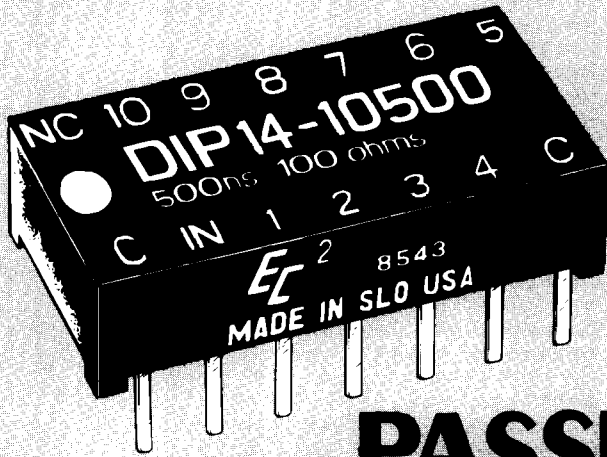


# EC<sup>2</sup>



## PASSIVE DELAY LINE

*low profile*

**DIP**

**LUMPED  
CONSTANT**

**DELAY LINE**

- Analog input and outputs
- Delays stable and precise
- 14-pin DIP package (.200 high)
- Available in delays from 10ns to 1000ns
- Ten (10) equally-spaced taps
- Available in impedances of 50, 100, 200, 350 and 500 ohms
- Fast rise times on all outputs

## design notes

The "DIP14 series" Lumped Constant Passive Delay Lines developed by Engineered Components Company have been designed to provide precise delays for analog delay line applications. These delay lines provide excellent delay accuracy, low DCR, low attenuation, low distortion and fast rise times on all outputs.

These delay lines are offered in 130 models with delays from 10 to 1000ns and with taps at 10% increments of total delay. Delay time is measured at the 50% point on the leading edge. Accuracies are maintained as shown under "Operating Characteristics." Temperature coefficient of delay is less than 75 ppm/°C over the operating temperature range of -55 to +125°C.

"DIP14 series" LC delay lines are intended for use in most analog applications; they are also compatible with the low signal levels of TTL and ECL. These delay lines find extensive use in providing the required delay timing functions necessary in radar, computer, communication, testing and instrument applications.

Construction of the "DIP14 series" utilizes miniature toroidal inductors and monolithic ceramic capacitors to provide fast rise times and the utmost in miniaturization and reliability. The MTBF on these delay lines, when calculated per MIL-HDBK-217, for a 50°C ground fixed environment and with 5V DC applied, is in excess of 13 million hours.

The "DIP14 series" delay lines are packaged in a 14-pin DIP housing, molded of flame-proof Diallyl Phthalate per MIL-M-14, Type SDG-F. These delay lines are designed to meet the applicable portions of MIL-D-23859 and they are capable of meeting the environmental requirements of MIL-STD-202 for moisture resistance, vibration, temperature cycling, humidity and life. Flat metal leads meet the solderability requirements of MIL-STD-202, Method 208. Corner standoffs on the housing provide positive standoff from the printed circuit board to permit solder-fillet formation and flush cleaning of solder-flux residues for improved reliability.

Marking consists of manufacturer's name, logo (EC<sup>2</sup>), part number, terminal identification and date code of manufacture. All marking is applied by silk screen process using white epoxy paint in accordance with MIL-STD-130, to meet the permanency of identification required by MIL-STD-202, Method 215.

