



**BLACK BOX**<sup>®</sup>  
NETWORK SERVICES



TSU2064

# ISDN S0 Loopback Device

## Basic Rate ISDN Test Tool

Issue 3.1

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# ISDN S0 LOOPBACK DEVICE

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## 2. Getting Started

### Overview

The ISDN Loopback Device is a self-contained miniature Basic Rate ISDN terminal which simply plugs into a spare socket on your NT1 equipment. When called the device will place a loop between Tx and Rx in either or both B channels. The Loopback Device can be called at any time from any location to verify the availability and quality of the line under test. Two RJ45 sockets are provided so that another ISDN terminal can be connected to the same NT1.

The ISDN Loopback Device may be connected to any suitable PC via the standard Serial Port using the lead provided, allowing simple configuration via Windows 95, 98, NT4 or 2000. The configuration options will satisfy a wide range of applications by allowing a trigger to be selected based on calls made to the device, and then subsequent required actions. Triggers and possible actions are shown below:-

Trigger Options	Action Options
<b>Any Call</b>	<b>Loop Immediately</b>
<b>Call Type</b> (Voice, Data, 3.1KHz)	<b>Loop after delay</b> (enter delay up to 999 Seconds)
<b>Subaddress</b> (enter address, up to 20 alphanumeric characters)	
<b>MSN</b> (enter number up to 20 digits)	
<b>CLI</b> (enter up to 20 digits)	



## ISDN S0 LOOPBACK DEVICE

### Packing List

- 1 x ISDN S0 Loopback Device
- 1 x CD ROM
- 1 x Configuration Cable
- 1 x ISDN Lead
- 1 x User Guide
- Power Adapter (optional accessory)

### System Requirements

- IBM Compatible PC with at least one Serial Port
- Windows 95/98/NT4/2000
- CD ROM Drive

### Software Installation

1. Insert **Loopback CD ROM** into the CD ROM drive of the PC host
2. Click **Start, Run**
3. Type **D:\setup.exe**, click **OK**
4. Follow the on screen instructions



## 2. Operation

### Running the Software

Once the supplied software has been installed, connect the Loopback Device to the PC serial port using the lead supplied. Click on **Start, Programs, ISDN S0 Loop, LoopBack** to run the software.

The software will prompt for the selection of a serial port (Comm 1 = default). The chosen selection will remain as default the next time the software is executed.

The ISDN Loopback Device Window will now open and generate a log file which will display the following messages:

**Searching for Pod...**

**Product Found - S0 Loopback**

**Uploading Profile from Pod...**

**Upload Complete**

This process ensures that the Loopback Device is correctly connected to the PC host and reads the current configuration. The configuration is displayed under the Loop 1 tab.





## ISDN S0 LOOPBACK DEVICE

### Default Configuration

The default configuration of the S0 Loopback Device is simply to answer any call received immediately and place a Loop between transmit and receive in either or both B channels without a delay.

It is possible to return the unit to the default configuration at any time by clicking the **Defaults** button and clicking **OK** to confirm. The default condition will now display on the screen, but in order to fix the Loopback Device in this condition, you must click the **Download to Pod** button.



## ISDN S0 LOOPBACK DEVICE

### Triggers and Actions

The configuration options shown within the main S0 Loopback Device window will satisfy a wide range of applications by allowing a trigger to be selected based on calls made to the device and subsequent desired actions. Examples of triggers and actions are shown below:-

Trigger Options	Action Options
<b>Any Call</b>	<b>Loop Immediately</b>
<b>Call Type</b> (Voice, Data, 3.1KHz)	<b>Loop after delay</b> (enter delay up to 999 Seconds)
<b>Subaddress*</b> (enter address, up to 20 alphanumeric characters)	
<b>MSN*</b> (enter number up to 20 digits)	
<b>CLI*</b> (enter up to 20 digits)	

\*For more information on using Subaddress, MSN or CLI as a trigger turn to pages 11 and 12.



## ISDN S0 LOOPBACK DEVICE

### Subaddress

The inclusion of a called party Subaddress is a way of directing incoming calls to particular ISDN terminals. A Subaddress consists of alpha numeric characters sent with the call setup message and these are read by all terminals connected on the same S bus, one of which will answer if it has been pre-programmed with a matching Subaddress code. If Subaddress is enabled on the ISDN line in use and Subaddress is required as a trigger, enter the chosen alpha numeric Subaddress code into the trigger address panel when programming the ISDN Loopback Device. Once configured click **Download to Pod** to fix the configuration.

