Colby Instruments

XT-100

Programmable Delay Line Instrument

Our most versatile product with a single input channel and a customizable delay range

Recommended when you need a finer step resolution and broad selection of delay ranges

Overview

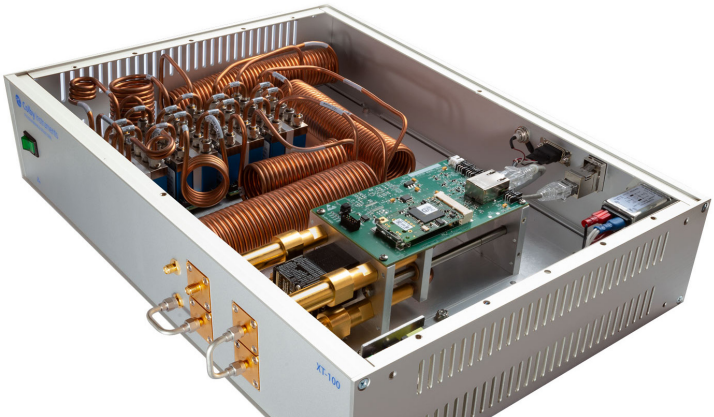
The latest generation of the product that started it all. The XT-100 features Colby's patented trombone technology for unmatched precision and ease of use. Using delay extensions, the XT-100 also comes in a number of configurations that give you the range you need, up to 100 ns.

Features/Benefits

- Easy to setup and use
- Proven reliability, accuracy, and repeatability
- Single channel offers 0-625 ps of total delay
- Additional configurations with delay extension offer total delay up to 2.5 ns, 5.0 ns, 10 ns, 20 ns, 50 ns, 80 ns, or 100 ns
- Full wideband passive delay from 0-18 GHz
- Resolution step size as small as 0.25 ps
- Trombone mean step accuracy better than 0.05% σ = 0.05 ps
- 500,000 operations before recommended maintenance service
- Now with web browser interface for remote instrument control

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 generator.



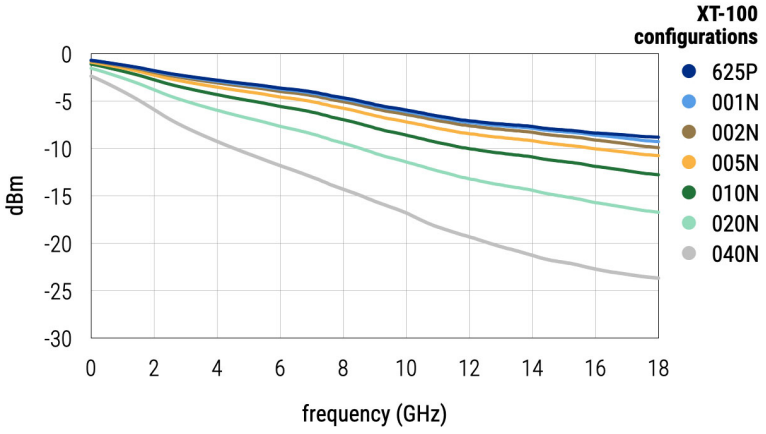
Delay Extensions

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).

Typical Performance/Insertion Loss

An insertion (S21) and return loss (S11) report is generated for each instrument at time of manufacture[1].

Typical insertion loss for all XT-100 configurations at max delay



Web Interface

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

Options

MT-100A Microterminal (LCD panel and numeric keypad) offers manual entry of desired delay.

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

Colby Product Comparison Chart

XT SERIES
Our most precise programmable delay line instruments using Colby's patented trombone technology.

XR SERIES
Featuring a selection of common step sizes that gives you the broadest signal delay range among all our products.

XS SERIES
Our XS series utilizes solid-state PIN diode technology to give you the fastest switching speeds within a limited signal bandwidth.

	XT-100	XT-200	XR-100	XS-100
Technology Type	Trombone, Trombone + Relay	Trombone	Relays	Solid state PIN diodes
Number of Channels	1	2	1	1
Signal Input Range	0 - 18 GHz	0 - 18 GHz	0 - 18 GHz	100 mhz to 3.5 GHz
Min. Step Resolution	0.25 ps	0.25 ps	5 ps, 10 ps, or 1 ns	1 ps or 5 ps
Max Delay Range	625 ps, 2.50 ns, 5.00 ns, 10.0 ns, 20.0 ns, 50.0 ns, 80.0 ns, 100.0 ns	312.5, 625.0 ps per channel	up to 50.95 ns, 101.91 ns, or 200.0 ns	5.12 ns or 10.23 ns
Phase Shift Step Resolution	0.18 ° per 1 GHz	0.18 ° per 1 GHz	1.8° , 3.60°, and 360° per 1 GHz	9 ° per 1 GHz
Total Phase Shift at 1 GHz	225°, 900°, 1800°, 3600°, 7200°, 18000°, 28800°, 36000°	112.5°, 225°		1842 ° or 3686 °
Total Phase Shift at 5 GHz	1125°,4500°, 9000°, 18000°, 36000°, 90000°, 144000°, 180000°	562.5°, 1125°		n/a
Switching Speed*	250 ms - 6500 ms	250 ms - 6500 ms	< 100 ms	< 50 ms
Ext. Trigger	no	no	no	yes
Ethernet TCP/IP	yes	yes	yes	yes
Serial RS-232	yes	yes	yes	yes
Web Browser UI	yes	yes	yes	yes
Microwave Relay Rated	5m MTBF	n/a	5m MTBF	n/a
Recommended Service Interval	500,000 operations or 1 year [2][3]	500,000 operations or 1 year [2][3]	1 year	n/a
Min. frequency for 360° phase shift coverage	1.6 GHz, 400 MHz, 200 MHz, 100 MHz, 50 MHz, 20 MHz, 12.5 MHz, 10 MHZ	3.2 GHz, 1.6 GHz	1/4	
Dimensions	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)	12.0" L x 16.5" W x 1.75" H (1U)
Weight	4.1 kg (9.0 lbs.) to 5.0 kg (11 lbs.)	5.4 kg (12 lbs.)	5.6 kg (12.5 lbs.) to 6.1 kg (13.5 lbs.)	2.7 kg (6.0 lbs.)

* depending on network latency
[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.

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Colby Instruments, Inc.
15375 SE 30th Place, Suite 320
Bellevue, WA 98007

425.452-8889
info@colbyinstruments.com
colbyinstruments.com