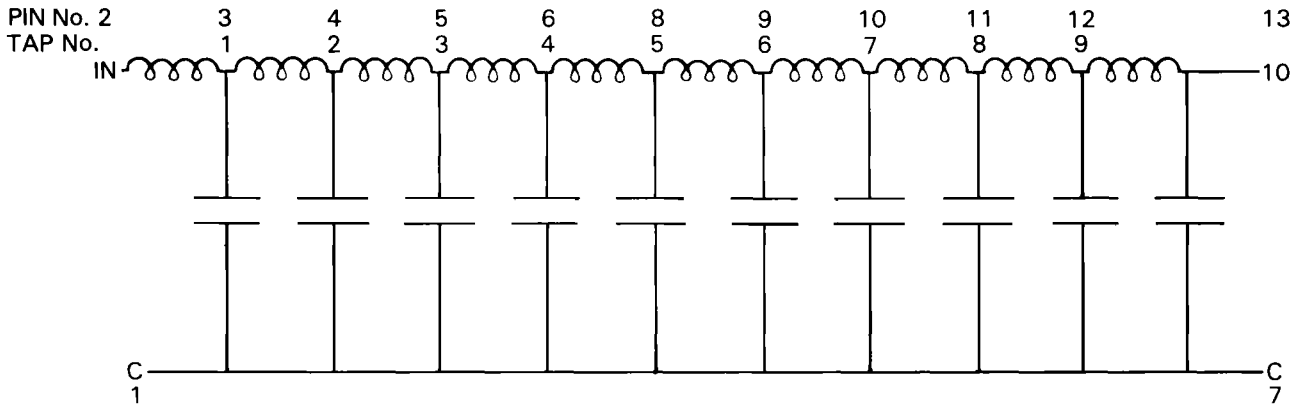
# EC<sup>2</sup>

**engineered components company**

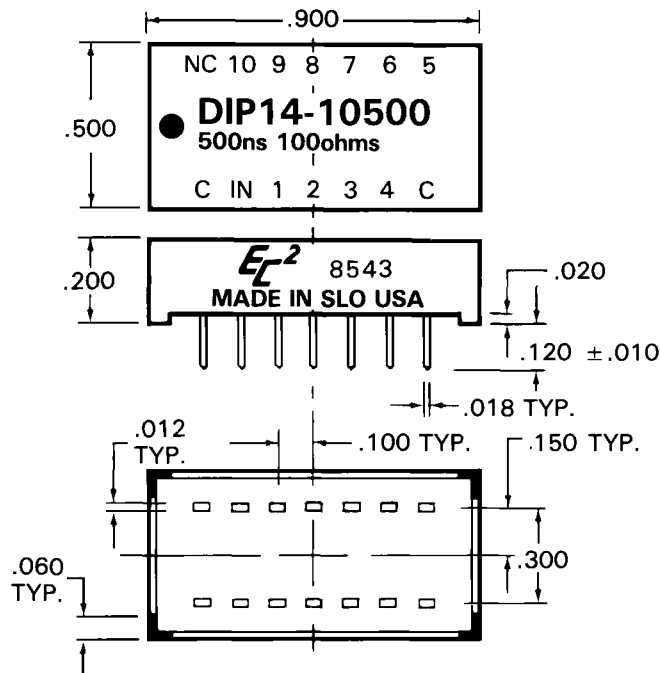
3580 Sacramento Drive, P. O. Box 8121, San Luis Obispo, CA 93403-8121

Phone: (805) 544-3800

BLOCK DIAGRAM IS SHOWN BELOW



MECHANICAL DETAIL IS SHOWN BELOW



TEST CONDITIONS

1. All measurements are made at 25°C.
2. Test procedures in accordance with MIL-D-23859.

OPERATING CHARACTERISTICS

Total delay tolerance:	See tabulations
Tap delay tolerance:	See tabulations $\phi$
Rise time, maximum:	See tabulations
Impedance:	50, 100, 200, 350 and 500 ohms
Impedance tolerance:	± 10%
DC resistance, maximum:	See tabulations
Attenuation, maximum:	1.0 db
Distortion, maximum:	± 5%
Overshoot, maximum:	10%
Working voltage, maximum:	25V DC
Dielectric strength:	100V DC @ 50ua
Insulation resistance, minimum:	10,000 megohms @ 100V DC

$\phi$  Referenced from input of delay line.

