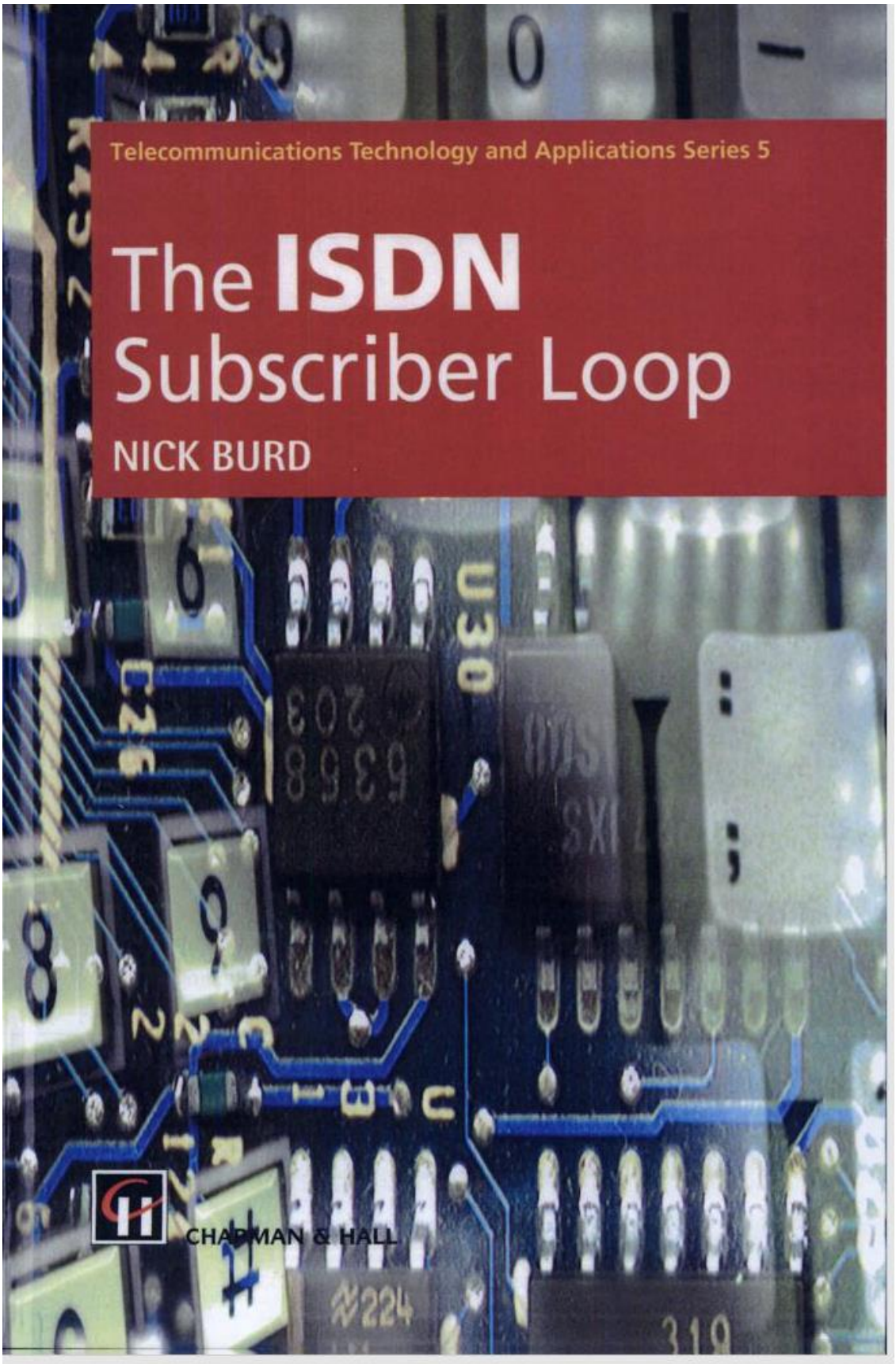

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be applied by splitting each line-side transformer winding into two equal halves and connecting them with a capacitor. The capacitor enables AC signals to pass without attenuation but blocks DC voltages. Components are added to this configuration to protect the circuitry from excessively high voltages caused by lightning strikes.

