



Ethernet to Token Ring Lite:

LBU9009AE

## Ethernet to Token Ring Lite



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### *Warning*

This equipment has been designed to comply with the limits for a Class B digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses 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 the separation between the equipment and the receiver.
- Connect the equipment to a different power circuit from that of the receiver.
- Consult your Black Box or an experienced radio/television technician for help.

Equipment must be connected to a suitably rated power supply using the power cable and plugs supplied (see power supply specification on product). Failure to do so could result in damage to the equipment and render the warranty null and void.



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## Introduction

The Ethernet to Token Ring Lite is a bridge that enables devices with interfaces for Token Ring or Ethernet to co-exist on the same network. It is self-learning, operates fully transparently, provides frame conversion and supports up to 512 MAC addresses.

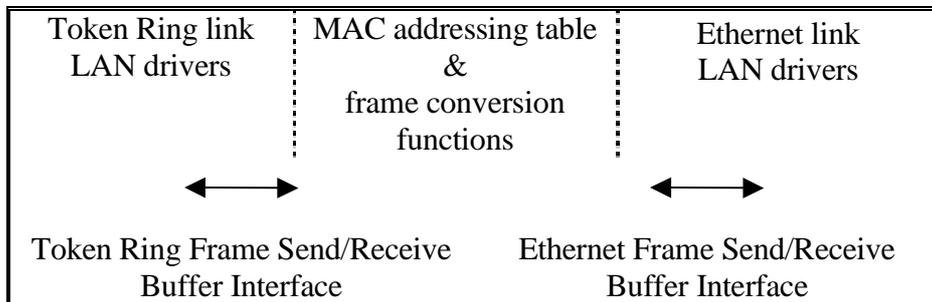
Functionally and physically, the bridge is located between a Token Ring network segment and an Ethernet Network segment and can be used in different ways, for example to provide a gradual migration from Token Ring to Ethernet topology for a network.

The only user configuration required is the setting of the Token Ring speed. All units are shipped set for 16 Mbps networks. This can be changed with the aid of the front panel LEDs and push buttons (see page 9, or the installation sheet).

The front panel LED indicators also show activity on both the Token Ring and Ethernet sides of the bridge.

A local [or remote] IBM/AT PC or compatible system can be (temporarily) connected to the bridge's Service Port, during normal operation to view system status and/or log details in real time (see pages 12 & 13)

### Bridge internal software and interfaces



## *Principles of Operation*

### Mac Addresses

If a frame is routed from Token Ring to Ethernet, or vice-versa, the MAC addresses are not converted. i.e. The MAC address of an Ethernet device is recognised by Token Ring devices without conversion and vice-versa.

### Frame Processing

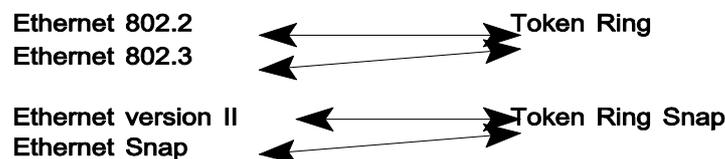
The initial establishment of a link between LAN stations, Hosts or servers can be made with any of the following three different types of frame:

- Broadcast
- XID command (at Data Link Control level)
- Test command (at Data link Control level)

These type of frames are always bridged to the other network. If a response is received the link is established and registered in the Bridge's MAC addressing table. When there is no response, the destination station is removed from the MAC table.

### Ethernet to Token Ring

Frames from Ethernet to Token Ring are immediately translated to the correct type of Token Ring frame. See the correspondence diagram below:



### Token Ring to Ethernet

The first frame received from Token Ring (not an XID or Test frame which are automatically forwarded in the correct format) is transmitted to Ethernet as both types of the corresponding Ethernet frame (see correspondence above).

