

ORDERING

TINYBRIDGE-100/#/\$

Miniature remote Fast Ethernet bridge

TINYBRIDGE-100/4W/\$

Miniature remote Fast Ethernet bridge with 4-wire WAN interface

Specify WAN interface:

V24 for V.24/RS-232

V35F for V.35 (female adapter cable supplied)

V35M for V.35 (male adapter cable supplied)

V36 for V.36 (adapter cable supplied)

530 for RS-530

X21F for X.21 (female adapter cable supplied)

X21M for X.21 (male adapter cable supplied)

\$ Specify **AC** for 100–240 VAC switching power supply with integral AC connector (may be ordered separately as P/S-AC/5/1200)

Installation and Operation Manual

TinyBridge-100



Miniature Remote Fast Ethernet Bridge



data communications

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Specifications are subject to change without prior notice.

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FEATURES

- 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: V.24, V.35, V.36, RS-530, X.21, or 4-wire modem
- 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

DESCRIPTION

- TinyBridge-100 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

- TinyBridge-100 is available with a 10/100BaseT interface. The interface operates in full or half duplex Ethernet topologies.
- TinyBridge-100 supports a packet length of up to 1536 bytes.
- Automatic MDIX allows using straight or crossed cables for the LAN connection.
- 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
- TinyBridge-100 has two queues for handling priority, determined in the following order:
 - If the packet received is an Ethernet tag frame, TinyBridge-100 marks the packet according to the tag priority (0–7).
0–3: low priority queue
4–7: high priority queue

- Otherwise, TinyBridge-100 marks 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 TinyBridge-100 shuts down the link and forces a router to trace another route.
- TinyBridge-100 operates over synchronous links at data rates of up to 10 Mbps. An external clock can be supplied for operation at other bit rates.

FLAG	DATA	CRC	FLAG
1	60-1532	2	1

Figure 1. TinyBridge-100 Frame Structure

- TinyBridge-100 WAN interface operates in DTE mode. This means it accepts receive and transmit clocks. The timing diagram is shown in *Figure 2*.

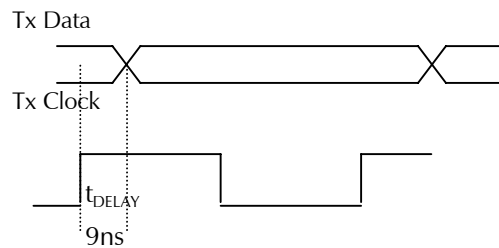
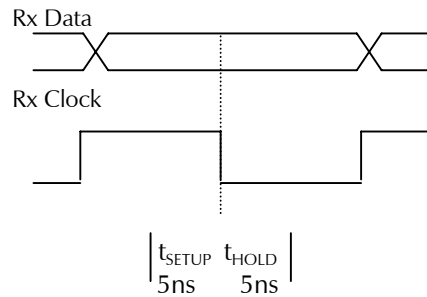


