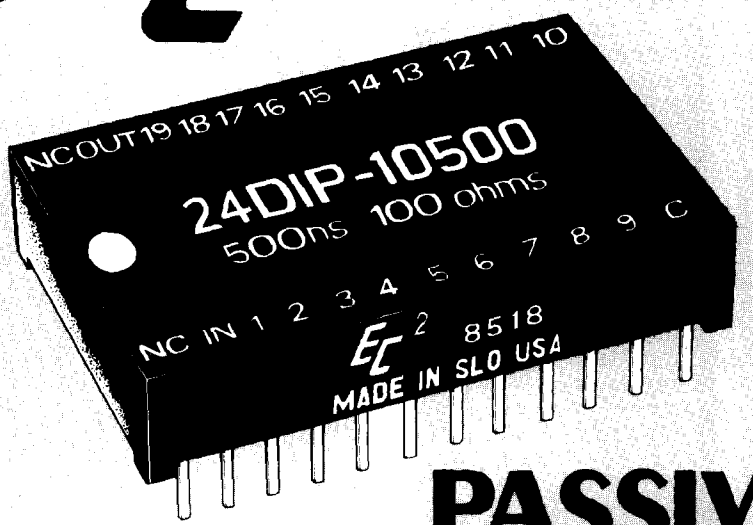
EC²



low profile

DIP

LUMPED CONSTANT PASSIVE DELAY LINE

- **Analog input and outputs**
- **Delays stable and precise**
- **24—pin DIP package (.225 high)**
- **Available in delays from 20ns to 1000ns**
- **Twenty (20) equally-spaced taps**
- **Available in impedances of 50, 100, 200, 350 and 500 ohms**

design notes

The "24DIP 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 and low distortion.

These delay lines are offered in 116 models with delays from 20 to 1000ns and with taps at 5% 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.

"24DIP 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 "24DIP series" utilizes miniature inductors and monolithic ceramic capacitors to provide 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 "24DIP series" delay lines are packaged in a 24-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 (EC²), 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.

