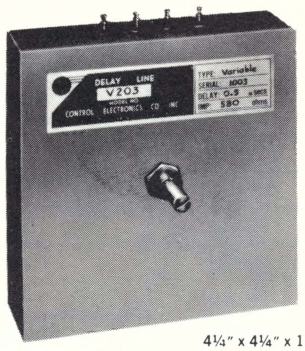
Variable Delay Lines

- **CONTINUOUS ROTATION,** or with mechanical stop
- **SUITABLE FOR MOTOR DRIVE**—we will supply units with motor drive to meet your specification



4¼" x 4¼" x 1¼"

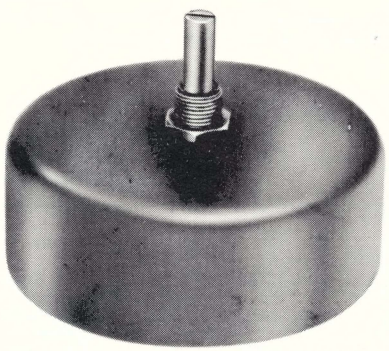
Model V203

TYPICAL CHARACTERISTICS*

Model	Time Delay	Steps	Impedance (Ohms)	Rise Time	Attenuation	Max. Input (Volts)
V203	0 .5 μsec	4.2 nsec	580	35 nsec	.5 db	500
V226	0-120 nsec	1 nsec	100	15 nsec	.5 db	500
V227	0-0.3 μsec	2.5 nsec	100	25 nsec	1 db	500
V228	0-0.3 μsec	2.5 nsec	5000	40 nsec	2 db	500
V229	0-1.2 μsec	10 nsec	2500	150 nsec	1 db	500
V230	0-3.0 μsec	25 nsec	1000	250 nsec	1 db	500
V231	0-12 μsec	100 nsec	250	750 nsec	6 db	300
V710	0-6 μsec	50 nsec	1000	300 nsec	2 db	500
V743	0-.1 μsec	0.833 nsec	75	15 nsec	.5 db	500
V745	0-5 μsec	42 nsec	100	250 nsec	2 db	500

*Characteristics can be varied to suit your needs.

Control Electronics' miniature series of rotary variable delay lines are 1" high and only 3" in dia. These lines are ruggedly constructed and hermetically sealed to provide high relability and a long service life. The delay variation is selected by a 60 position shorting type rotary switch. This shorting feature provides an intermediate delay of ½ step so that the resolution is one part in 120. This switch, designed by Control Electronics, can be motor driven at speeds in excess of 10 rpm, and has been life tested for over 1,000 hours of continuous use.



Model V397

Model	Time Delay	Rise Time	Impedance (Ohms)	Attenuation
V364	0 to .1 μsec	.01 μsec	50	.5 db
V365	0 to .2 μsec	.01 μsec	50	1 db
V390	0 to 3.0 μsec	.25 μsec	750	2 db
V397	0 to 1.2 μsec	.10 μsec	1000	1 db
V440	0 to 1.5 μsec	.15 μsec	500	2 db

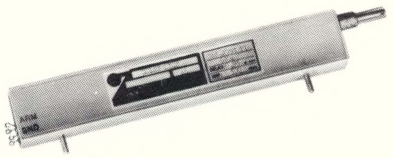
CONTROL ELECTRONICS COMPANY, INC.
153 Florida Street, Farmingdale, L.I., N.Y. 11735 • (516) 694-0125

Variable Delay Lines

- **RESOLUTION:** Better than .001 μsec.
- Can be terminated externally or internally.
- All models are hermetically sealed.
- Can be operated above ground potential.
- **DC WORKING VOLTS:** 500 volts max.
- High impedance tap (variable)

Model	Min. Delay at Max. Delay Setting	Maximum Pulse Rise Time*	Impedance (Ohms)
VR 900	.10 μsec	.025 μsec	100
VR 901	.20 μsec	.030 μsec	200
VR 902	.70 μsec	.080 μsec	500
VR 903	.95 μsec	.090 μsec	500
VR 904	.50 μsec	.055 μsec	750
VR 905	.40 μsec	.040 μsec	1000
VR 906	.25 μsec	.030 μsec	1300
VR 907	.20 μsec	.030 μsec	1500

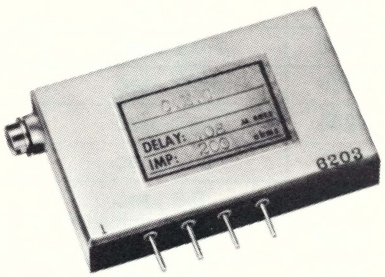
*Rise time at maximum delay setting.



