Lindos Electronics Application Notes

LA100 Application Note 9:
Lines Testing with the LA100

The Lindos LA100 is ideally suited to testing lines and networks. An automatic test sequence can be generated by the LA101 Audio Oscillator and received by an LA102 Audio Measuring Set at the other end of the line. All the relevant control and timing data, together with a source identification message, is sent over the signal path via FSK (Frequency Shift Keyed) data.

If the line is normally used for programme material the LA102 can still be left connected as it will only respond to sequences sent from the LA101 oscillator, and it will never mis-trigger on speech or music. The LA102 can store 6 complete sets of test results for later examination or printing. Every measurement can be compared against tolerence limits giving an immediate PASS/FAIL message using the pre-programmed EPS81, EPS84 and EPS98 lines tolerances or one of 5 easily entered user tolerances.

Speed of Testing

A test sequence would normally measure level, frequency response, noise, distortion, crosstalk and phase on a stereo link within a minute. A single channel sequence would take typically 30s, but either can be made faster by omitting some tests.

If testing a line during a short break in programme material, or even if testing during a broadcast, it may be desirable to perform a very quick test. Faster testing is achieved by carefully chosing the test segments used in the sequence. For example, seqment X performs a frequency sweep from 20Hz to 20kHz in 1.5s and segment B measures crosstalk at 4 frequencies in 2s.

Obviously there are physical limits to the accuracy of the faster tests; testing a NICAM filter for example will require a 20s sweep to fully test the very steep roll-off which cannot be followed by the rms rectifier on fast sweeps. Bad echoes or group delay (time smearing) on the line can affect fast measurements; in particular a 1.5s frequency sweep may produce inaccurate results due to the frequencies not appearing at the times the LA102 expects them to, again a slower sweep segment (5s or 20s) will avoid this problem.

Automatic Printing of Test Results

If the results are not required immediately the LA102 can be left permanently connected to a printer and configured to print the test results as soon as a sequence is received.

Receiving the Test Results via a Modem

The LA102 can be fully controlled over a telephone line using an inexpensive modem connected to its RS232 serial port. After transmitting the test sequence from the LA101 over the line a computer at the transmitting station can dial the LA102 and read the test results, via a modem link, allowing them to be stored on disk, displayed, printed or checked against a pass/fail tolerance.

Alternatively the LA102 can be configured to dial a telephone number and print the test results on a printer connected to a second modem. This provides printed test results for the line within seconds of the test being performed.

Remote Transmission

If the oscillator is at a remote site it can be left repeating a sequence continuously (or hourly or daily etc) allowing a test to be performed by simply connecting an LA102 to the other end of the line and waiting until a complete test sequence has been received. Alternatively it is possible to trigger a sequence by applying a DC signal to the LA101 serial input, allowing control from a simple switch or timer (automatic transmission on power-up is another possibility).

Further Details

Please contact Lindos Electronics if you have any questions concerning lines testing. We are continuously developing the LA100 and the computer support software and can often modify it to suit your application.

PMS, Last Updated 16.06.1989