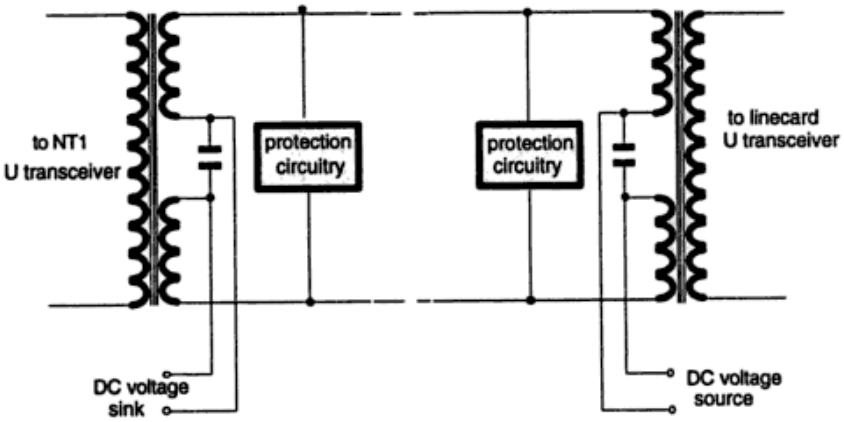

Fig. 4.13 Power feed configuration at the U interface.

In European ISDNs, the U transceiver side of an NT1 for both 2B1Q and 4B3T systems will typically be powered remotely from the network across the transmission cable, thus allowing the network operator to maintain full control over the U transmission system at all times. The S/T user–network interface may under normal conditions be powered locally from the NT1 using a local power source such as mains or batteries, and is backed-up with remote power from the network under emergency power conditions where the local power source fails. When active, the NT1 must consume no more than 500 mW of power from the network, and in a deactivated state must consume no more than 120 mW. Under emergency power conditions when the NT1 is expected to also power the user's designated terminal across the user–network interface, then the power consumption of an active NT1 is allowed to rise to a maximum of 1.1 W[8]. This power is delivered as a DC voltage and current that varies between different ISDNs due to the different safety requirements and subscriber loop configurations. The minimum voltage at the NT1 required for correct operation is 28 V, while the feed voltage at the exchange may vary from network to network from 51 V to 115 V.

[8]Slightly higher values of less than 600 mW and 1.3 W respectively were allowed during an interim period until the end of 1994 provided the power is available from the network.

In America, it is expected that remote powering of the NT1 is not provided and both primary power and emergency, or secondary, power may have to be sourced locally at the customer premises. Primary power will usually be derived from a local mains source while emergency power will come from local batteries. The status of power at the NT1 is indicated in both ETSI and ANSI 2B1Q systems using the ps1 and ps2 bits of the M-channel, and Table 4.1 shows the four messages defined by the value of these bits. In particular, the value 00 indicates to the network that both primary and emergency power sources have failed and that the NT1 will shortly cease normal operations. This value is referred to as the **dying gasp** message, for which the American NT1 must have sufficient energy storage to ensure that it continues operation long enough after failure of the power sources to send this status to the network.

Apart from the delivery of remote power, the continuous supply at the exchange of a small amount of current through the subscriber loop helps to prevent the build-up of oxidation at cable joints that could otherwise lead to bad connections. This is known as **sealing current** as it helps to seal the connection.

Table 4.1 Power supply bits of the 2B1Q system

NT1 status	*ps1*	*ps2*	*Definition*
All power normal	1	1	Primary and emergency power supplies are both normal
Secondary power out	1	0	Primary power normal, but emergency power is marginal, unavailable or not provided
Primary power out	0	1	Primary power is marginal or unavailable, emergency power is normal
Dying gasp	0	0	Both primary and emergency power are marginal or unavailable. The NT may shortly cease normal operation

4.5.3 Test and maintenance functions

As a result of the NT1 being considered customer premises equipment in American ISDNs, American operating companies can place the NT1 in quiet mode as described in section 4.3.1.4 in order to perform tests on the subscriber loop using test equipment tapped onto the line either at the local exchange or at some point along the length of the subscriber loop to the NT1. Return loss, insertion loss and impedance measurements can be performed while the NT1 is in quiet mode. In quiet mode, the NT1 is effectively placed in an idle state, ignoring requests for activation from the user or terminal side of the interface.