Figure 2. Receive and Transmit Clock Timing Diagrams

APPLICATIONS

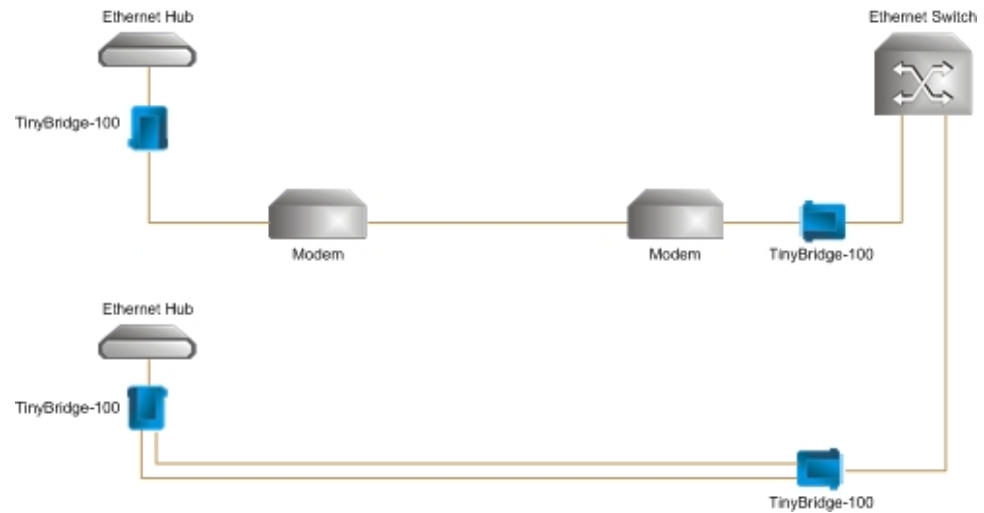


Figure 3. Bridging and Extending Ethernet over Baseband Modems

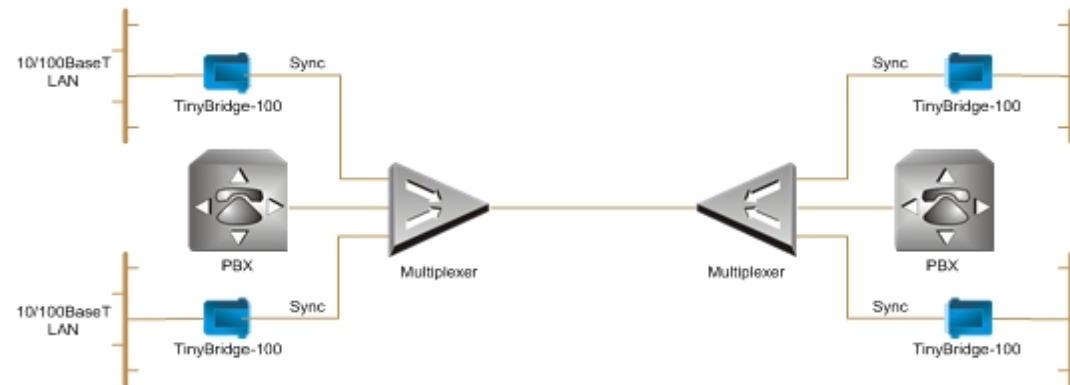


Figure 4. Bridging Ethernet over Multiplexed E1/T1 Links



Figure 5. Extending Ethernet over 4-Wires in the Campus Environment

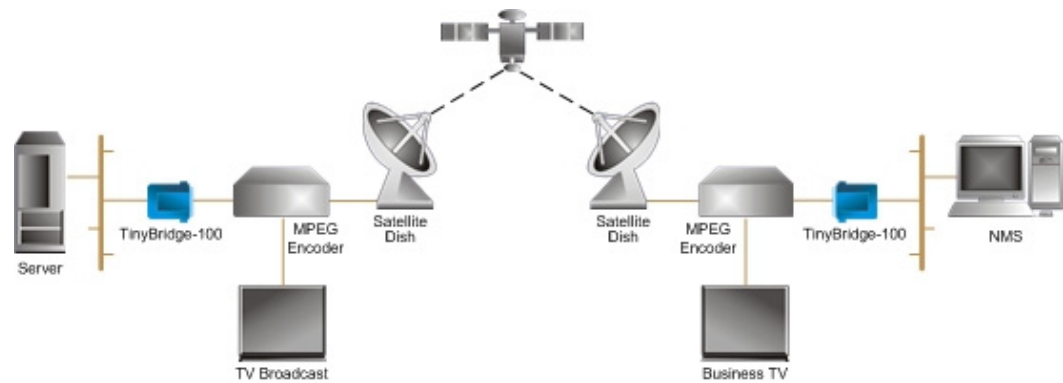


Figure 6. Broadcasting Data over Satellite Link

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 μ s for 64-byte frames
 - 1400 μ s 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 recommended to use shielded Cat. 5 cable.

WAN

- **Protocol**
HDLC
- **Data Rate**
Up to 10 Mbps synchronous
- **Throughput**
With WAN rate 10 Mbps:
 - 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)

GENERAL

- **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
- **Power Supply**
External 5 VDC/0.6A regulated adapter
Note: While TinyBridge-100 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
- **Environment**
Temperature: 0–50°C (32–122°F)
Humidity: Up to 90%, non-condensing



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 fonctionnement et l'entretien mentionnées 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 phenomena and surges.

DECLARATION OF CONFORMITY

Mfr. Name: RAD Data Communications Ltd.

