



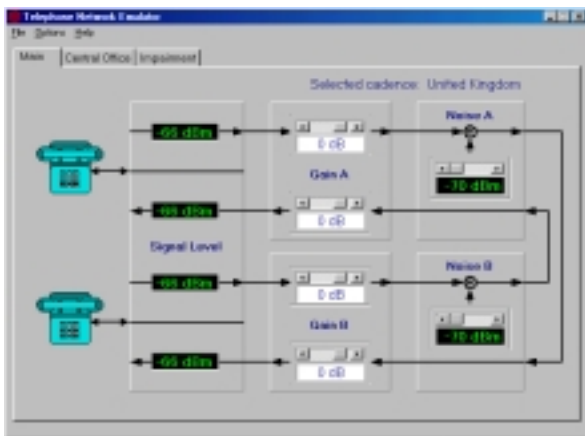
Telephone Network Emulator



TNE Concept

The performance of high-speed voiceband data modems and fax machines is heavily dependent on the characteristics of the telephone network connection. Impairments of various types introduced by a poor quality connection can lead to digital transmission errors and consequent increased transmission time due to the need for re-transmission of corrupted data. Developers of such data communication devices therefore need realistic network emulation to test their designs effectively, and network operators need the same network emulation capability to evaluate the products of different manufacturers.

To satisfy this requirement, DSPG Ltd. has developed a low-cost Telephone Network Emulator (TNE). The use of the TNE should afford a major reduction in the time required to test or evaluate data communication products.



Initial Display

Main Features

- Low-cost telephone network emulation - provides everything necessary to emulate an end-to-end PSTN connection.
- Single PC-card (ISA bus) option for lowest cost, or -
- Self-contained unit with an optional laptop offers additional features and versatility.
- Customers who have DSPG's echo canceller tester (ECT) can have the TNE card installed in that unit to benefit from shared resources.
- Allows connection of any 2-wire telephone apparatus.
- Digital processing for reliability and precisely repeatable test conditions.
- Provides easy configuration of all the main transmission impairments via a Windows-based graphical user interface.
- All impairments can be configured independently in the two directions of transmission.
- True-RMS level meters provide continuous display of levels in dBm and dBm0.
- Control of all aspects of signalling frequencies and timings used to establish a call.
- The cadence and tones for many countries can be quickly selected from a country list.
- User-specified dial-numbers.

Since the TNE will connect any 2-wire telephone instruments, standard or calibrated, it can also be used for subjective evaluation purposes, either of the telephone instruments themselves, or of some aspect of the emulated connection.

TNE Concept

The TNE is easy to use, but capable of introducing all the main impairments that adversely affect voice-band data communications. Impairment processing is all-digital so

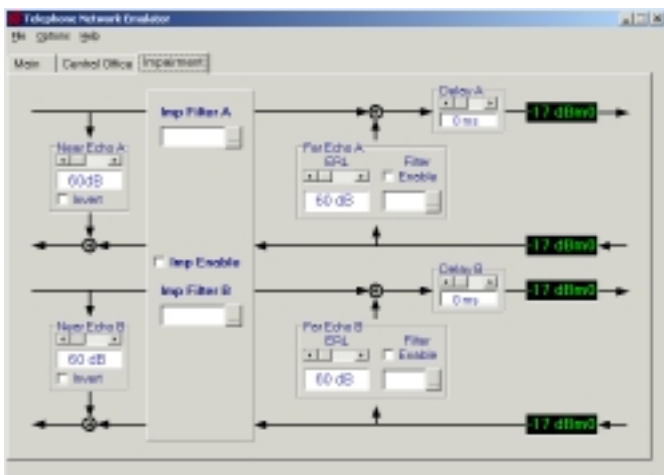
that test conditions can be precisely repeated. All impairments are introduced independently in the two directions of transmission.

True-RMS level measurements in the emulated connection are continuously updated and displayed.

Examples of the parameters and impairments that can be controlled are:

- Call progress tones: dial, busy, ring-tone;
- Timing/cadence control;
- Emulation of line characteristic;
- Send and Receive gain adjustments;
- Noise injection;
- Near-end and far-end echo levels;
- Echo path characteristic, with the option to use ITU-T G.168 echo path models;

Transmission delay (e.g. satellite delay).

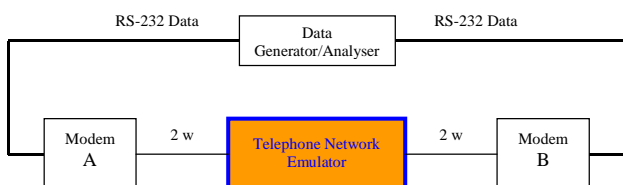


The Echo Path, Delay and Impairment Filter Controls

### Applications

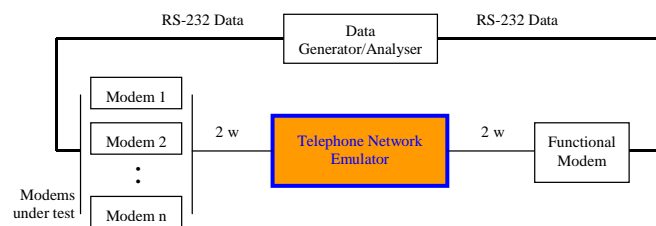
The TNE can be used in a wide variety of test scenarios, wherever a convenient, easily configurable emulation of real network conditions is required. Some examples are given below

### Modem Testing



The above configuration can be used to test modem designs during development, or to evaluate modems for use in the network.

### Quality Assurance



Modems are switched into circuit for QA checks after manufacture.

### FAX Testing



Allows evaluation of achievable data rate, error performance, and image quality.

### Testing Communication Software



Allows test and demonstration of communication software in emulated real network scenarios.

### Subjective Testing



Can be connected directly to any 2-wire telephones to allow subjective evaluation of the telephone instruments, or of particular network scenarios.

### Standard Specifications

Part No.	Description
TNE-C	DS-SLIC2, 16-bit ISA bus compatible, 2/3 length PC AT form factor card. Includes TNE software.
TNE-Mini Genie	Portable unit with expansion capability. Includes in-built SBC + Windows operating system. Includes the same features as TNE-C.
DSPGenie TNE	Ultra-compact unit based on a new DSPGenie hardware platform with expansion capability. Includes in-built SBC + Windows operating system. Includes the same features as TNE-C.

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