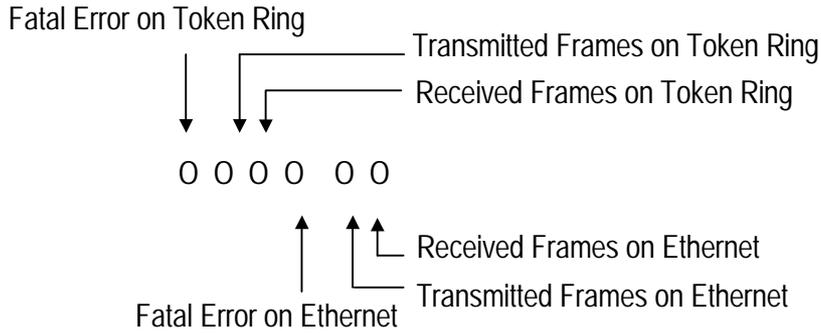
Ethernet's response determines the frame conversion to be used. When a response is received, the MAC addressing table is updated with both the address and frame type to use when converting subsequent frames on that link.

### Indicator LED activity

The front panel LEDs light up to show fatal errors, frame transmission and frame reception activity for both the Token Ring and Ethernet segments of the network, as indicated overleaf:



# Ethernet to Token Ring Lite



● = on (lit)      0 = off (not lit)

7 6 5 4 3 2 1 0  
 ● 0 0 0 0 0 0 0 = Fatal Error on Token

7 6 5 4 3 2 1 0  
 0 0 0 0 ● 0 0 0 = Fatal Error on Ethernet  
 (e.g. not connected)

7 6 5 4 3 2 1 0  
 0 0 ● 0 0 0 0 ● = Frame Received on Ethernet plus Frame  
 Transmitted on Token Ring

The frame activity LEDs light up for a short time for each frame which is received or sent by the Ethernet to Token Ring Lite.



## *Installation*

### Token Ring Speed Setting

Token Ring Speed Setting is only necessary if the factory default setting of 16 Mbps needs to be changed to 4 Mbps.

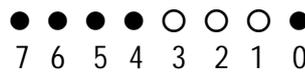
**Power up the unit** and wait until the Indicator LEDs numbered 7 to 4 inclusive start flashing.


 = unit in "Program mode" (3 seconds)

⚙ = flashing, ○ = off

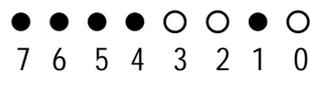
This only lasts for about three seconds, during which the left hand "PROG" button must be pressed and held in (use a ball point pen or small electrical/instrument screwdriver).

While the "PROG" button is pressed in, the LED pattern will change to Indicator LEDs numbered 7 to 4 plus 0 are lit steadily:


 Token Ring Speed = 4 Mbps  
 ● = lit steadily, ○ = off

**Release the "PROG" button.**

If 16 Mbps is the Token Ring speed required, then within two seconds press and hold the "PROG" button in again until Indicator LEDs numbered 7 to 4 inclusive and 1 are lit steadily:


 Token Ring Speed = 16 Mbps  
 ● = lit steadily, ○ = off

**Release the "PROG" button** when LEDs 7 to 4 plus 1 are lit, indicating 16 Mbps Token Ring speed.

If the speed indicated is still not the speed required, press the "PROG" button again within two seconds, holding it in until the LED pattern for the speed required appears and then release the button again.

*Once the "PROG" button has been released for more than two seconds, the Ethernet to Token Ring Lite will reboot itself using the Token Ring Speed indicated by the LED display.*



## Ethernet to Token Ring Lite

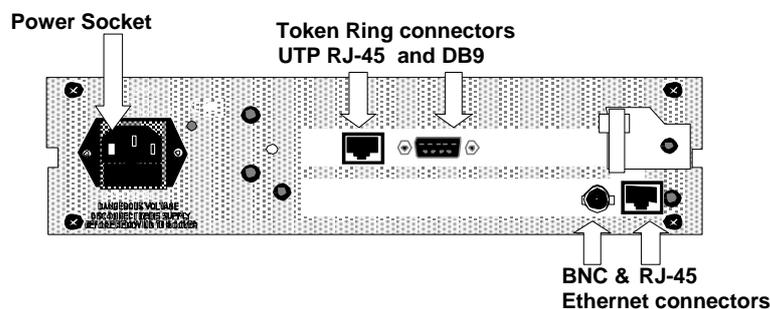
### Connecting the Ethernet to Token Ring Lite Hardware

Prerequisites for installing the Local Bridge unit are:

- A suitable power supply (220 V or 110 V mains).
- Suitable cables to connect the unit to both the Token Ring and Ethernet segments of the network.