- **ATTENUATION:** Less than 1.5 db.
- **OPERATION:** Continuously variable shaft rotation of 10 turns from zero to maximum delay
- **OUTSIDE DIMENSIONS:** 7½ x ¾ x 1¼
- Locking device optional at no extra charge

Model	Min. Delay at Max. Delay Setting	Maximum Pulse Rise Time*	Impedance (Ohms)
VS 950	0.75 μsec	0.25 μsec	390
VS 951	0.62 μsec	0.206 μsec	470
VS 952	0.50 μsec	0.16 μsec	560
VS 953	0.37 μsec	0.125 μsec	680
VS 954	0.25 μsec	0.085 μsec	1000
VS 955	0.125 μsec	0.042 μsec	1000
VS 956	0.062 μsec	0.021 μsec	1500
VS 957	0.125 μsec	0.042 μsec	1800
VS 958	0.080 μsec	0.027 μsec	200

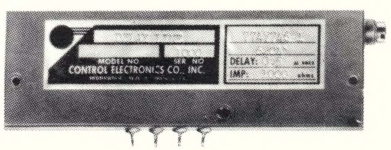
*Rise time at maximum delay setting.



- **ATTENUATION:** 0.5 db max.
- **OPERATION:** Continuously variable shaft rotation of 2½ turns from zero to maximum delay.
- **OUTSIDE DIMENSIONS:** 2⅜ x ½ x 1½

Model	Min. Delay at Max. Delay Setting	Maximum Pulse Rise Time*	Impedance (Ohms)
VL 1000	1.50 μsec	.30 μsec	390
VL 1001	1.25 μsec	.25 μsec	470
VL 1002	1.0 μsec	.20 μsec	560
VL 1003	0.75 μsec	.15 μsec	680
VL 1004	0.50 μsec	.10 μsec	1000
VL 1005	0.25 μsec	.04 μsec	1000
VL 1006	0.125 μsec	.03 μsec	1500
VL 1007	0.25 μsec	.06 μsec	1800

*Rise time at maximum delay setting.



- **ATTENUATION:** Less than 1.0 db.
- **OPERATION:** Continuously variable shaft rotation of 5 turns from zero to maximum delay.
- **OUTSIDE DIMENSIONS:** 4¾ x ½ x 1½

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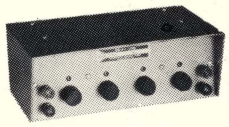
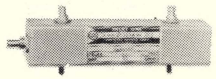
DELAY LINES ELECTROMAGNETIC FIXED - TAPPED - VARIABLE

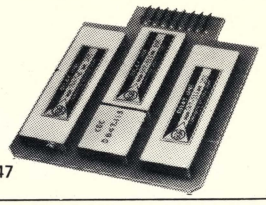
TO MILITARY AND COMMERCIAL SPECIFICATIONS



V492



DV576A



V447-D647

FIXED AND TAPPED DELAYS	Model	Delay microsec.	Rise Time Kc	Step or Tap Delay μsec.	Impedance Ohms	Attenuation db	Size
CODING LINES for Radar Recognition Sets — Tap spacing 1.45 μsec. Accuracy up to ±.02 μsec over Mil. specs. Lumped Constant hermetically sealed units — other tap spacings available.	D110	24.65	.45	1.45	180	6	8 x 4 x 2.5
	D180	25.3	.55	1.45	2200	3	4.37 x 3.25 x 2.12
	D203	20.3	.35	1.45	470	3	10 x 2.5 x 2.25
	D170	20.3	.60	1.45	510	3	4 x 2 x 1
	D231	20.3	.50	1.45	2200	2	4 x 3 x 2
Slab type for printed circuit mounting.	D735	20.3	.50	1.45	500	4	4 x 4 x .5
TYPICAL LUMPED CONSTANT TYPES — Large variety of performance characteristics available. Delay to rise time ratios of up to 175 to 1 — accuracies up to .1% over Mil. Spec. range. Hermetically sealed in metal containers.	D286	.5	.05		1000	1	3.5 x .5 x .5
	D148	10.0	.3		1000	3	2.12 x 2.12 x 4
	D121	15.0	.25		1000	2	2.25 x 3.75 x 4.25
	D754	50	1.5	.5	1000	6	4 x 4 x 2
	D414	100	3.0	1.0	500	4	6 x 3.5 x 3
	D136	200.0	6.0		1000	6	2.12 x 2.12 x 4

AUDIO DELAY AND SONAR LAG LINES	Model	Delay microsec.	3 db B.W. Kc	Step or Tap Delay μsec.	Impedance Ohms	Attenuation db	Size
FIXED AND TAPPED DELAYS of low frequency C.W. signals. High accuracy of delay — Temperature stability 40 PPM/°C, VSWR ±½ db. Phase linearity ±¼%.	DA563	500	30	25	1000	6	7 x 2.5 x 2
	DA301	1000	20	20	600	3	19 x 3.5 x 9
	DA261	5000	5	40	500	3	19 x 5.25 x 10
	DA607	20000	3.5	80	500	1	19 x 7 x 15
	DA177	100000	.2	1000	1000	10	19 x 21 x 12
VARIABLE DELAYS — Decade insertion type switching — provides low signal distortion and input and output impedance of equal value — Other characteristics same as fixed line.	AV175	0 - 150	30	.1	500	6	9 x 3 x 6
	AV287	0 - 500	20	.002	1000	3	19 x 3.5 x 12
	AV206	0 - 1000	20	1.0	600	3	19 x 3.5 x 12
	AV731	0 - 5000	5	.1	1000	2	19 x 5.25 x 15
	AV211	0 - 10000	2.5	.1	600	3	19 x 5.25 x 15

