furse

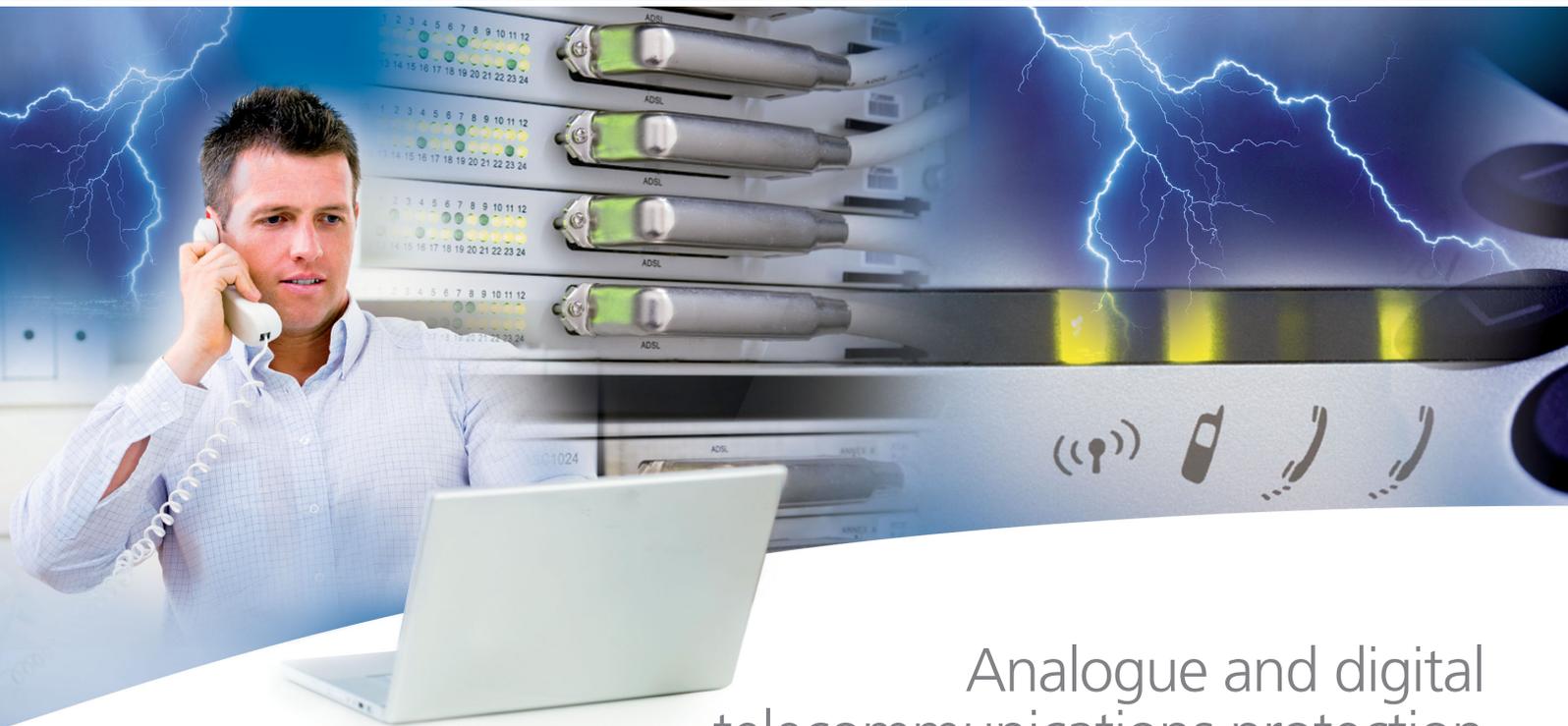## AN010

Analogue and digital telecommunications protection

Thomas&Betts

Analogue and digital telecommunications protection

Protection for analogue telecommunication systems

Overview

PSTN stands for Public Switched Telephone Network.

This is basically the phone lines that are the property of the Public Telecommunications Operator (PTO).

Terminating the PSTN line is a Network Termination Point (NTP).

PSTN interface

When installing an analogue system the PTO will install a standard PSTN line *(see Figure 1)*.

The NTP on this line can vary depending on the system type required by the end user. It is usually a master wall socket for domestic phone lines. For complex telecommunication installations, it is usually a connection frame or Private Branch Exchange (PBX).