### MSN (Multiple Subscriber Number)

With MSN a range of usually ten telephone numbers will all gain access to the same ISDN port. In this case, the user is expected to configure each terminal with a unique number so that it is possible to direct calls to individual terminals. If MSN is selected as a trigger for the Loopback Device the user should enter one of the ten MSN numbers allocated to the ISDN port as the trigger address within the main S0 Loopback Device configuration window. Once configured click **Download to Pod** to fix the configuration.



### CLI (Calling Line Identification)

If CLI is selected as a trigger the user is expected to enter the telephone number that will be used to call the Loopback Device in exactly the same form as it is presented at the device. In some cases the leading zero may have been removed before the number is presented to the Loopback Device. In these cases all digits with the exception of the leading zero should be entered. A protocol analyser will display how the number is presented but if an analyser is not available try both with and without the leading zero. Once configured click **Download to Pod** to fix the configuration.



## 3. Download and Upload Functions

### **Download to Pod**

Having entered the chosen Loop trigger and required action, it is important to click the button labelled **Download to Pod** to fix this configuration.

### **Upload from Pod**

To read the configuration of an unknown Loopback Device, simply connect the Loopback to the PC host and click **Upload from Pod** to ascertain exactly how the unknown device has been configured.

### **Saving Profiles**

The S0 Loopback Configuration Window allows the user to save a number of different configurations as profiles using the **File, Save As** command. Save each profile with the extension **.pds** and click on **Open** to reload the profile.



## **4. LED Indicators**

### **PH LED**

The PH LED confirms that synchronisation has been achieved, electrical signals (Layer 1) are present and that signalling to the network is active. If this LED fails to illuminate, remove the plug from the NT1 socket and repeat insertion after a few seconds delay.

### **B1 LED**

When illuminated, this LED indicates that a call is in progress on bearer channel 1.

### **B2 LED**

When illuminated, this LED indicates that a call is in progress on bearer channel 2.

### **Loop LED**

This LED confirms that the pre-programmed loop trigger parameter has been met and that the device has placed a loop in the B channel(s). Note: If a delay action has been selected, the B channel LED will not illuminate until the delay period expires.

### **PS1 Normal**

Under 'normal' conditions, power is provided on the ISDN S bus by the network operator at a level of 40V at up to 1W. If power is provided in this way then the PS1 NORMAL LED on the Loopback Device will illuminate.



## ISDN S0 LOOPBACK DEVICE

In some cases only the ETSI stipulated minimum level of power will be available at all times (see PS1 Restricted).

### PS1 Restricted

ETSI have defined two levels of ‘phantom power’ that should be available on an ISDN basic rate port. Under normal conditions, 40V at up to 1W should be available (Normal) but in the event of a local mains failure the power level is reduced to 40V at up to 420mW (Restricted) and the polarity is reversed. This restricted level is deemed enough to power an ISDN telephone from the line for making emergency calls. **Some network providers will only supply restricted power at all times but because the Loopback Device is very power efficient it will operate below the restricted power level.**

If local mains fails or the network provider has limited the power available to the minimum level, the PS1 RESTRICTED LED on the Loopback Device will illuminate.

### External LED

The ISDN Loopback Device is very power efficient and is able to take its power directly from the ISDN line. However, in situations where phantom power (PS1) is not available, an optional power adapter (available from Black Box) can be plugged into the device in order that it can feed from the power adapter until the plug is removed. The External LED will illuminate to provide confirmation that power is being derived from the external adapter.



## 5. Technical Specification

### **CE Marking**

The CE marking of the ISDN Loopback Device and its Power Supply Unit is for compliance with the following directives:

#### **73/23/EEC - Low Voltage Directive**

Compliance with: EN60950 - User Safety

#### **89/336/EEC – EMC Directive**

Compliance with: EN55022 - Emissions  
EN50082-1 - Immunity

### **Environment**

Operating Temperature	0°C to 40°C
Storage	-20°C to 50°C
Relative Humidity	90% non-condensing
Size	64mm x 180mm x 24mm
Weight	140g

### **External PSU**

Connection	2.1mm barrel, internal +ve
Type	As ordered (various types available)





## ISDN S0 LOOPBACK DEVICE

### ISDN S0 Interface

Connection	RJ45 sockets (x2) *
Physical Layer	I.420 'S' Bus TE Mode
Layer 2	Q.921 Euro ISDN
TEI	Single TEI used (automatic)
Layer 3	Q.931 Euro ISDN
PS1 Use	Normal/Restricted 250mW

\* Two RJ45 sockets are provided for convenience. Either socket may be used for connecting the Loopback Device to the ISDN basic rate port. The spare socket can be used to connect another ISDN terminal if required.