VARIABLE DELAYS		Model	Delay Range microsec.	Rise Time microsec.	Resolution	Impedance Ohms	Attenuation db	Size
One Turn	Movable tap on coil type.	DV252	0 - .06	.02	1/300	330	.5	1.5 dia. x .75
One Turn	60 position switch type.	V168	0 - .2	.15	1/120	100	.5	4 x 4 x 1.25
Multi-Turn	Movable tap on coil type.	DV186	0 - .5	.06	1/1000	500	1	.62 x 1.25 x 6.5
Multi-Turn	Movable tap on coil type.	V172	0 - .55	.08	1/1000	1000	1	.5 x 1.5 x 4.5
Multi-Turn	35 pos. longitudinal switch type.	V703	0 - .95	.07	1/70	500	1	.75 x 1.87 x 7
Multi-Turn	Movable tap on coil type.	V289	0 - 1.0	.2	1/1000	500	1	.5 x 1.5 x 4.5
Multi-Turn	Movable tap on coil type.	DV219	0 - 1.0	.11	1/1000	1000	1	.62 x 1.25 x 6.5
Multi-Turn	30 pos. longitudinal switch type.	V443	0 - 3.0	.25	1/60	200	2	.62 x 2 x 4.5
Multi-Turn	Movable tap on coil type.	V176	0 - 3	.5	1/1000	330	2	.75 x 1.87 x 7
Phase Shifter for up to 200 Kc.		V649	0 - 10	1.8	1/2000	100	4	2 x 2 x 8
INFINITE RESOLUTION — Inductive pick-off — Distributed Constant.		VP162	0 - 7	.3	Infinite	150	30	2 x .75 x 5
		VP333	0 - 12	1.2	Infinite	10000	30	1.37 dia. x 10
INSTRUMENT TYPE. Decade switch variables — Direct in-line numerical display of delay setting — For Lab and equipment use.		V492-1	0 - 20	.5	.01	1000	5	8 x 5 x 3
		V492-2	0 - 30	.7	.01	1000	6	8 x 5 x 3
		V492-3	0 - 10	.3	.01	1000	3	8 x 5 x 3
		V492-4	0 - 100	3.0	.01	1000	3	8 x 5 x 3

ULTRA MINIATURE VARIABLES	Model	Delay Range Nanosec.	Rise Time Nanosec.	Resolution Nanosec.	Impedance Ohms	Attenuation db	Size
NANOSECOND RANGE COMPUTER TRIM-DELAYS. Hermetically sealed in metal cases — "O" ring seal on control shaft — for printed circuit board mounting. Can be cascaded with Series D647.	V447-1	0 - 55	15	.5	150	1	1 x .31 x 1.25
	V447-2	0 - 100	30	.7	50	1	1 x .31 x 1.25
	V447-3	0 - 150	25	.6	150	1	1 x .31 x 2.45
	V447-4	0 - 250	30	1.0	50	1.5	1 x .31 x 2.45
	V447-5	0 - 300	30	.6	150	1.5	1 x .31 x 3.45
	V447-6	0 - 500	60	1.0	50	2	1 x .31 x 3.45

D647 SERIES — MINIATURE MODULES	Delay Choice	Choice Impedance	Delay to Rise Time Ratio	Size
Lumped Constant Printed circuit mounting modules can be cascaded to obtain any desired delay. Case size depends on delay to rise time required. Units are compatible with variable V447 series. *Tapped each 1.45 μsec. for use in coders.	50; 100; 250; 500 and 750 nanosec.	50 ohms	4:1	1 x .31 x 1.25
		150 ohms and 500 ohms	8:1	1 x .31 x 2.20
	1.0; 1.45; 2:90* and 4:35* microsec.		12:1	1 x .31 x 3.45

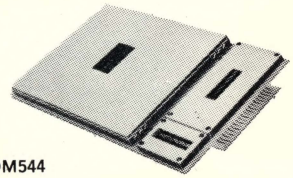
DO IT YOURSELF DELAY ADJUSTMENT	Part No. Imp. 93	Part No. Imp. 330	Section Delay — Nanosec.	Tot. Delay Nanosec.	Rise Time Nanosec.
5 completely separate sections in each module. Cascaded modules allow selection of any desired delay in 5 nanosec. increments. Ideal for experimental work. Size of all modules 1 x .31 x 2.25 for printed circuit mounting.	D740	D741	5; 10; 20; 30; 40	105	15
	D742	D743	50; 100; 200; 300; 400	1050	150
	D744	D745	One Delay	100	15
	D746	D747	One Delay	1000	150

