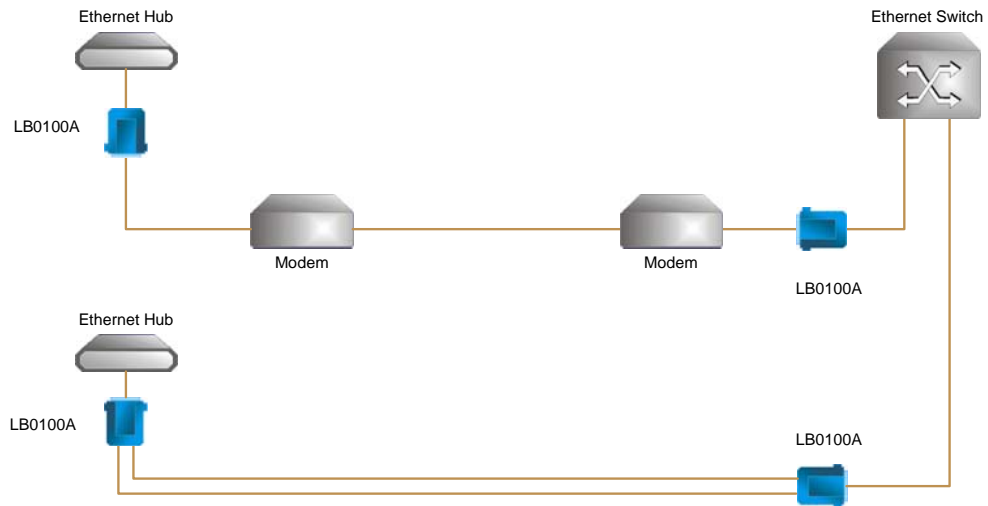Typical applications are illustrated in the following figures.

Ethernet Hub

Ethernet Switch

LB0100A

Modem

Modem

LB0100A

Ethernet Hub

LB0100A

LB0100A

Figure 1. Bridging and Extending Ethernet over Baseband Modems

10/100BaseT
LAN

Sync

Sync

LB0100A

LB0100A

PBX

Multiplexer

Multiplexer

PBX

10/100BaseT
LAN

Sync

Sync
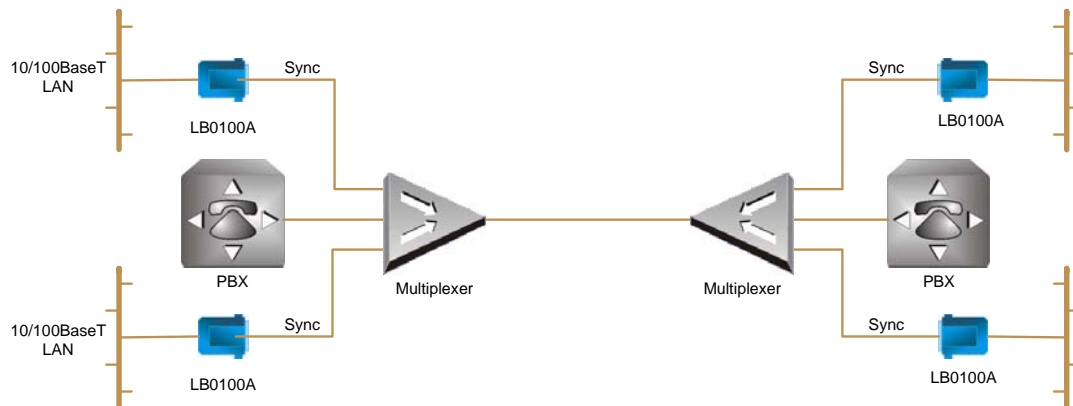
LB0100A

LB0100A

Figure 2. Bridging Ethernet over Multiplexed E1/T1 Links

10/100BaseT
LAN

4-wire ≤ 700m (2300 ft)