Mfr. Address: 24 Raoul Wallenberg St.
Tel Aviv, 69719,
Israel

declares that the product: **TinyBridge-100**

Conforms to the following standard(s) or other normative document(s):

EMC: EN 55022:1998 - Information technology equipment, radio disturbance characteristics, limits and methods of measurement.
EN 50024:1998 - Information technology equipment, immunity characteristics, limits and methods of measurement.

Safety: EN 60950:2000 – Safety of information technology equipment.

Supplementary Information:

The product herewith complies with the requirements of the R&TTE Directive 1999/5/EC for wired equipment. The product was tested in a typical configuration. This declaration is valid only for products that bear a CE mark.

Tel Aviv, 20 September 2004

Haim Karshen
VP Quality

European Contact: RAD Data Communications GmbH, Lyoner Strasse 14, 60528 Frankfurt am Main, Germany

INSTALLATION

Configuring TinyBridge-100

1. Identify switches on top panel of TinyBridge-100.
2. Set switches according to *Table 1*.

Table 1. DIP Switch Settings

Switch	Switch Identity	Function	Possible Settings	Factory Setting
1	100	LAN rate	ON – 100 Mbps OFF – 10 Mbps	ON
2	FDX	LAN duplex mode	ON – Full duplex OFF – Half duplex	ON
3	AN	Autonegotiation mode	ON – Autonegotiation is enabled. Maximum LAN port level is advertised at 100 Mbps, full duplex. OFF – Autonegotiation disabled. Speed and duplex mode are determined by the 100 and FDX switches.	ON
4	FIL ¹	LAN Filtering mode.	ON – Only frames destined for another LAN are transmitted over the WAN OFF – All frames are transmitted over the WAN	ON
5	FP	Fault Propagation	ON – If the CTS (RS-530, V.36, V.35, V.24), or Indication (X.21) signal is not received at the WAN side or LOS condition is detected (4-wire), LAN link is shut down. OFF – LAN link status does not depend on any signal on the WAN side.	OFF
6	FLC ²	Backpressure/Flow control	ON - Backpressure/flow control are enabled for half duplex/full duplex respectively OFF - Backpressure/flow control are disabled for half duplex/full duplex respectively	ON
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

Note 1: Reset TinyBridge-100 to put changes in the filtering mode into effect.

Note 2: Enable autonegotiation to put changes in the flow control mode into effect.

When powering up the TinyBridge-100 with flow control disabled, enabling flow control requires resetting TinyBridge-100.

Connecting the LAN Interface

- Connect the user LAN to the RJ-45 connector of TinyBridge-100. Automatic MDIX allows using straight or crossed cables for the LAN connection.

Connecting the WAN Interface

- Connect the 25-pin female connector of the unit to DCE equipment, using the supplied adapter cables (see *Table 3*, *Table 4*, or *Table 5* for pinout details)

Connecting the 4-Wire Interface

Warning: Do not apply power to the TinyBridge-100 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 TinyBridge-100.
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.

IMPORTANT: When two 4-wire TinyBridge-100 units are to be connected directly, the terminal blocks should be wired so that the Rx terminals of each TinyBridge-100 connect to the Tx terminals of the other unit.

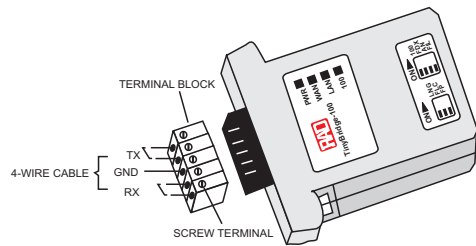


Figure 7. Connecting the 4-wire WAN Interface

Connecting Power

1. Connect external power adapter to a mains outlet
2. Plug in the external power adapter jack to the TinyBridge-100. The PWR LED lights up

Note: While the TinyBridge-100 operates with any regulated 5 VDC, 600 mA power supply, the CE approval requires use of the power supply listed in Ordering.

OPERATION

TinyBridge-100 operation is automatic. Table 2 shows how to diagnose the status of the TinyBridge-100 from the LED indicators.

Table 2. 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

¹ 4-wire model

Table 3. 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 4. 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 5. 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	

* Indication signal for X.21