**PART NUMBER TABLE**

Part Number	Delay Time (ns)	Rise Time (ns)	∅ Tap Delay (ns)	Impedance (ohms)	DCR (ohms)	Part Number	Delay Time (ns)	Rise Time (ns)	∅ Tap Delay (ns)	Impedance (ohms)	DCR (ohms)
DIP14-510	10 ± 0.5	3.0	1.0 ± 0.5	↑ 50	1.0	DIP14-2010	10 ± 0.5	4.0	1.0 ± 0.5	↑ 200	2.0
DIP14-515	15 ± 1.0	4.0	1.5 ± 0.5		1.0	DIP14-2015	15 ± 1.0	4.5	1.5 ± 0.5		2.5
DIP14-520	20 ± 1.2	5.0	2.0 ± 0.5		1.0	DIP14-2020	20 ± 1.2	5.5	2.0 ± 0.5		2.8
DIP14-525	25 ± 1.5	5.5	2.5 ± 0.6		1.5	DIP14-2025	25 ± 1.5	6.2	2.5 ± 0.6		3.0
DIP14-530	30 ± 1.5	7.0	3.0 ± 0.6		1.5	DIP14-2030	30 ± 1.5	7.8	3.0 ± 0.6		3.5
DIP14-540	40 ± 2.0	8.5	4.0 ± 0.8		1.8	DIP14-2040	40 ± 2.0	9.0	4.0 ± 0.8		3.5
DIP14-550	50 ± 2.5	10.0	5.0 ± 1.0		2.0	DIP14-2050	50 ± 2.5	11.0	5.0 ± 1.0		3.5
DIP14-560	60 ± 3.0	11.5	6.0 ± 1.2		2.5	DIP14-2060	60 ± 3.0	12.0	6.0 ± 1.2		3.5
DIP14-570	70 ± 3.5	13.0	7.0 ± 1.2		2.8	DIP14-2070	70 ± 3.5	14.0	7.0 ± 1.2		3.5
DIP14-580	80 ± 4.0	14.5	8.0 ± 1.6		3.0	DIP14-2080	80 ± 4.0	16.0	8.0 ± 1.6		4.0
DIP14-590	90 ± 4.5	16.0	9.0 ± 1.8		3.3	DIP14-2090	90 ± 4.5	18.0	9.0 ± 1.8		4.0
DIP14-5100	100 ± 5.0	18.0	10.0 ± 2.0		3.5	DIP14-20100	100 ± 5.0	20.0	10.0 ± 2.0		4.0
DIP14-5110	110 ± 5.5	20.0	11.0 ± 2.0		3.0	DIP14-20110	110 ± 5.5	26.0	11.0 ± 2.0		4.0
DIP14-5120	120 ± 5.5	22.0	12.0 ± 2.2		3.0	DIP14-20120	120 ± 5.5	28.0	12.0 ± 2.2		4.0
DIP14-5130	130 ± 6.0	23.0	13.0 ± 2.4		3.0	DIP14-20130	130 ± 6.0	30.0	13.0 ± 2.4		4.0
DIP14-5140	140 ± 6.0	24.0	14.0 ± 2.4		3.0	DIP14-20140	140 ± 6.0	32.0	14.0 ± 2.4		4.0
DIP14-5150	150 ± 6.5	26.0	15.0 ± 2.5		3.0	DIP14-20150	150 ± 6.5	32.0	15.0 ± 2.5		4.0
DIP14-5160	160 ± 8.0	28.0	16.0 ± 2.6		3.0	DIP14-20160	160 ± 8.0	36.0	16.0 ± 2.6		4.0
DIP14-5170	170 ± 8.5	30.0	17.0 ± 2.6		3.0	DIP14-20170	170 ± 8.5	38.0	17.0 ± 2.6		4.0
DIP14-5180	180 ± 9.0	30.0	18.0 ± 2.8		3.0	DIP14-20180	180 ± 9.0	40.0	18.0 ± 2.8		4.0
DIP14-5190	190 ± 9.5	32.0	19.0 ± 2.8	3.0	DIP14-20190	190 ± 9.5	42.0	19.0 ± 2.8	4.0		
DIP14-5200	200 ± 10.0	34.0	20.0 ± 3.0	3.0	DIP14-20200	200 ± 10.0	44.0	20.0 ± 3.0	4.0		
DIP14-5250	250 ± 12.0	42.0	25.0 ± 3.5	3.5	DIP14-20250	250 ± 12.0	52.0	25.0 ± 3.5	4.0		
DIP14-5300	300 ± 14.0	50.0	30.0 ± 3.5	3.5	DIP14-20300	300 ± 14.0	62.0	30.0 ± 3.5	4.0		
DIP14-5350	350 ± 16.0	58.0	35.0 ± 3.5	4.0	DIP14-20350	350 ± 16.0	68.0	35.0 ± 3.5	4.0		