EC² **engineered components company**

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

Phone: (805) 544-3800

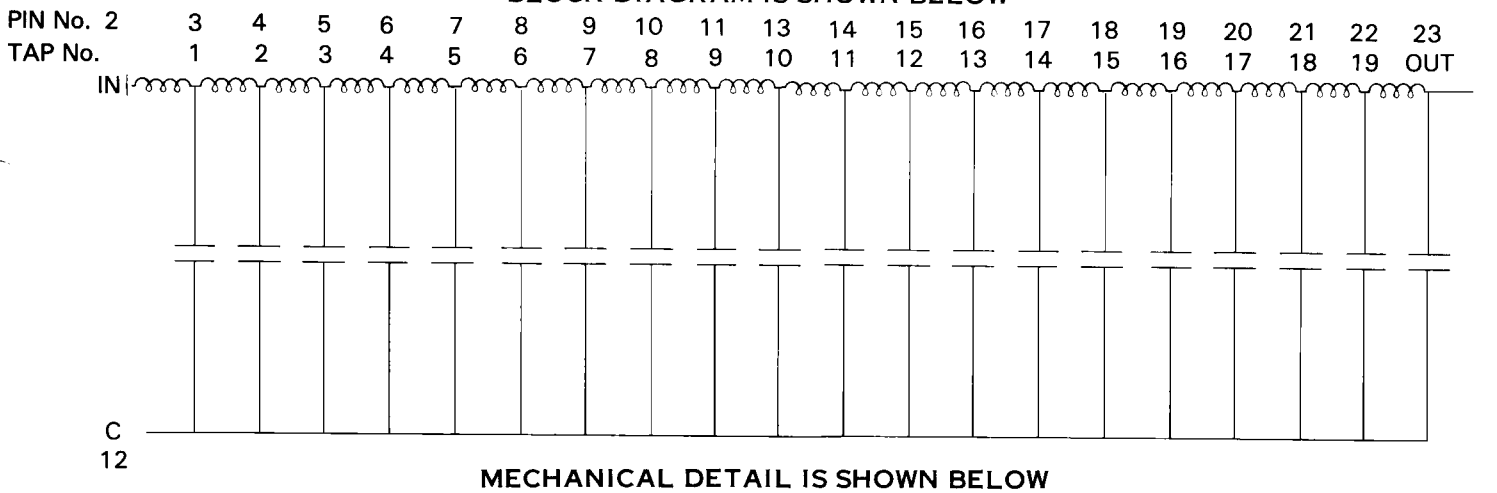
PART NUMBER TABLE

Part Number	Delay Time (ns)	Rise Time (ns)	ϕ Tap Delay (ns)	Impedance (ohms)	DCR (ohms)
24DIP-520	20 ± 1.2	5.0	1.0 ±0.5	50	3.0
24DIP-530	30 ± 1.5	7.0	1.5 ±0.5		3.0
24DIP-540	40 ± 2.0	9.0	2.0 ±0.5		3.0
24DIP-550	50 ± 2.5	10.0	2.5 ±0.6		3.0
24DIP-560	60 ± 3.0	12.0	3.0 ±0.6		5.0
24DIP-580	80 ± 4.0	15.0	4.0 ±0.8		5.0
24DIP-5100	100 ± 5.0	19.0	5.0 ±1.0		5.0
24DIP-5120	120 ± 5.5	21.0	6.0 ±1.2		5.0
24DIP-5140	140 ± 6.0	23.0	7.0 ±1.4		5.0
24DIP-5150	150 ± 7.0	25.0	7.5 ±1.5		5.0
24DIP-5160	160 ± 8.0	26.0	8.0 ±1.6		5.0
24DIP-5180	180 ± 9.0	28.0	9.0 ±1.8		5.0
24DIP-5200	200 ±10.0	30.0	10.0 ±2.0		5.0
24DIP-5250	250 ±12.0	36.0	12.5 ±2.2		5.0
24DIP-5300	300 ±14.0	44.0	15.0 ±2.5		5.0
24DIP-5350	350 ±16.0	50.0	17.5 ±2.7		5.0
24DIP-5400	400 ±18.0	60.0	20.0 ±3.0		5.0
24DIP-5450	450 ±19.0	62.0	22.5 ±3.2		5.0
24DIP-5500	500 ±20.0	65.0	25.0 ±3.5		5.0
24DIP-5600	600 ±22.0	80.0	30.0 ±3.8		5.0
24DIP-5700	700 ±24.0	90.0	35.0 ±4.0		7.0
24DIP-5800	800 ±26.0	100.0	40.0 ±4.2		7.0
24DIP-5900	900 ±28.0	110.0	45.0 ±4.5		7.0
24DIP-51000	1000 ±30.0	140.0	50.0 ±5.0	50	7.0
24DIP-1020	20 ± 1.2	5.0	1.0 ±0.5	100	5.0
24DIP-1030	30 ± 1.5	7.0	1.5 ±0.5		5.0
24DIP-1040	40 ± 2.0	9.0	2.0 ±0.5		5.0
24DIP-1050	50 ± 2.5	10.0	2.5 ±0.6		5.0
24DIP-1060	60 ± 3.0	12.0	3.0 ±0.6		5.0
24DIP-1080	80 ± 4.0	16.0	4.0 ±0.8		5.0
24DIP-10100	100 ± 5.0	18.0	5.0 ±1.0		5.0
24DIP-10120	120 ± 5.5	20.0	6.0 ±1.2		5.0
24DIP-10140	140 ± 6.0	22.0	7.0 ±1.4		5.0
24DIP-10150	150 ± 7.0	23.0	7.5 ±1.5		5.0
24DIP-10160	160 ± 8.0	25.0	8.0 ±1.6		5.0
24DIP-10180	180 ± 9.0	27.0	9.0 ±1.8		5.0
24DIP-10200	200 ±10.0	30.0	10.0 ±2.0		5.0
24DIP-10250	250 ±12.0	36.0	12.5 ±2.2		5.0
24DIP-10300	300 ±14.0	42.0	15.0 ±2.5		7.0
24DIP-10350	350 ±16.0	50.0	17.5 ±2.7		7.0
24DIP-10400	400 ±18.0	55.0	20.0 ±3.0		7.0
24DIP-10450	450 ±19.0	62.0	22.5 ±3.2		7.0
24DIP-10500	500 ±20.0	70.0	25.0 ±3.5		7.0
24DIP-10600	600 ±22.0	85.0	30.0 ±3.8		7.0
24DIP-10700	700 ±24.0	100.0	35.0 ±4.0		9.0
24DIP-10800	800 ±26.0	115.0	40.0 ±4.2		9.0
24DIP-10900	900 ±28.0	130.0	45.0 ±4.5		9.0
24DIP-101000	1000 ±30.0	140.0	50.0 ±5.0	100	9.0
24DIP-2020	20 ± 1.2	5.0	1.0 ±0.5	200	5.0
24DIP-2030	30 ± 1.5	7.0	1.5 ±0.5		5.0
24DIP-2040	40 ± 2.0	9.0	2.0 ±0.5		5.0
24DIP-2050	50 ± 2.5	10.0	2.5 ±0.6		5.0
24DIP-2060	60 ± 3.0	12.0	3.0 ±0.6		5.0
24DIP-2080	80 ± 4.0	16.0	4.0 ±0.8		5.0
24DIP-20100	100 ± 5.0	18.0	5.0 ±1.0		5.0
24DIP-20120	120 ± 5.5	20.0	6.0 ±1.2		5.0
24DIP-20140	140 ± 6.0	24.0	7.0 ±1.4		7.0
24DIP-20150	150 ± 7.0	25.0	7.5 ±1.5		7.0
24DIP-20160	160 ± 8.0	26.0	8.0 ±1.6		7.0
24DIP-20180	180 ± 9.0	28.0	9.0 ±1.8		7.0
24DIP-20200	200 ±10.0	30.0	10.0 ±2.0		7.0
24DIP-20250	250 ±12.0	38.0	12.5 ±2.2		7.0
24DIP-20300	300 ±14.0	44.0	15.0 ±2.5		9.0
24DIP-20350	350 ±16.0	50.0	17.5 ±2.7		9.0
24DIP-20400	400 ±18.0	58.0	20.0 ±3.0		9.0
24DIP-20450	450 ±19.0	65.0	22.5 ±3.2		9.0
24DIP-20500	500 ±20.0	72.0	25.0 ±3.5		12.0
24DIP-20600	600 ±22.0	85.0	30.0 ±3.8		12.0
24DIP-20700	700 ±24.0	100.0	35.0 ±4.0		12.0
24DIP-20800	800 ±26.0	115.0	40.0 ±4.2		14.0
24DIP-20900	900 ±28.0	130.0	45.0 ±4.5		14.0
24DIP-201000	1000 ±30.0	160.0	50.0 ±5.0	200	14.0