ELECTRICALLY VARIABLE	Model	Delay μsec.	RiseTime μsec.	Distortion %	Impedance Ohms	Attenuation db	Size
Delay is varied by varying a D.C. control voltage. Both L & C are controlled to minimize mismatch.	DEV623A	.03 to .04	.008	10	150	2	2 x 1 x .31
	DEV350	3 to 7	.25	10	1000	3	3.5 x 4 x 4

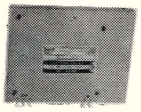
COMPUTER DEVICES CORP.
6 W. 18TH STREET, HUNTINGTON STA., L.I., N.Y.
TEL: 516 – AR1 – 0666, TWX: 516 – 421 – 4235

DELAY LINES *MAGNETOSTRICTIVE FIXED - TAPPED - VARIABLE*

HIGH QUALITY FAST DELIVERY



DM544



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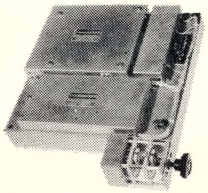

MS574

FIXED DELAYS	Model	Maximum Delay Microsec.	Max. Bit Rate RZ or C.W. Cent. Freq Mc	Size
LONGITUDINAL MODE — Short delays with ±4 μsec trim adjustment; standard temperature coefficient 150 PPM/°C, provided as low as 2 PPM/°C.	ML755	20	3.0	1 x 6 x .375
	ML756	50	1.5	2 x 8 x .375
	ML757	100	1.5	2 x 14 x .375
TORSIONAL MODE — Ultra stable with temperature coefficient less than .5 PPM/°C available. Signal to spurious noise 10:1 dynamic 30:1 static. All units provide a ±4 μsec adjustment. Unsealed or hermetically sealed to meet MIL specs. Package thickness can be reduced by accepting next higher case width and depth.	MT760	250	2.0	6 x 7 x .75
	MT761	500	1.5	3 x 4 x .75
	MT762	1800	1.5	4 x 5 x .75
	MT763	3000	1.2	6 x 7 x .75
	MT764	6000	1.0	8 x 9 x .75
	MT765	10000	1.0	10 x 11 x .75
	MT766	15000	0.7	12 x 13 x .75

SERIAL COMPUTER MEMORIES	Model	Max. Storage Bits RZ	Max. Storage Bits NRZ	Size
COMPLETE UNITY GAIN MEMORY SYSTEMS supplied with transistorized circuitry for operation in any required mode RZ, NRZ or Bi-Polar. These units use the MT760 Delay Line series and have the exceptional stability and high signal to noise ratio of these Delay Lines. Can be cascaded and complete memory stacks are also provided.	MS770	500	1000	8.5 x 7 x .75
	MS771	750	1500	5.5 x 4 x .75
	MS772	2700	5400	6.5 x 5 x .75
	MS773	3600	7200	8.5 x 7 x .75
	MS774	6000	12000	10.5 x 9 x .75
	MS775	10000	20000	12.5 x 11 x .75
	MS776	10000	20000	14.5 x 13 x .75

VARIABLE DELAYS	Model	Delay Range Microsec.	Bit Rate MC	C.W. B.W. MC	Size
SINGLE SHAFT CONTROL provides infinite resolution over a wide range of delays. Ideal for Radar Range Calibration, Simulation or Correlation work. 6 decade switch system provides .1 μsec resolution.	MV781	2 - 30	1.0	.8 - 1.2	1 x 9 x .5
	MV782	30 - 100	1.0	.8 - 1.2	2 x 15 x .5
	MV783	10 - 2000	0.5	.3 - .7	10.0 dia x 4
	MV784	10 - 5000	0.3	.2 - .4	10.0 dia x 8
	MV785	10 - 100000	1.0	.8 - 1.2	19 x 17 x 10.5

COMPLEX C.W. SIGNAL DELAYS	Model	Delay Millisec.	Step Delay Millisec.	C.W. Bandwidth Kc	Size
LONG DELAYS of low frequency. Delay of complex continuous wave signals provided by driving the Delay Lines with an H.F. carrier and AM or FM modulating it with the signal.	MS400	7.0	1.0	0 - 10	13 x 13 x 4
	MS574	10.0	.4	0 - 200	12 x 12 x 3
	MS786	50.0	1.0	0 - 70	19 x 17 x 8.70
	MS787	100.0	.1	0 - 200	19 x 17 x 12.50

MULTIPLE OUTPUT DELAYS	Model	Tot. Delay Microsec.	Number of Taps	Tap Spacing or Location Microsec.	Size
CODE GENERATORS — Provide as many tap positions as desired at any spacing desired (.2 μsec min.). Fast rise times. Also provided with in and out circuitry.	ML790	16	16	1.0	1.75 x 8 x .50
	ML718	15	12	1.25	1.75 x 8 x .50
	ML791	20.3	14	1.45	1.75 x 8 x .50
	ML792	35,000	500	70	19 x 17 x 8.75
MULTIPLE OUTPUTS — Adjustable independently over range ±6 μsec for radar correlation work.	MS283	30.50	4	12, 15, 18, 30	4 x 12 x 1.5
	MS402	48.00	6	2, 5, 8, 12, 14, 48	5 x 10 x 2.75
	MS399	16.35	3	6, 12, 16	4 x 12 x 1.5