DIP14-5400	400 ± 18.0	64.0	40.0 ± 3.5	4.5	DIP14-20400	400 ± 18.0	74.0	40.0 ± 3.5	5.0		
DIP14-5450	450 ± 19.0	72.0	45.0 ± 3.5	4.5	DIP14-20450	450 ± 19.0	82.0	45.0 ± 3.5	5.0		
DIP14-5500	500 ± 20.0	82.0	50.0 ± 3.5	5.0	DIP14-20500	500 ± 20.0	90.0	50.0 ± 3.5	5.0		
DIP14-1010	10 ± 0.5	3.0	1.0 ± 0.5	↑ 100	1.5	DIP14-3520	20 ± 1.2	10.0	2.0 ± 0.5	↑ 350	3.0
DIP14-1015	15 ± 1.0	4.0	1.5 ± 0.5		1.5	DIP14-3525	25 ± 1.5	12.0	2.5 ± 0.6		3.0
DIP14-1020	20 ± 1.2	4.5	2.0 ± 0.5		2.0	DIP14-3530	30 ± 1.5	14.0	3.0 ± 0.6		3.0
DIP14-1025	25 ± 1.5	5.0	2.5 ± 0.6		2.2	DIP14-3540	40 ± 2.0	14.0	4.0 ± 0.8		3.0
DIP14-1030	30 ± 1.5	6.0	3.0 ± 0.6		2.5	DIP14-3550	50 ± 2.5	16.0	5.0 ± 1.0		3.0
DIP14-1040	40 ± 2.0	7.5	4.0 ± 0.8		2.8	DIP14-3560	60 ± 3.0	18.0	6.0 ± 1.2		3.0
DIP14-1050	50 ± 2.5	9.5	5.0 ± 1.0		3.0	DIP14-3570	70 ± 3.5	20.0	7.0 ± 1.2		3.0
DIP14-1060	60 ± 3.0	12.0	6.0 ± 1.2		2.5	DIP14-3580	80 ± 4.0	22.0	8.0 ± 1.6		3.0
DIP14-1070	70 ± 3.5	14.0	7.0 ± 1.2		2.8	DIP14-3590	90 ± 4.5	24.0	9.0 ± 1.8		3.5
DIP14-1080	80 ± 4.0	16.0	8.0 ± 1.6		3.0	DIP14-35100	100 ± 5.0	26.0	10.0 ± 2.0		3.5
DIP14-1090	90 ± 4.5	18.0	9.0 ± 1.8		3.0	DIP14-35110	110 ± 5.5	28.0	11.0 ± 2.0		3.5
DIP14-10100	100 ± 5.0	18.0	10.0 ± 2.0		3.0	DIP14-35120	120 ± 5.5	30.0	12.0 ± 2.2		3.5
DIP14-10110	110 ± 5.5	20.0	11.0 ± 2.0		3.2	DIP14-35130	130 ± 6.0	30.0	13.0 ± 2.4		4.0
DIP14-10120	120 ± 5.5	22.0	12.0 ± 2.2		3.2	DIP14-35140	140 ± 6.0	32.0	14.0 ± 2.4		4.0
DIP14-10130	130 ± 6.0	24.0	13.0 ± 2.4		3.2	DIP14-35150	150 ± 6.5	34.0	15.0 ± 2.5		4.0
DIP14-10140	140 ± 6.0	26.0	14.0 ± 2.4		3.2	DIP14-35160	160 ± 8.0	36.0	16.0 ± 2.6		4.0
DIP14-10150	150 ± 6.5	26.0	15.0 ± 2.5		3.5	DIP14-35170	170 ± 8.5	38.0	17.0 ± 2.6		4.0
DIP14-10160	160 ± 8.0	28.0	16.0 ± 2.6		3.5	DIP14-35180	180 ± 9.0	40.0	18.0 ± 2.8		4.0
DIP14-10170	170 ± 8.5	30.0	17.0 ± 2.6		4.0	DIP14-35190	190 ± 9.5	42.0	19.0 ± 2.8		4.5
DIP14-10180	180 ± 9.0	32.0	18.0 ± 2.8		4.0	DIP14-35200	200 ± 10.0	44.0	20.0 ± 3.0		4.5
DIP14-10190	190 ± 9.5	34.0	19.0 ± 2.8	4.0	DIP14-35250	250 ± 12.0	52.0	25.0 ± 3.5	5.0		
DIP14-10200	200 ± 10.0	36.0	20.0 ± 3.0	4.0							
DIP14-10250	250 ± 12.0	50.0	25.0 ± 3.5	4.0	DIP14-5025	25 ± 1.5	12.0	2.5 ± 0.5	↑ 500	3.0	
DIP14-10300	300 ± 14.0	56.0	30.0 ± 3.5	4.0	DIP14-5030	30 ± 1.5	14.0	3.0 ± 0.6		3.0	
DIP14-10350	350 ± 16.0	62.0	35.0 ± 3.5	4.0	DIP14-5040	40 ± 2.0	16.0	4.0 ± 0.8		3.0	
