

Adtech Data Link Simulators.

Adtech SX series Data Link Simulators create the same delay and error characteristics caused by long distance terrestrial and satellite data links. By providing realistic simulations of actual network conditions, they allow users to stress test equipment and network applications without the expense and inconsistency inherent with on-line testing.

Utilising dual-channel, full-duplex interfaces, these devices provide true bi-directional testing using programmable delays, random bit errors and burst errors. Multiple delay and error events can be programmed into complex sequences to simulate a wide variety of adverse link conditions or even specific events such as targeting line framing bits and testing CPE alarm thresholds.

Applications

Adtech Data Link Simulators can be used to test the effects of digital data links on the operation, performance and reliability of multiplexers, bridges, encrypters, network applications and related communications hardware and software products.

Example 1: Simulating a Data Link

When used for link simulation, these simulators connect directly between two pieces of equipment to simulate conventional data links such as satellite connections, terrestrial or data networks.

Example 2: Simulating an Additional Data Link

The simulators can also be used in line with a real data link to add additional delays or errors. This simulates the effects of adding one more link to the system.

Basic Description and Features

All SX Data Link Simulator models perform the same basic functions. The main differences between the models are the number of physical interfaces, link speeds, and features available.

Each simulator is housed in a rack mountable chassis and uses interchangeable plug-in modules to support various data channel (physical) interfaces. The front panel includes an LCD display and keypads for user input and control. All front panel functions can also be accessed remotely via an optional IEEE-488 or RS-232 remote control port. Other hardware options providing additional delay and error simulation capabilities are also available.

SX/12 Data Link Simulators (up to 8.448 Mbps)

Adtech's lowest priced simulator, the SX/12 is designed for basic link simulation at lower speeds. Available in three different versions. The SX/12-1 and 2 supports the Extended T1/E1 Simulation Options.

SX/13A Data Link Simulator (up to 51.84 Mbps)

This mid-range simulator supports higher speeds than the SX/12 as well as an error targeting option for injecting errors into specific bits. In addition to its own set of physical interface options, the SX/13A is upgradeable to the SX/14 which supports link rates of up to 155.52 Mbps.

SX-14 Data Link Simulator (up to 155.52 Mbps)

This is Adtech's fastest and most advanced simulator supporting speeds up to SONET 155.52 Mbps. In addition to its own set of physical interfaces, the SX/14 also accepts SX/13A style physical interfaces.

SX/12 Data Link Simulator Features.

There are three different versions of the SX/12. All function identically except for the maximum link speed each version supports. An Extended T1/E1 Simulation option is available for the SX/12-1 and SX/12-2 versions. This factory installed hardware option provides additional delay and error simulation parameters for T1 (1.544 Mb/s) and E1 (G.703 2.048 Mbps) data streams.

Versions

SX/12-0 Data Link Simulators (up to 100 kbps)
SX/12-1 Data Link Simulators (up to 2.048 Mbps)
SX-12-2 Data Link Simulators (up to 8.448 Mbps)
SX/12 versions are factory upgradeable.

Type of Channel

Full-duplex digital link

Error Generation

Random (Gaussian) bit error rates from 0, 1×10^{-9} , 2×10^{-9} , 3×10^{-9} , ... 9×10^{-1} , 1
Optional targeting of errors at specific bits and subchannels of formatted streams.

Burst Error Generation

Burst error rates from 9×10^{-1} to 1.0×10^{-9}
Selectable burst length from 1 to 16,777,215 bits or from 1 to 9,999 ms
Selectable gap between bursts from 1 to 99,999,999 ms

Burst Error modes

Fixed gap length, fixed burst length
Random gap length, fixed burst length
Fixed gap length, random burst length
Random gap length, random burst length
Manual burst trigger, fixed burst length
Manual burst trigger, random burst length

Delay Generation

Delays up to 10 seconds in 1 ms or 8 bit steps
Optional targeting of delays at specific subchannels of formatted streams.

Available Interfaces

RS-232-C
RS-449 (RS-422-A)
V.35
DS1 (T1) (1.544 Mbps)*
G.703 (E1, 2.048 Mbps)*
G.703 (E2, 8.448 Mbps)**
* - Available for SX/12-1 and SX/12-2 versions
** - Available for SX-12-2 version

Data Channel Clocking

Internal
External
Asynchronous
Recovered

Programming

Programmable test sequences with complex link degradations
Up to 99 parameter steps per sequence
Step duration from 1 to 9,999,999 seconds
All SX/12 parameters are programmable including error rates, delays and triggers
Sequencing capabilities include manual step trigger and auto repeat

Other Built-in Features

2 line by 40 character LCD

7-year lithium battery backup for program memory

Self-test, bypass, loopback and keyboard lock modes

Remote Control Options

IEEE-488

RS-232

Extended T1/E1 Simulation Option

Permits assigning any one of 10 definable delays to each timeslot (DS0) in

T1/E1 data stream

Permits targeting within a variety of framing formats to any desired bits in multiframe

Each channel can be targeted independently

Permits targeting of overhead bits: framing, signalling, CRC, etc.

Fixed, random and burst errors.

Injected errors types include are logic reversals, zero insertions, one insertions.