	Choice of Delays	Choice of Center Frequency	Bandwidth	Size
MS795 SERIES — Long Delay in the V.H.F. Range. For C.W. applications in communications work. Complete unity gain systems. Size depends on delay.	2 microsec. to 10 milliseconds	5 Mc to 400 Mc	400 Kc	2 x MS770 Series

DISTRIBUTED CONSTANT DELAY LINES

D680 SERIES NANOSECOND MODULES	Delay Choice Nanosec.	Impedance Choice Ohms	Delay to Rise Time Ratio	Size
DISTRIBUTED CONSTANT — Epoxy encapsulated Temperature coefficient less than 120 PPM/°C. Case size depends on delay to rise time ratio.	5, 10, 20, 30 40, 50, 60, 70 80, 90, 100	93, 330 500, 1000	5:1 10:1	.5 x .31 x 2.25 1.0 x .31 x 2.25

D679 SERIES MICROSECOND MODULES	Delay Choice Microsec.	Impedance Choice Ohms	Delay to Rise Time Ratio	Size
DISTRIBUTED CONSTANT — Epoxy encapsulated Temperature coefficient less than 120 PPM/°C — Can be cascaded to obtain longer delays — other delays and impedance available.	.1, .2, .3, .4, .5, .6, .7, .8, .9, 1.0	330, 500 1000	5:1 10:1	.5 x .375 x 4.5 1.0 x .375 x 4.5
	2.0; 4.0; 5.0; 10.0	500, 1000	10:1	1.0 x .5 x 4.5

INFINITE RESOLUTION VARIABLE *REEL DELAY LINE*	Model	Delay Range Nanosec.	3 db B.W. Mc	Resolution	Impedance Ohms	Attenuation Db	Size
DISTRIBUTED CONSTANT — With input and output impedance of equal value — can be spliced directly into interconnecting coaxial cables — IDEAL PHASE SHIFTER. Usable to 200 Mc — Single shaft control — BNC connectors.	DV581	2 - 50	70	Infinite	200	1	1.0 x 1.75 x 5.37
	DV576A	2 - 50	70	Infinite	93	1	1.0 x 1.75 x 5.37
	DELAYS UP TO 100 NANOSEC. AND OTHER IMPEDANCES ALSO AVAILABLE.						

This condensed catalogue information is only meant to serve as a guide. Before finalizing on a design it is most prudent to utilize the experience, ingenuity and up-to-date information of our Engineering Staff. Expert guidance, which can save you hours of searching, is as close to you as your telephone —

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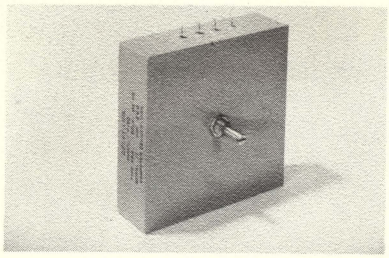
VARIABLE DELAY LINES

STANDARD SWITCH VARIABLES



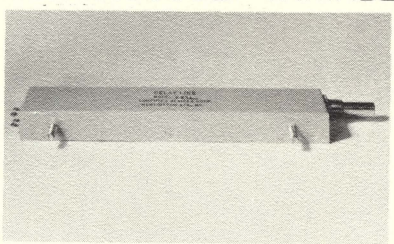
MODEL	DELAY in μ secs	RISE TIME in μ secs	Z_o in OHMS	ATT in db	SIZE
V 108	0-3.0	.25	2700	0.8	6 x 6 x 1.5
V 125	2-5	.40	1000	1.5	6 x 6 x 1.5
V 142	0-12	.80	500	3.0	6 x 6 x 1.5
V 150	0-.5	.035	560	0.5	4 x 4 x 1.25
V 159	0-1.2	.15	2500	1.0	4 x 4 x 1.25
V 165	0-.3	.025	100	0.5	4 x 4 x 1.25
V 168	0-.2	.015	100	0.5	4 x 4 x 1.25

This variable delay line series is constructed using a 60 position printed circuit, rodium plated, commutator type switch. Resolution of 1/120 is obtained by a shorting feature providing an intermediate delay of approximately 1/2 step. These units are suitable for motor driven operation and have been tested for over 1/4 million cycles without any deterioration. Package size depends upon delay range, impedance, and rise time. Three standard cases are available:

6 x 6 x 1.5, 5 x 5 x 1.5, and 4 x 4 x 1.25

The delay rise time ratio is better than 15:1 in most cases. Shaft locks for the 1/4" control shaft, mechanical stops, detents, and special mounting are also supplied on request.