### Serial Port

Connection	RJ11 using supplied RJ11 to 9 Pin D Type cable
Physical Layer	RS232
Speed	9600
Bits	8
Parity	None
Stop Bits	1



## ISDN S0 LOOPBACK DEVICE

### Warnings

**Lethal Voltages** - are present within the power supply adapter which is supplied optionally with the ISDN Loopback Device. There are no user serviceable parts in the unit. On failure, return to the supplier.

**Configuration** - of the unit does not require access into the case. Entry into the case by removing screws should only be made by persons authorised by the supplier to do so, otherwise Warranty could become void.

**Power Supply** - only the provided Power Supply Unit should be used with the ISDN Loopback Device, otherwise Warranty could become void. There are no replaceable fuses in the unit or power supply.

**Disposal** - The ISDN Loopback Device contains hazardous components that require safe disposal at the end of life. Disposal should be carried out by a competent person.



## 6. Glossary

### **3.1KHz**

This is a bearer capability requesting a guaranteed bandwidth of just 3.1KHz which is the bandwidth available on an analogue telephone line. Calls made from an analogue line may be received with this bearer capability so when dialling the Loopback Device from an analogue line it may be convenient to use 3.1KHz as a trigger.

### **Basic Rate ISDN**

The Basic Rate ISDN interface provides a bandwidth of 144Kbit/S which is divided into two bearer channels of 64Kbit/S each and one data (D) channel for signalling with an available bandwidth of 16Kbit/S.

### **Bearer Channel**

A 64Kbit/S time slot available to carry voice or data across the ISDN network. Two bearer channels are available on a basic rate interface (2B+D) and thirty bearer channels are available on a primary rate interface (30B+D).

### **CLI**

Calling Line Identification is a supplementary service which when activated allows the terminal receiving the call to see the telephone number of the terminal calling.



## **ISDN S0 LOOPBACK DEVICE**

### **ISDN**

Integrated Services Digital Network.

### **ISDN S Interface**

144kbit/S HDLC framed digital interface used for Basic Rate ISDN where it is divided into 3 channels comprising of one for signalling (16Kbit/S D channel) and two 64Kbit/s bearer channels. The Physical interface used is RJ45.

### **MSN**

Multiple Subscriber Number is a supplementary service available from the network provider which allows a range of ten independent telephone numbers to be provided to gain access to just one ISDN basic rate port. MSN is used so that businesses can direct customers to a particular telephone or terminal. For example 'dial 0118 9844444 for sales or 0118 9845444 for support'. Each terminal plugged in to the S bus must be programmed to accept the required MSN code.

### **Passive Bus**

This is an ISDN feature which allows up to 6 terminal devices and two voice devices to share the same twisted pair, each with unique identification.

### **PH**

Physical Layer for synchronisation and activation.



### **Pod**

In the configuration software the ISDN Loopback Device is referred to as a 'Pod'.

### **Profile**

The Profile is a file containing a chosen configuration. It is possible to save a number of profiles to disk and these can be selected easily to configure one or more Loopback Devices.

### **PS1**

Power Source 1 or Phantom Power provided by the network to the ISDN S bus.

### **RJ45**

Standard eight way physical connector for basic rate and primary rate (E1) ISDN.

### **Rx**

Received Signal

### **S Interface**

The standard interface between ISDN terminals or terminal adapters and the network channel termination.

### **Subaddress**

Subaddress is a supplementary service allowing alphanumeric characters to be sent when sending or receiving a call. Only terminals programmed with a matching Subaddress will accept the call.



## ISDN S0 LOOPBACK DEVICE

### Terminal Equipment

Telephones and other equipment such as video conferencing equipment and terminal adapters that the user will connect to the telephone line.

### Tx

Transmitted Signal

Specifications subject to change without notice.  
User Guide Issue 3.1