LB0100-4W

LB0100-4W

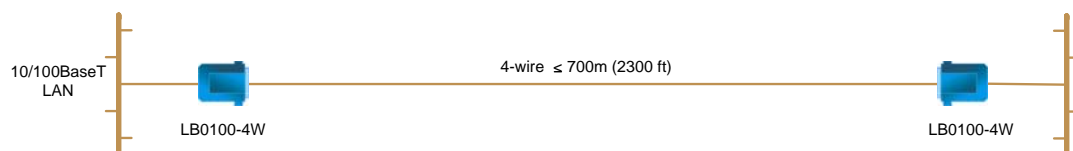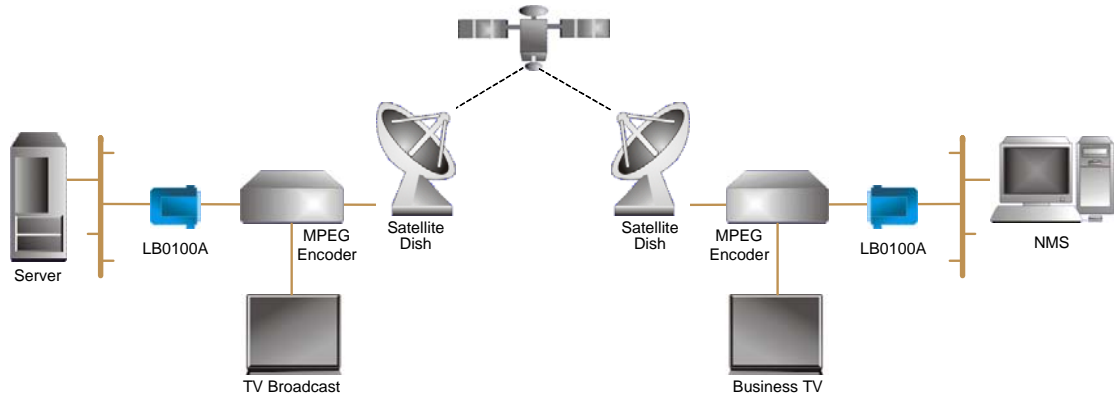*Figure 3. Extending Ethernet over 4-Wires in the Campus Environment*

Figure 4. Broadcasting Data over Satellite Link

2. Description

The LB0100A is a high performance, remote, self-learning Ethernet/Fast Ethernet bridge. Its small size and low cost make it ideal for sensitive bridging applications, or as a LAN extender over synchronous WAN.

LAN interface

The LAN interface features the following characteristics:

- Is available with a 10/100BaseT interface. The interface operates in full or half duplex Ethernet topologies

- LB0100A supports a packet length of up to 1536 bytes

- Incorporates automatic MDIX, which allows using straight or crossed cables for the LAN connection

- Automatically learns MAC addresses of the LAN to which the unit is connected are automatically learnt. Only those frames destined for the remote LAN are forwarded. The LAN table stores up to 2048 addresses and is updated automatically.

- MAC address filtering can be disabled, allowing all traffic to flow over the WAN link

- LB0100A has two queues for handling priority, determined in the following order:

  - If the packet received is an Ethernet tag frame, LB0100A mark the packet according to the tag priority (0–7).
    0–3: low priority queue
    4–7: high priority queue

- Otherwise, LB0100A mark the packet according to IP TOS priority (0–7).
  0–3: low priority queue
  4–7: high priority queue

- Untagged and non-IP frames enter the low priority queue.

Frames egress from the queues with a 1:2 ratio, two frames with high priority, one frame with low priority.

- Flow control for full duplex and backpressure for half duplex are supported. The buffer holds up to 120 frames.

WAN interface

- A selection of synchronous WAN interfaces is available:

  - V.24/RS-232

  - V.35

  - V.36/RS-449

  - X.21

  - RS-530.

- A fault on the WAN can be propagated if fault propagation is enabled; the LB0100A shuts down the link and forces a router to trace another route.

- LB0100A operates over synchronous links at data rates of up to 10 Mbps. An external clock can be supplied for operation at other bit rates.

Table 1. LB0100A Frame Structure

FLAG	DATA	CRC	FLAG
1	60–1532	2	1

The LB0100A WAN interfaces operate in DTE mode. This means they accept receive and transmit clocks. The timing diagram is shown in *Figure 5*.
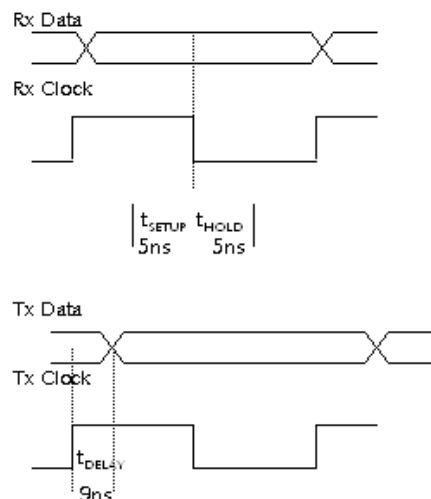