DIP14-10400	400 ± 18.0	76.0	40.0 ± 3.5	4.0	DIP14-5050	50 ± 2.5	18.0	5.0 ± 1.0		3.0	
DIP14-10450	450 ± 19.0	84.0	45.0 ± 3.5	4.0	DIP14-5060	60 ± 3.0	20.0	6.0 ± 1.2		3.0	
DIP14-10500	500 ± 20.0	90.0	50.0 ± 3.5	4.0	DIP14-5070	70 ± 3.5	22.0	7.0 ± 1.2		3.5	
DIP14-10600	600 ± 22.0	115.0	60.0 ± 3.8	4.0	DIP14-5080	80 ± 4.0	22.0	8.0 ± 1.6		3.5	
DIP14-10700	700 ± 24.0	130.0	70.0 ± 4.0	4.5	DIP14-5090	90 ± 4.5	24.0	9.0 ± 1.8		3.5	
DIP14-10800	800 ± 26.0	150.0	80.0 ± 4.2	4.5	DIP14-50100	100 ± 5.0	26.0	10.0 ± 2.0		4.0	
DIP14-10900	900 ± 28.0	160.0	90.0 ± 4.5	5.0	DIP14-50110	110 ± 5.5	28.0	11.0 ± 2.0		4.0	
DIP14-101000	1000 ± 30.0	170.0	100.0 ± 5.0	5.0	DIP14-50120	120 ± 5.5	30.0	12.0 ± 2.2		4.5	
					DIP14-50130	130 ± 6.0	32.0	13.0 ± 2.4		4.5	
					DIP14-50140	140 ± 6.0	34.0	14.0 ± 2.4		4.5	
					DIP14-50150	150 ± 6.5	36.0	15.0 ± 2.5		4.5	
					DIP14-50160	160 ± 8.0	38.0	16.0 ± 2.6		4.5	
					DIP14-50170	170 ± 8.5	40.0	17.0 ± 2.6		5.0	
					DIP14-50180	180 ± 9.0	42.0	18.0 ± 2.8		5.0	
					DIP14-50190	190 ± 9.5	44.0	19.0 ± 2.8		5.0	
					DIP14-50200	200 ± 10.0	46.0	20.0 ± 3.0		5.5	
					DIP14-50250	250 ± 12.0	54.0	25.0 ± 3.5		6.0	

Special delay lines can be readily manufactured with longer or specific delays, impedances, rise times and package configurations for specific applications.

# The Leader in Passive Delay Line and Active Digital Module Technology

**EC<sup>2</sup>** manufactures products in T<sup>2</sup>L Schottky, T<sup>2</sup>L Low Power Schottky, Advanced CMOS, ECL 10,000 and ECL 100K Logic Families.

- LC Passive Delay Lines—fixed, tapped and programmable
- Active Digital Delay Lines—fixed, tapped, multiple and programmable
- Active Digital Delay Modules in SIP, DIP, Standard, Mini-DIP, Thinny-DIP, Hermetically Sealed, Wee DIP, Surface Mount, Leadless Chip, Double and 10 Tap configurations
- Digital Frequency Multiplier Modules
- Pulse Generator Modules and Programmable Pulse Generator Modules
- Noise Filter Modules
- Square Wave Generator Modules
- Memory Timing Modules and Four Phase Clock Modules
- Pixel Clock Generator Modules
- Manchester Encoder and Decoder Modules
- Memory Backup Power Modules

All **EC<sup>2</sup>** products are *always* manufactured of the finest materials obtainable, 100% tested and

**MADE IN USA**