### Hardware Connections

Connect the power cable to the mains supply and plug into the power socket at the rear of the unit.



Rear of Token Ring - EthernetBridge showing connectors

### Token Ring Connection

Attach an appropriate Token Ring cable to one of the connectors on the Token Ring adapter in the bridge [DB-9 for IBM cabling or RJ 45 for UTP (unshielded twisted pair)].

### Ethernet Connection

Attach an appropriate Ethernet cable to one of the connectors on the Ethernet adapter of the unit [BNC for coaxial cabling or RJ 45 for UTP (unshielded twisted pair)].

### Monitor Port

The Local Bridge unit is delivered with a cable to (temporarily) connect its monitor port to a normal PC. This PC is referred to as the "Monitor PC", and can be used for system status and error log monitoring purposes while the bridge is operational. The program TSPMON (Test and Service Port MONitor), which is supplied with the unit on a software diskette, must be run on the "Monitor PC", preferably by installing it on the PC's hard disk as described in the section overleaf.

## Installing TSPMON

Make a backup copy of the software diskette supplied with the unit, and place the diskette in the appropriate diskette drive of the Monitor PC (e.g. A). Enter the following sequence of DOS commands to install TSPMON in a (sub)directory called TSP on the Hard disk of your choice (e.g. C).

```
C:
MD TSP
CD TSP
COPY A:\PC-UTIL\TSP*.*
```

Enter the following command to run the TSPMON program

```
TSPMON -C1 -B57600
└─┬─┘ default Baudrate as set on the bridge unit
└─┬─┘ PC COM port (1 - 4) connected to the bridge
```

## Running TSPMON from a Floppy Disk

Make a working copy of the software diskette supplied.

Insert the working copy in an appropriate diskette drive (e.g. A) on the Monitor PC.

Enter the following DOS commands to change to the drive containing the diskette and run the program:

```
A:
TSPMON -C1 -B57600 (As Per the parameters described above).
```

## Exiting TSPMON

To exit from the TSPMON program: first hold down the <ALT> key for at least 3 seconds and then, while still holding down Alt, press the <ESC> or <X> key.

## Working With TSPMON

Once TSPMON is running, "Black Box" appears on the screen and, when the connection with the Bridge has been successfully established, the keyboard and screen of the PC effectively become peripherals of the Bridge unit in the same way as, for example, Carbon Copy or PC Anywhere works.

When the unit is turned off and then on again, or the RESET button is pressed, all the screen messages from the POST and BIOS reports onwards will appear on the PC screen.

If nothing appears and the PC continues to emit an audible beep, then the COM port or baudrate parameters of TSPMON have not been set correctly.

Once this works correctly, you only need to start TSPMON to establish the connection with the Bridge unit. Bear in mind that, once TSPMON is running on the Monitor PC, the use of the key combination <Ctrl> <Alt> <Del> will cause a reset of the bridge unit and not the Monitor PC.

## Runtime Status And Logging Program

Start the program 'TSPMON' on the Monitor PC, as described in the previous.

When the Local Bridge program is running, its Main Menu will be displayed on the Monitor PC's screen:

```

                                Ethernet to Token Ring Lite - v.100
                                ----- MAIN MENU -----

Ethernet to Token Ring Lite is running!
<2> - Runtime status / Statistics display
<3> - Display/Clear log file

Select number <1..3> | F1=System Info | <Alt+Q>=Exit

```

Pressing the **<Alt>** and **<Q>** keys at the same time exits the Bridge program and the DOS prompt of the Bridge platform will then appear. This should only be done if new software needs to be loaded (see appendix L).