Figure 5. Receive and Transmit Clock Timing Diagrams

3. Technical Specifications

Table 2. Technical Specifications

Ethernet	Frame size (max)	1536 bytes
	LAN Table	2048 MAC addresses with 5-minute automatic aging
	Buffer	Up to 120 frames for 64-byte frames
	Latency	With LAN rate 100 Mbps, WAN rate 10 Mbps: • 66 μs for 64-byte frames • 1400 μs for 1536-byte frames
	Compliance	Conforms to IEEE 802.3
	Data Rate	10 Mbps, 100 Mbps
	Connectors	Shielded RJ-45
	Cable	To comply with electromagnetic regulations, it is recommend to use shielded Cat. 5 cable.
WAN	Protocol	HDLC
	Data Rate	Up to 10 Mbps synchronous
	Throughput	With 10 Mbps WAN rate: • 19700 pps for 64-byte frames and increment byte data (00, 01, 02, …) • 802 pps for 1536-byte frames and increment byte data (00, 01, 02, …)
	4-wire Range	700m (2300 ft)
	Connectors	• V.24/RS-232, DB-25 female • V.35, 34-pin female via adapter cable • V.36/RS-422, DB-37 female via adapter cable • RS-530, DB-25 female • X.21, DB-15 female via adapter cable • 4-wire: 5-pin terminal block
	Operating Range	Using Cat. 5 UTP cable: • 10 Mbps: 500m (1640 ft) • 5 Mbps: 700m (2300 ft)

Table 2. Technical Specifications (Cont.)

General	Power Supply	External 5 VDC/0.6A regulated adapter
		Note: *While LB0100A operates with any regulated 5 VDC, 600 mA power supply, the CE approval for the 4-wire versions requires provision of a grounding path through the use of a power supply with a three-prong plug.*
	Power Consumption	400 mA @ 5 VDC
	Physical	Length: 69 mm (2.7 in) Width: 53 mm (2.1 in) Height: 18 mm (0.7) in Weight: 30 g (1.0 oz)
	Environment	Temperature: 0–50°C (32–122°F) Humidity: Up to 90%, non-condensing

4.   Installation

Configuring LB0100A

➤   **To configure the LB0100A:**

1.   Identify switches on the top panel of the LB0100A.

2.   Set switches according to *Table 3*.

Table 3. DIP Switch Settings

Switch	Switch Identity	Function	Possible Settings	Factory Setting
1	100	LAN rate	**ON** – 100 Mbps	ON
			OFF – 10 Mbps	
2	FDX	LAN duplex mode	**ON** – Full duplex	ON
			OFF – Half duplex	
3	AN	Autonegotiation mode	**ON** – Autonegotiation is enabled. Maximum LAN port level is advertised at 100 Mbps, full duplex.	ON
			OFF – Autonegotiation disabled. Speed and duplex mode are determined by the 100 and FDX switches.	
4	FIL[1]	LAN filtering mode	**ON** – Only frames destined for another LAN are transmitted over the WAN	ON
			OFF – All frames are transmitted over the WAN	

Table 3. DIP Switch Settings (Cont.)

Switch	Switch Identity	Function	Possible Settings	Factory Setting
5	FP	Fault propagation mode	**ON** – If the CTS (V.24) signal is not received at the WAN side or LOS condition is detected (4-wire), LAN link is shut down	OFF
			OFF – LAN link status does not depend on any signal on the WAN side	
6	FLC[2]	Backpressure/flow control	**ON** - Backpressure/flow control are enabled for half duplex/full duplex respectively	ON
			OFF - Backpressure/flow control are disabled for half duplex/full duplex respectively	
7	LNG	LONG (for 4-wire interface version only)	**ON** – 4-wire link operates at 5 Mbps	
			OFF – 4-wire link operates at 10 Mbps	OFF

Notes   1.   *Reset LB0100A to put changes in the filtering mode into effect.*
2.   *Enable autonegotiation to put changes in the flow control mode into effect. When powering up the LB0100A with flow control disabled, enabling flow control requires resetting the LB0100A.*

Connecting the LAN Interface

➤ **To connect the LAN interface:**

- Connect the user LAN to the RJ-45 connector of LB0100A. Automatic MDIX allows using straight or crossed cables for the LAN connection.

Connecting the WAN Interface

➤ **To connect the WAN interface:**

- Connect the 25-pin female connector of the unit to DCE equipment, using the supplied adapter cables (see *Table 5*, *Table 6*, or *Table 7* for pinout details).

Connecting the 4-wire Interface

➤ **To connect the 4-wire interface:**

⚠ **Warning**

Do not apply power to the LB0100A until the 4-wire terminal block is connected as described below.

1. Remove the protective cover from the terminal block.

2. Unplug the terminal block from the LB0100A-4W.

3. Feed the 4-wire cable through the protective cover and connect the Tx and Rx wires to their respective terminals, as illustrated in *Figure 7*. If the cable is shielded, connect the shield to the GND terminal.