The PSTN lines and the NTP remain the property of the PTO.

Only a licensed PTO can make connections to the PSTN line.

The lines after the NTP are the equivalent to the ISDN S/T interface, protection can be installed on these lines without permission of the PTO.

Protection

There are two ways to protect telecommunication systems, either protection on the PSTN interface or protection after the NTP.

Protection on the PSTN interface

Connections to the PSTN lines should only be made by licensed PTO's or with prior permission of the PTO who owns the system. However if this is permitted, PSTN lines can be protected by using Furse wire-in protectors ESP SL TN, ESP TN or the 4-way ESP TNQ. *See Figure 1.*

Protection after the NTP or PSTN interface

The type of protection on standard analogue systems after the NTP varies depending on the system.

Furse wire-in ESP SL TN, ESP TN (or 4-way ESP TNQ) can be used in-line with telephone wiring.

The British style jack plug-in connection ESP TN/JP can be used in between the telephone equipment and a wall socket.

Similarly the RJ11 jack plug-in connection ESP TN/RJ11-#/6 (# variants are 2, 4 and 6 wire) can be used in between the telephone equipment (usually modems or non-UK phones) and a wall socket.

If an LSA-Plus PBX board is used, ESP KT1 protectors and an ESP KE10 earth bar (or the 10-way ESP K10T1 protectors) can be used. *See Figure 1.*

Figure 1: Protection on analogue systems
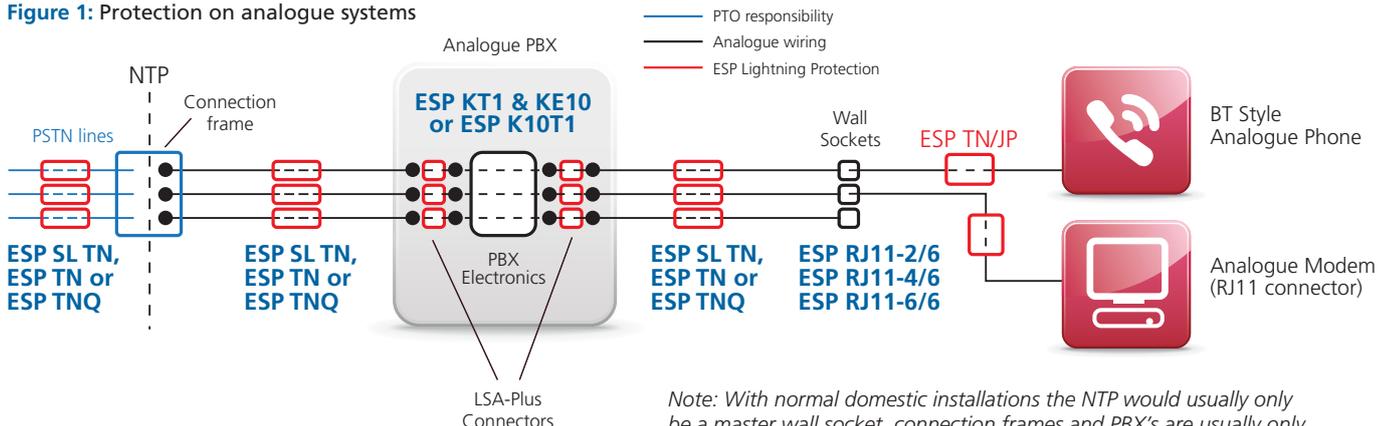
Note: With normal domestic installations the NTP would usually only be a master wall socket, connection frames and PBX's are usually only used in business or other complex telecommunication installations.

Protection for digital telecommunication systems

Overview

ISDN stands for Integrated Services Digital Networks. For ISDN installations licensed Public Telecommunications Operators (PTO's) will use normal PSTN (analogue) lines then terminate them with a NT1 device, this is referred to as the Network Termination Point (NTP).

After the NTP the lines are digital and are routed to ISDN data/voice terminals or ISDN modems.

S/T interface or U interface?

When installing an ISDN system the PTO will install a U interface *(see Figure 2).*

The U interface remains the property of the PTO and for basic rate ISDN installation is a 2-wire line that connects to a NT1 termination device. This termination device will also be installed by, and remain the property of, the PTO.