CONTINUOUSLY VARIABLE

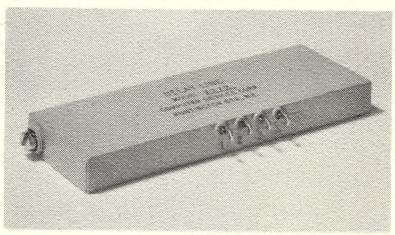


MODEL	DELAY in μ secs	RISE TIME in μ secs	Z_o in OHMS	ATT in db	CASE SIZE
DV 186	0-.5	.06	500	1	.62 x 1.25 x 6.5
DV 190	0-.7	.09	500	1	.62 x 1.25 x 6.5
DV 219	0-1.0	.11	1000	1	.62 x 1.25 x 6.5
V 176	0-3.0	.5	330	2	.75 x 1.87 x 7
V 250	0-10	1.5	50	5	.75 x 1.87 x 7
V 251	0-15	3.0	50	8	.75 x 1.87 x 7

Featuring small control area, these variable delay lines are ideally suited for trim application where numerous lines need to be closely packaged. Delay is controlled by a lead screw providing full delay in 6 to 8 turns of a 1/4" control shaft. Variation from 0 delay to any delay specified up to 15 micro seconds, with resolution of one part in 1000, is available.

Lines are also provided with fixed delays added to the variable sections with little or no increase in case size. Special lines with multiple tap arms are also manufactured.

MINIATURE CONTINUOUSLY VARIABLE



MODEL	DELAY in μ secs	RISE TIME in μ secs	Z_o in OHMS	ATT in db	TEMPERATURE COEFFICIENT
V 172	0-.55	.08	1000	1	50 PPM/C°
DV 270	0-.55	.10	1000	1	200 PPM/C°
V 289	0-1.0	.20	500	1	50 PPM/C°
V 300	0-2.5	.50	180	3	50 PPM/C°
V 319	0-1.5	.30	330	2	50 PPM/C°
DV 290	0-1.0	.30	1000	2	200 PPM/C°

This series is specifically designed for printed circuit application. The miniaturized variable line has all the ruggedized construction features and reliability of other CDC variables. Both lumped and distributed constant lines are offered in this 1/2 x 1 1/2 x 4 1/2 size. A 1/4" control shaft is located on the 1/2 x 1 1/2 surface. The lumped constant type has excellent temperature stability - .5% delay change from -20°C to +80°C while the more economical distributed constant changes 1.5% to 2% over the same range.

All CDC Variable Delay Lines are hermetically sealed in metal cans. A Special "O" ring seal is used on the drive shaft. These delay lines are manufactured to meet all the rugged environmental requirements of military specifications.

Only a few of the available models are listed above to serve as a guide.
Lines to your specific characteristics will be packaged in the above case sizes.

CDC welcomes the opportunity to serve you - to assist in specifying and solving your delay line problems. We offer prompt response to your inquiries -- rapid delivery of samples and quality assured production units.

COMPUTER DEVICES CORP.

TEL: AR 1-0666

6 WEST 18 STREET HUNTINGTON STATION, N.Y.

eem 2350

REEL DELAY LINE INFINITE-RESOLUTION CONSTANT-IMPEDANCE VARIABLE

COMPUTER DEVICES

A DELAY LINE PHASE SHIFTER FOR V.H.F.

Delay Line Has Infinite Resolution

New unit maintains constant impedance at all delay settings

By **E. S. WENDOLKOWSKI**
President, Computer Devices Corp.
Huntington Station, N. Y.

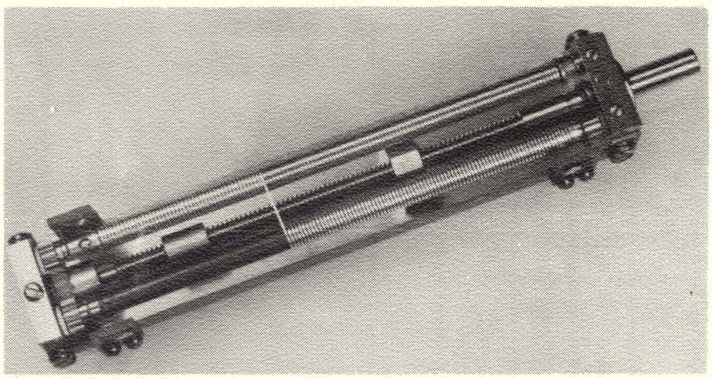
NEW APPROACH provides infinite resolution in a variable delay line; constant impedance is also maintained between input and output terminals at any delay setting.

Delay lines with infinite resolution, as contrasted with those having discrete tap settings, are especially useful in coordinating different waveforms. The new line has been used to correlate data coming from a multielement antenna and to adjust radar signals in time to feed a computer.

The length of this distributed-constant delay line is varied mechanically, eliminating mismatch problems associated with shorted turns in the usual distributor type delay line.