Size and Weight

19" wide (rack mountable)

3.5" high

12" deep

11.5 lbs.

Power Requirements

115 or 230 VAC +/- 10%

48-66 Hz

SX/13A Data Link Simulator Features.

The SX/13A supports higher speeds and more test options than the SX/12. Both channels can be set independently and with different impairment parameters.

Type of Channel

Full-duplex digital link

Data Rates

100 bps to 51.84 Mbps

Error Generation

Random (Gaussian) bit error rates from $0, 1 \times 10^{-12}$ to $9 \times 10^{-1}, 1$

Logical errors. BPV or Code errors selectable for high speed interfaces

Optional targeting of errors at specific bits and subchannels of formatted streams

Burst Error Density

Burst error rates from $0, 1 \times 10^{-12}$ to $9 \times 10^{-1}, 1$

Logical errors. BPV, force to 0 or 1, or Code errors selectable for high speed interfaces

Selectable burst length from 1 to 16,777,215 bits or from 1 to 9,999 ms

Selectable gap between bursts from 1 to 99,999,999 ms

Burst Error modes

Fixed gap length, fixed burst length

Random gap length, fixed burst length

Fixed gap length, random burst length

Random gap length, random burst length

Manual burst trigger, fixed burst length

Manual burst trigger, random burst length

Manual single bit error injection

Delay Generation

Delays up to 10 seconds in 1 msec, 1 usec, 8 or 16 bit steps, each direction

Displays delays in msec, usec, or bytes

Optional targeting of delays at specific bits and subchannels of formatted streams.

Low Speed Data Channel Interfaces Available

RS-232-C

RS-449 (RS-422-A)

V.35

DS1 (T1) (1.544 Mbps)

E1 (G.703 2.048 Mbps)

High Speed Data Channel Interfaces Available

E3 (G.703 34.368 Mbps)

T3 (44.736 Mbps)

HSSI (up to 51.84 Mbps)

STS-1 (51.84 Mbps SONET)

Data Channel Clocking

Internal

External

Asynchronous

Recovered

Programming

Programmable test sequences with complex link degradations

Up to 99 parameter steps per sequence

Step duration from 1 to 9,999,999 seconds

All SX/13A parameters are programmable including error rates, delay and triggers

Sequencing capabilities include manual step trigger and auto repeat

Other Built-in Features

8 line by 40 character LCD

10-year lithium battery backup for program memory

Self test, bypass, loopback and keyboard lock modes

Remote Control Options

IEEE-488

RS-232

Error Targeting Option

Targets one of six error types into specific selected overhead bits in T1, T3, E1, E2, E3, and STS-1 data streams

Errors can also be targeted into selected DS0 channels in T1 and E1 data streams

Programmable User-defined pattern injection into any data pattern stream

Extended T1/E1 Simulation Option

Permits assigning any one of 10 definable delays to each timeslot (DS0) in T1/E1 data stream

Permits targeting within a variety of framing formats to any desired bits in multiframe

Each channel can be targeted independently

Fixed, random and burst errors.

Injected errors types include logic reversals, zero insertions, one insertions.

Size and Weight

19" wide (rack mountable)

5.25" high

14" deep

19 lbs

Power Requirements

115 or 230 VAC +/- 10%

47-66 Hz

SX/14 Data Link Simulator Features.

The SX/14 supports higher speeds and more test options than any other SX model. Both channels can be set independently with different operating parameters.

Type of Channel

Full-duplex digital link

Data Rates

100 bps to 155.52 Mbps

Error Generation

Random (Gaussian) bit error rates from $0, 1 \times 10^{-12}$ to 9×10^{-1} , 1
Logical errors. BPV or Code errors selectable for high speed interfaces
Optional targeting of errors at specific bits and subchannels of formatted streams

Burst Error Density (errors/bit)

Burst error rates from $0, 1 \times 10^{-8}$ to 9×10^{-1} , 1
Logical errors. BPV, force to 0 or 1, or Code errors selectable for high speed interfaces
Selectable burst length from 1 to 16,777,215 bits or from 1 to 9,999 ms
Selectable gap between bursts from 1 to 99,999,999 ms

Burst Error modes

Fixed gap length, fixed burst length
Random gap length, fixed burst length
Fixed gap length, random burst length
Random gap length, random burst length
Manual burst trigger, fixed burst length
Manual burst trigger, random burst length
Manual single bit error injection

Delay Generation

Delays up to 10 seconds in 1 msec, 1 usec, 16 to 48 bit steps, each direction
Displays delays in msec, usec, or bytes.
Optional targeting of delays at specific bits and subchannels of formatted streams.

Low Speed Data Channel Interfaces Available

RS-232-C
RS-449 (RS-422-A)
V.35
DS1 (T1) (1.544 Mbps)
E1 (G.703 2.048 Mbps)

High Speed Data Channel Interfaces Available

E3 (G.703 34.368 Mbps)
T3 (44.736 Mbps)
STS-1 (51.84 Mbps SONET)
HSSI (up to 51.84 Mbps)
STS-3 (155.52 Mbps SONET)
OC-3 (155.52 Mbps SONET)

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Recovered

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47-66 Hz

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