Pressing **<F1>** displays a screen of system information showing the Ethernet to Token Ring Lite's major hardware and software elements, as shown below:

```

                                Ethernet to Token Ring Lite - v.100
                                ----- SYSTEM INFORMATION -----

Bridge BIOS release           01.23
Base memory free              336848 Bytes
Largest base memory block     336848 Bytes
Bridge platform type          UCP

Press a key

```

Press any key and the Main Menu screen will be displayed again.

### Runtime Status /Statistics Displays

The status and statistics display can be chosen from the main menu by pressing **<2>** while the bridge program is running.

There are two status/statistics screens, which are refreshed in real time, so that changes in status and statistics can be monitored while the network is active.

Press the **<PgUp>** or **<PgDn>** key to toggle the display from the first to the second screen or back again. Press the **<Esc>** key to return (escape) to the Main menu.

## Ethernet

The first screen shows the Ethernet status and statistical data:

Ethernet to Token Ring Lite - v.100	
----- ETHERNET STATUS/STATISTICS -----	
Bad packets received	0
Packets sent	783
Packets received	21025
Packets routed	824
Data buffer queue corrupted	0
No databuffer available	0
Actual data buffers in the queue	50
Number of MAC addresses in table	1

<PageDown>/<PageUp>=Next/Prev status | <ESC>=Exit

## Token Ring

The second screen shows the Token Ring status / statistical data:

Ethernet to Token Ring Lite - v.100	
----- TOKENRING STATUS/STATISTICS -----	
Bad packets received	0
Packets sent	832
Packets received	1576
Packets routed	781
Data buffer queue corrupted	0
ECB queue corrupted	0
No databuffer available	0
No ECB available	0
Session rx queue overflow	0
Actual data buffers in the queue	50
Actual ECB's in the queue	60
Number of MAC addresses in table	1

<PageDown>/<PageUp>=Next/Prev status | <ESC>=Exit

## Log Handling

The log handling display can be chosen from the main menu by pressing <3> while the bridge unit remains active. The log is in the form of a fixed length file of 100 records.

Only Errors are recorded in the log.

The screen displays the log file contents. New log entries can be monitored by pressing the cursor down (↓) key.



## Appendix A - Loading New Application Software

1) Place the "User Utility diskette ..." in the appropriate diskette drive of the PC to be used (e.g. drive A as in examples below). Copy the TSPMON files from this diskette into a temporary directory on the PC by typing the following commands in DOS:

```
MD \TEMP
CD \TEMP
COPY A:\PC-UTIL\*.*
```

2) Disconnect the power to the bridge.

3) Connect the Bridge's SERVICE port to the PC using the PC to RJ 45 cable supplied (type 8839). If the PC has a 25 pin serial COM port, use a 9 pin male to 25 pin female adapter.

4) Execute the TSPMON program from the TEMP directory, by entering the command:

**TSPMON -c1 -b57600**      (if attached to **COM1** on the PC).

Or **TSPMON -c2 -b57600**      (if attached to **COM2** on the PC).

Now the PC should display the TSPMON logo, with "Waiting for connection" in the Monitor status window.

5) Reconnect the power to the Bridge.

6) After a second or two the UCP logo will be displayed (the bridge is built on a UCP platform). While this logo is displayed, press the <Control> key on your PC keyboard. Now the "UCP STARTUP MENU" should be displayed. If not, check that the PC-Bridge cable is properly connected and repeat steps 2), 5) and 6).

7) Press <F3> for option 3 (Initialize flash disk A: from DOS floppy in PC drive), followed by <Enter>. Enter Y[es] in response to the next question: "Are you sure you want to continue (Y/N)?" After a few seconds you will be asked which PC drive is to be used.

Put the "**Configuration disk - ...**", which contains the new version of the Bridge Application software, into the appropriate drive and press <Enter> for drive A:, or **B** followed by <Enter> for drive B:

8) After a few minutes the message: "*flash disk successfully loaded from PC floppy*" will be displayed. Press <Enter> to continue and you are returned to the "UCP STARTUP MENU".

9) Press <F9> (=Reboot) followed by <Enter>.

10) While holding down the <Alt> key, after 3 seconds press the <Esc> key. The TSPMON program should then terminate and the DOS prompt be displayed.

The Bridge Application should now be operational with its new software.