In effect, the new delay line acts as a multi-switch insertion-type delay line, wherein a series of switches disconnect unused portions of the delay line from the circuit. Both the new delay line and the multi-switch type maintain a constant impedance between input and output terminals.

The roller delay line uses the distributed constant principle wherein time delay is a function of inductance and capacitance: $T_d = \sqrt{LC}$. A silvered, then insulated, ceramic core is wrapped with a single-layer coil. The coil is inductive and capacitance is provided between the coil and the silver plating on the ceramic. Each increment of wire wound on the core provides an increment of inductance and capacitance, thereby providing an increment of delay. Variation in delay is accomplished by winding and unwinding wire from the spool.

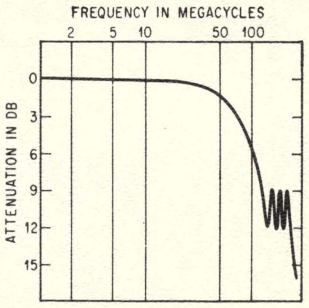


ROLLER-TYPE DELAY LINE varies delay by winding wire from delay-line mandrel (bottom) to shorting mandrel (top). Locknut (right center) provides positive, multi-turn stop to prevent damage to delay-line wire at either end —Fig. 1

Mechanism—The delay line is composed of a delay-line mandrel, a shorting mandrel, and a drive system. The two mandrels are geared such that turning the drive shaft causes wire to wind from delay-line mandrel to shorting mandrel, or visa versa. The shorting mandrel is threaded to control the manner in which the wire is layered onto the delay-line mandrel.

A spring mechanism on the shorting mandrel maintains a constant tension on the wire.

Because the coil of wire is uninsulated, and the shorting mandrel is metal and also uninsulated, any inductance turns taken off the delay-line mandrel are shorted out. The removal of the slightest increment of wire removes a matched increment of capacitance and inductance, thus producing a corresponding change in delay. The delay adjustment is accomplished with infinite resolution at the impedance of the line.



FREQUENCY RESPONSE of roller delay line is flat to 50 Mc. Vswr is less than 0.5 db to 45 Mc and less than 1 db from 45 Mc to 75 Mc. Beyond 75 Mc, vswr is still ± 3 db—Fig. 2

Delay Line—The delay-line shown in Fig. 1 has a delay range of 0 to 50 nanoseconds, an impedance of 100 ohms, and a frequency response that is flat to 50 megacycles (Fig. 2). Full delay excursion is achieved in 60 turns of the control shaft. Delay lines with delays up to 100 nanoseconds have been produced in the same 1 × 1¼ × 5½-inch package size. Different delays and impedances are achieved by adjusting the thickness of the dielectric, changing wire size, changing pitch, and by varying the diameter and length of the mandrels.

Application—The new units are most useful where a delay trim adjustment between units of an existing system are required.

The constant impedance feature permits the delay line to be directly inserted into the interconnecting coaxial cables of the system without system modification or degradation.

At vhf, the line provides a means for introducing a phase shift at any frequency up to 200 Mc.

Extremely accurate phase settings can be made due to the infinite resolution feature of the roller delay line.

THE ROLLER DELAY LINE in effect simulates a varying length of coaxial cable and can be spliced directly into a circuit without impedance mismatch. Its anti-backlash features provide accurate resetability and exceptional shaft angle to delay linearity.

Standard Roller Lines are designed for hand operation and should not be motor driven at speeds of over 150 RPM. Ruggardized versions for higher speed operations are provided on special order.

The listing of standard models on the back of this sheet is only indicative of the characteristics that can be provided. All models shown are provided in any case or terminal configuration on request.

Longer delays and different impedances are provided in larger case sizes on special order.

