

Programmable Delay Line Instrument XT-100



- Programmable delay
- Phase shift RF/microwave signals with precise, repeatable, and accurate delay
- Signal input frequency range from DC to 18.0 GHz
- Resolution to 0.50 ps per step, 0.18° per 1.0 GHz
- Maximum delay range to 100.0 ns
- 2U tall compact chassis
- Easy to setup and use
- Proven reliability, accuracy, and repeatability
- Easily automate or replace manual processes
- Ethernet TCP/IP and RS-232 protocols supported for full instrument control

Wideband electrical signal delay with industry-leading resolution and precision programmable control in one easy setup

Overview

The Colby Instruments X Series instruments offer wide-band electrical signal delay (phase shift) with industry leading resolution and precision programmable control in one easy to setup and use instrument. All X Series instruments are completely passive and are DC-coupled with signal input bandwidth to 18.0 GHz. Easily automate RF/high frequency phase shift with precision programmable control and high-precision accurate delay. The XT-100 can be configured to offer different total delay ranges, starting from 0 to 625.0 ps to 0 to 100.0 ns.

XT-100-625P

With a programmable delay range from 0 to 625.0 ps and step precision to 0.18° per 1 GHz, the XT-100-625P utilizes the patented electromechanical trombone and accurately delays RF signal input from DC to 18.0 GHz. Instrument control is via Ethernet TCP/IP and RS-232 interfaces.

Delay Extensions

The XT-100 offers the flexibility to specify the instruments' total delay range (or phase shift) by adding delay extensions. Delay extensions consist of high frequency aerospace grade RF/Microwave relays and low-loss semi-rigid coaxial cable to extend total instrument delay range to a maximum limit of 100.0 ns. Typical unit delay ranges are: 2.5 ns (XT-100-002N), 5.0 ns (XT-100-005N), 20.0 ns (XT-100-020N), and 100.0 ns (XT-100-100N).

Programmable Interface

Delay settings can be specified remotely via Ethernet TCP/IP and RS-232 protocols. Simple commands like "del 100 ps", are sent to the unit and the corresponding delay is realized. A programmable interface assures instrument repeatability, accuracy, and performance superior to any manual phase shifter or delay line generator.

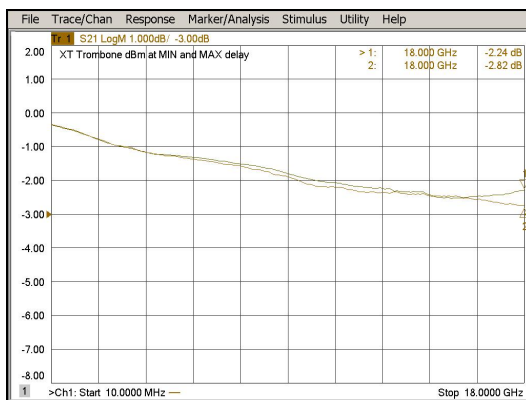
Web Interface

Use your existing Web Browser to control the XT-100 and set desired delay.

Typical Performance/Insertion Loss

An Insertion(S21) and Return Loss(S11) report is generated for each instrument at time of manufacture. Typical insertion loss for a single channel/trombone at 18.0 GHz:

- 2.2 dBm (MIN delay)
- 2.8 dBm (MAX delay)



Programmable Delay Line Instrument XT-100

COLBY PRODUCTS COMPARISON TABLE

	XT-100-625P	XT-100-020N	XR-100	XS-100-005N
Delay Type	Electromechanical Trombone	Electromechanical Trombone, microwave relays, and semi-rigid coaxial cable	Microwave relays and semi-rigid coaxial cable	PIN diode modules
Resolution	0.50 ps	0.50 ps	10 ps (min.)	1 ps
Delay Range	625.0 ps	20.0 ns standard, other ranges available up to 100.0 ns	Customer specifies maximum range	5.12 ns
Total Phase Shift / resolution per 1.0 GHz	225° at 625 ps / 0.18°	7200° at 20.0 ns/ 0.18°	Custom	1800° at 5.12ns
Frequency Range	DC to 18.0 GHz	DC to 18.0 GHz	Custom	100 mHz to 3.5 GHz
Data Rate	DC to 40 Gb/s DC	DC to 40 Gb/s	Custom	0.10 to 7.0 Gb/s
Delay at 0 ns	1.60 ns	3.30 ns	Custom	4.40 ns
Connectivity	Ethernet TCP/IP and RS-232	Ethernet TCP/IP and RS-232	Ethernet TCP/IP and RS-232	Ethernet TCP/IP and RS-232
Power Handling	10W CW, 50W peak	10W CW, 50W peak	10W CW, 50W peak ^[2]	+25 dBm max
Repeatability	0.2 ps maximum	0.2 ps maximum	Custom	n/a
Recommended Service Interval	500,000 operations or annually ^{[2] [3]}	500,000 operations or annually ^{[2] [3]}	5m operations MTBF	n/a
Maximum Settling Time min to max delay	6500 ms	6500 ms	50 ms	n/a
Operating Temp. Range	+10°C to +30°C	+10°C to +30°C	+10°C to +30°C	+10°C to +30°C
Absolute Accuracy	0.1%, 0.03 ps SD	0.1% per step, ± 5 ps to 10 ns total delay (due to cables & relays)	Custom	+/- 1 ps
Weight	9.0 lbs (4.1 kg)	12.0 lbs. (5.5 kg)	Custom	7.5 lbs (3.3 kg)
Physical Size	12" L x 16 3/4" W x 3 1/2" H (2U)	12" L x 16 3/4" W x 3 1/2" H (2U)	12" L x 16 3/4" W x 3 1/2" H (2U)	12" L x 16 3/4" W x 1 3/4" H (2U)

[1] Customer receives actual measured insertion (S21) and return loss (S11) data report for each device manufactured.

[2] Rated lifetime is specified for maximum switching current of 100 ma. Higher currents for increased power handling can be switched (up to 100W CW max.), but the rated lifetime will be lower.

[3] All connection interfaces should be inspected/serviced to ensure instrument is operating at its published performance specifications.