Only a licensed PTO can make connections to the U interface side of the NT1 termination device.

The S/T interface is the output lines of the NT1 termination device, this side of the NT1 is the property of the consumer, and therefore protection can be installed without permission of the PTO.

All ISDN devices connect to this interface in order to communicate over ISDN.

In Europe the ISDN wall jacks are S/T interfaces, and ISDN modems and data/voice terminals connect to this interface.

Protection

There are two ways to protect telecoms systems, either protection on the U interface or protection on the S/T interface.

Protection on the U interface

Installation at this point offers the best possible protection, as all the equipment after, including the NT1 termination device, is protected.

Connections to the U interface should only be made by a licensed PTO or with prior permission of the PTO who owns the system.

Usually the U interface is routed straight to the NT1 device, the Furse ESP SL TN, ESP TN or the 4-way ESP TNQ protector can be installed in series before the NT1 device. *See Figure 2.*

Protection on the S/T interface

The output (S/T interface) terminals of NT1 devices are usually RJ45 connectors. In this case Furse ESP ISDN/RJ45-4/8 (4-wire) or Furse ESP ISDN/RJ45-8/8 (8-wire) protectors should be used to protect each line going to equipment requiring protection *(see Application Note AN002 for information on ISDN/RJ45 protectors - contact Furse).*

The outputs from an NT1 device may go through an LSA-Plus panel before connection to ISDN data/voice terminals, in this case Furse ESP KT2 protectors and an ESP KE10 earth bar (or the 10-way ESP K10T2 protectors) can be used. *See Figure 2.*

Figure 2: Digital line protection
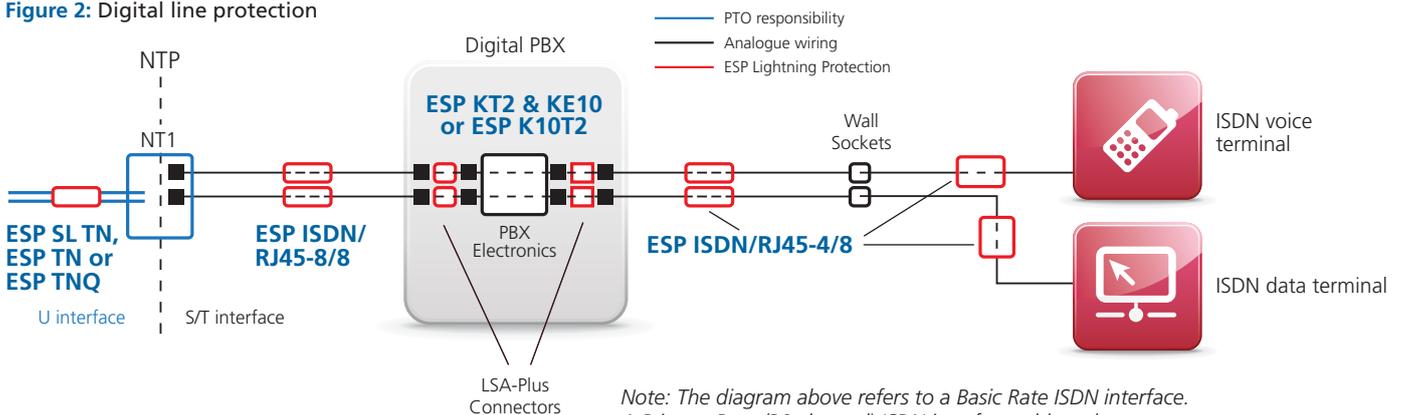
Note: The diagram above refers to a Basic Rate ISDN interface. A Primary Rate (30 channel) ISDN interface, although more complex, can be protected in exactly the same way.

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Full specifications of all of the products in the Furse ESP range of transient overvoltage protectors can be found in the Total Solution Product Catalogue.

To request a copy, contact Furse Sales at the address opposite.

Full product data can be downloaded in PDF form from our website at www.furse.com. Copies of the Total Solution Product Catalogue can also be requested from our website.

GLOSSARY

1. **ISDN** = Integrated Services Digital Networks
2. **NTP** = Network Termination Point
3. **PBX** = Private Branch Exchange
4. **PSTN** = Public Switched Telephone Networks
5. **PTO** = Public Telecommunications Operator: e.g. BT, Mercury, etc. and cable TV companies

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