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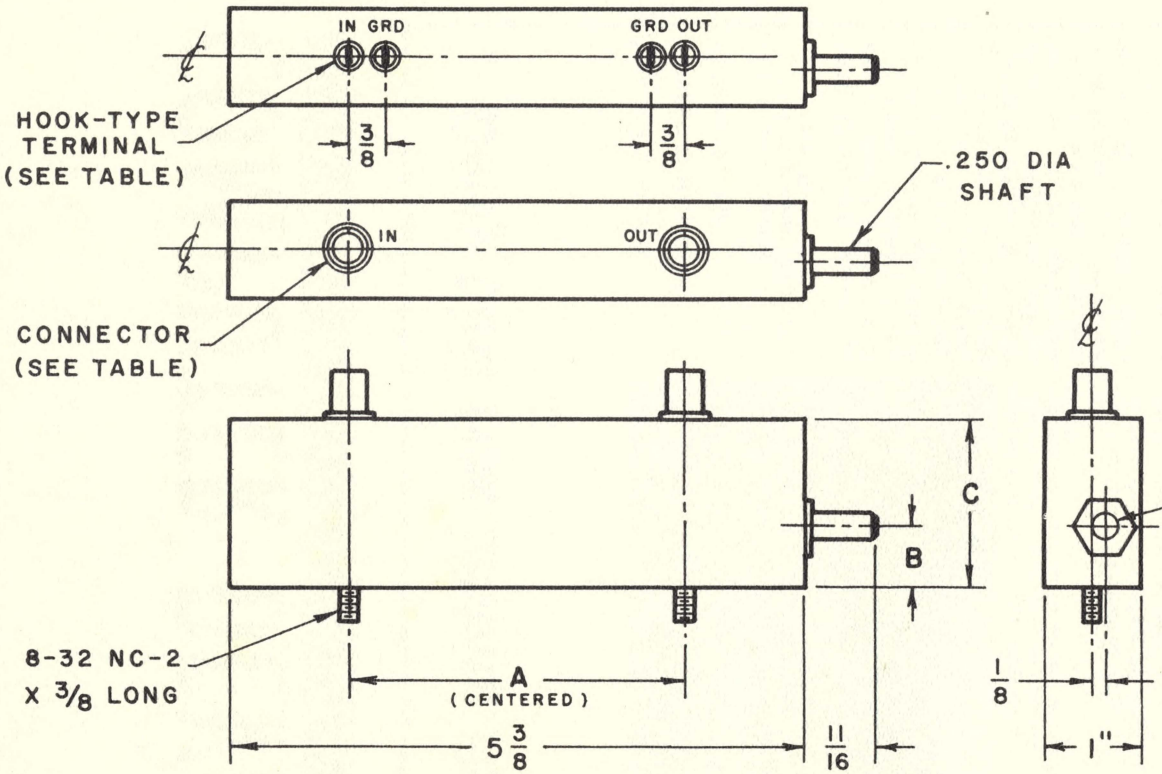
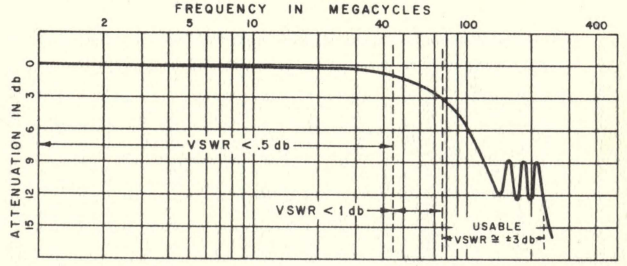
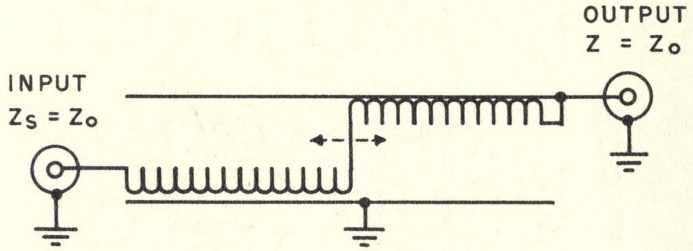
6 W. 18TH STREET, HUNTINGTON STA., L.I., N.Y.
TEL: 516 – AR1–0666, TWX: 516 – 421–4235





TYPICAL AMPLITUDE vs FREQUENCY

MODELS DV580-1 AND DV520-1 HAVE SLOTTED .250 DIA SHAFTS WITH 3/8-32 THREADED BUSHING. SHAFT LOCK CAN BE PROVIDED.



CIRCUIT DIAGRAM

NOTE: ALL MODELS, HERMETICALLY SEALED METAL CASES WITH GRAY LACQUER FINISH.

TABLE OF ELECTRICAL SPECIFICATIONS
(AND CORRESPONDING DIMENSIONS)

MODEL	DV575	DV580	DV581	DV576	DV580-1	DV520
DELAY RANGE NANOSECONDS	2 TO 25	2 TO ~~25~~ 50	2 TO 50	2 TO 50	2 TO ~~50~~ 25	2 TO 50
FREQ. RESPONSE MC MINIMUM	70	70	70	70	70	70
INSERTION LOSS DB	1	1	1	1	1	1
IMPEDANCE INPUT & OUTPUT (OHMS)	200	100	200	93	50	93
DELAY PER TURN NANOSECONDS	0.42	0.84	0.55	0.84	0.84	0.84
CONNECTOR	TERM.	BNC	TERM.	BNC	TSM	TSM
DIMENSION A	3.37	3.37	3.37	3.37	3.25	3.25
DIMENSION B	11/16	11/16	11/16	11/16	5/8	5/8
DIMENSION C	1 3/4	1 3/4	1 3/4	1 3/4	1 1/4	1 1/4

DELAY LINE, VARIABLE
CONSTANT IMPEDANCE
INFINITE RESOLUTION

COMPUTER DEVICES CORP.
6 WEST 18 TH ST.
HUNTINGTON STA., N.Y.

SCALE 1/2 = 1	DWN Rnk 9/25/63	A	57502	
APPVD E.W.	CHKD K. Dunne	SIZE	DWG NO.	REV.