4. Check that the wires are secure and reconnect the terminal block to its socket.

5. Place the protective cover in position over the terminal block.

Note *When two 4-wire LB0100A-4W units are to be connected directly, the terminal blocks should be wired so that the Rx terminals of each LB0100A-4W connect to the Tx terminals of the other unit.*
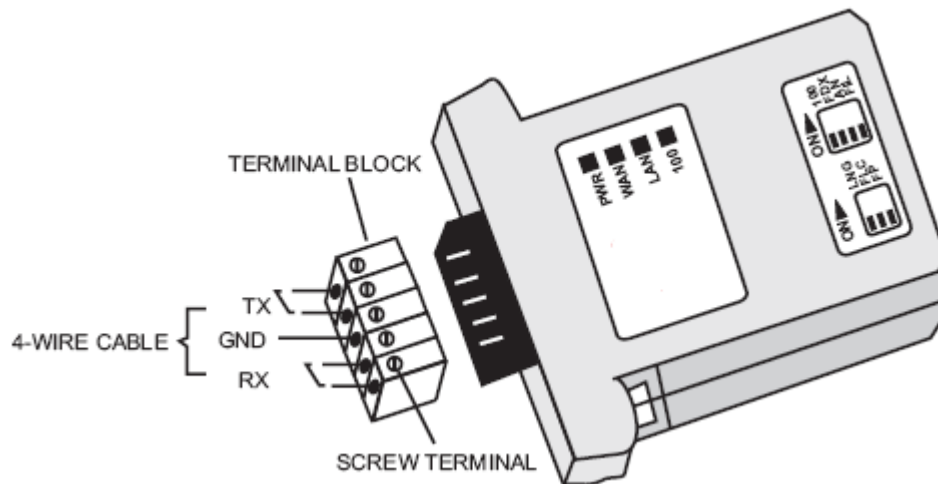

Figure 6. Connecting the 4-Wire WAN Interface

Connecting Power

➤ **To connect power:**

1. Connect external power adapter to a mains outlet

2. Plug in the external power adapter jack to the LB0100A. The PWR LED lights up

Note *While the LB0100A operates with any regulated 5 VDC, 600 mA power supply, the CE approval requires use of a 1200 mA power supply.*

5. Operation

LB0100A operation is automatic. *Table 4* shows how to diagnose the status of the LB0100A using the LED indicators.

Table 4. LED Indicators

LED	Color	Description
PWR	Green	**ON** – Power is connected
		OFF – Power is disconnected
WAN	Yellow	**ON** – Activity on WAN (includes idle)
		OFF – No activity on WAN
	Red[1]	**ON** – Error condition on WAN
		OFF – No error condition on WAN
LAN	Green	**OFF** – No link integrity
		ON – Link integrity
	Yellow	**OFF** – No activity on LAN
		Blinking – Activity on LAN
100	Green	**ON** – 100 Mbps LAN
		OFF – 10 Mbps LAN

Note   1. *4-wire mode only.*

DB-25 Pin Allocations

The tables on the following pages specify DB-25 pin allocations.

Table 5. DB-25 Pin Allocation (V.24/RS-232)

Pin	Name	Type
1	SHIELD	
2	TxD	Output
3	RxD	Input
4	RTS	Output
5	CTS	Input
6	NC	
7	GND	
8	NC	
9	NC	
10	NC	
11	NC	
12	NC	
13	NC	
14	NC	
15	TCLK	Input
16	NC	
17	RCLK	Input
18	NC	
19	NC	
20	NC	
21	NC	
22		
23	NC	
24	NC	
25	NC	

Table 6. DB-25 Pin Allocation (V.35)

Pin	Name	Type
1	SHIELD	
2	TxD-A	Output
3	RxD-A	Input
4	RTS-A	Output
5	CTS-A	Input
6	NC	
7	GND	
8		
9	RCLK-B	Input
10	NC	
11	NC	
12	TCLK-B	Input
13	NC	
14	TxD-B	Output
15	TCLK-A	Input
16	RxD-B	Input
17	RCLK-A	Input
18	NC	
19	NC	
20	NC	
21	NC	
22	NC	
23	NC	
24	NC	
25	NC	

*Table 7. DB-25 Pin Allocation (V.11)
(used for RS-530, X.21, V.36)*

Pin	Name	Type
1	SHIELD	
2	TxD-A	Output
3	RxD-A	Input
4	RTS-A	Output
5	CTS-A*	Input
6	NC	
7	GND	
8	NC	
9	RCLK-B	Input
10	NC	
11	NC	
12	TCLK-B	Input
13	CTS-B*	Input
14	TxD-B	Output
15	TCLK-A	Input
16	RxD-B	Input
17	RCLK-A	Input
18	NC	
19	RTS-B	Output
20	NC	
21	NC	
22	NC	
23	NC	
24	NC	
25	NC	