

## **3750 V of isolation not required at the Network Termination, or why Reinforced Insulation is not required.**

The requirements for isolation at the Network Termination Port (NTP) for apparatus connecting to the Telecommunications Network in Europe are, and have been,

- Reinforced Insulation between Mains and the Network.
- Supplementary Insulation (1500Vrms) between Tip/Ring and Earth Ground.
- Basic Insulation (1500Vrms) is now required between Tip/Ring and the Operator and SELV (Safety Extra Low Voltage) Circuits (BS 6301 specified creepage and clearance and  $2M\Omega$  of insulation resistance as the requirement).

3750VAC of isolation is no longer required at the Telecommunications Network interface. In the past, European Agencies required this level of isolation for after market modems being sold independently of a personal computer to ensure isolation from Mains, as this was the requirement for Reinforced Insulation.

BABT, for example, required this. The basis of this requirement was the (now) obsolete standards IEC 380 *Safety of Electrically Energized Office Machines*, and BS 6301, *Electrical Safety Requirements for Apparatus for Connection to Telecommunication Networks*. IEC 380 defined 3750VAC as the minimum dielectric strength for Reinforced Insulation, and BS 6301 required a Reinforced barrier to isolate the Telecommunications Network from Mains. Therefore, to ensure proper isolation of the telephone network from mains, the Reinforced barrier was required as it was viewed that when approving a stand alone modem, as one could not count on the proper isolation to be provided from mains via the equipment the modem was connected to.

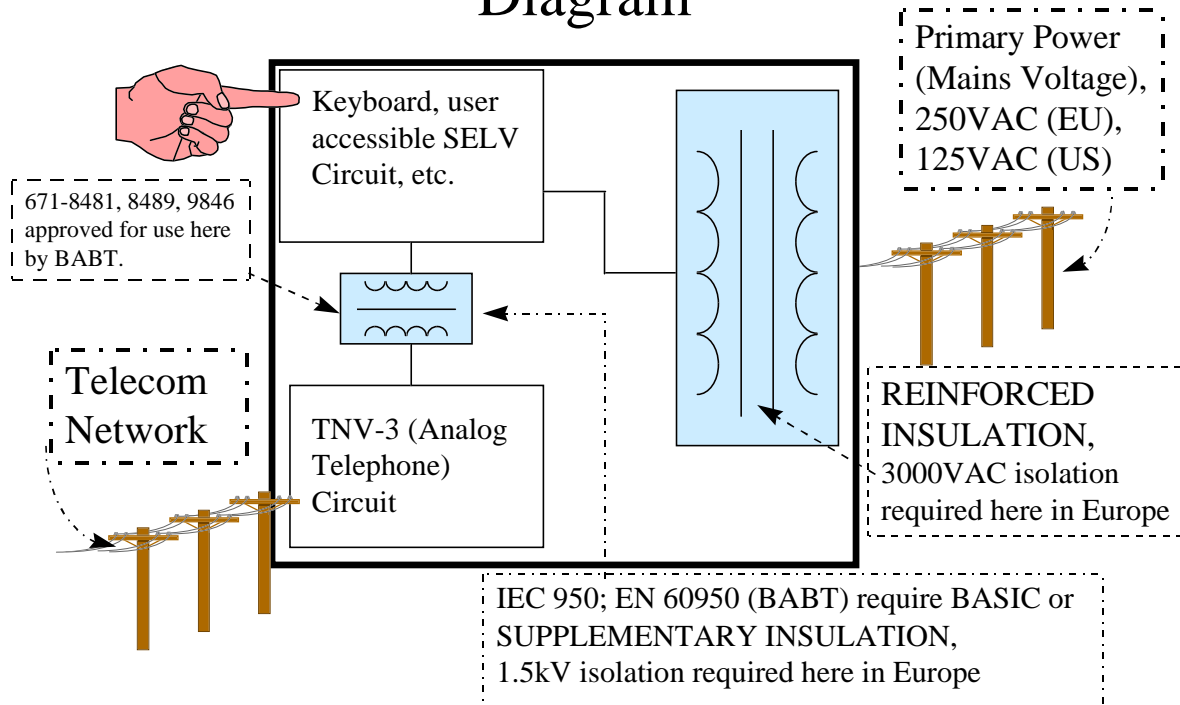
With the advent of IEC 950 (and consequently, EN 60950) *Safety of Information Technology Equipment including Electrical Business Equipment*, IEC 380 became obsolete as the European requirements for all Information Technology Equipment were harmonized. BS 6301 was replaced by EN 41003, which now simply references the relevant clauses of EN 60950. While the essential requirements and issues addressed remain the same, this change impacted the requirements for host independent terminal equipment in the following manner:

- All computers, modems, and other information technology equipment is now evaluated to a common European standard, EN 60950.
- EN 60950 now defines the required electrical strength of Reinforced Insulation as 3000Vrms, not 3750Vrms.
- Test labs and agencies such as BABT are now very willing to approve modems providing only Supplementary Insulation (1500Vrms) at the Network Termination Port (NTP). This is because it is now generally assumed that the Reinforced Barrier is provided between mains and the output of the PC power supply. This is required if the inside of a PC is intended to be accessible to the equipment operator, as the vast majority are. Also, the fact that there is now a harmonized safety standard (EN 60950) which Information Technology Equipment is now evaluated to has probably had a good deal to do with this relaxation. Be aware that additional user instructions are required when Reinforced Insulation is not provided.

The above holds true also for PC Card (PCMCIA) modems. It is recommended that one obtain a copy of BABT Application Note 48 which discusses this matter in more detail. Midcom Technical Note #79 also covers these requirements in greater detail.

Below is a diagram that should be helpful in explaining the isolation requirements. If a BABT approved transformer is being used, the BABT certificate specifically addresses what type of isolation the transformer provides.

# Typical Analog Modem Isolation Diagram



## References:

- BS 6301: 1989
- IEC 380
- IEC 950, 2<sup>nd</sup> Ed., incorporating Amendments 1-4, 1991
- EN 60950, 2<sup>nd</sup> Ed. Incorporating Amendments 1-4, 1992
- EN 41003: 1997
- BABT Application Note 48
- Midcom TN#79
- Helpful compliance colleagues of TREG and EMC-PSTC

**Disclaimer:** This document is intended only as an introduction to some of the requirements affecting your choice of transformer. All said in this document may not be 100% accurate, and is likely to change. It would be prudent to check these facts against the appropriate national standard, and also with the appropriate competent approval authority. Midcom or myself cannot take responsibility for any blunders made as a result of the information presented here.