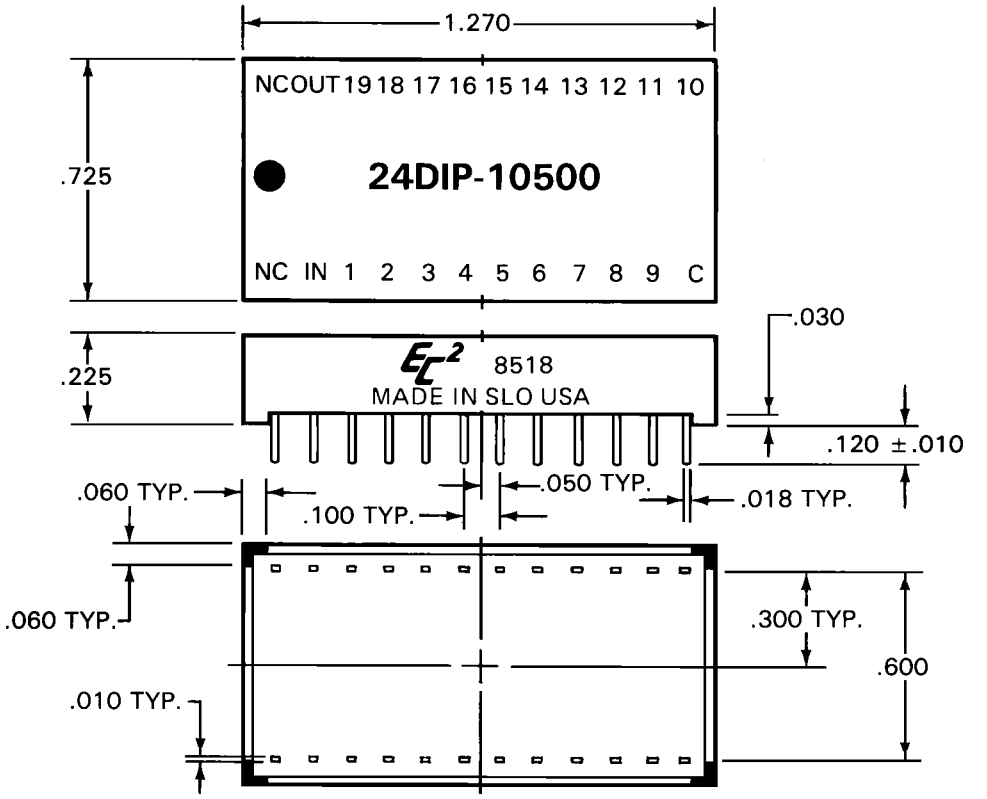
Part Number	Delay Time (ns)	Rise Time (ns)	ϕ Tap Delay (ns)	Impedance (ohms)	DCR (ohms)
24DIP-3540	40 ± 2.0	11.0	2.0 ±0.5	350	7.0
24DIP-3550	50 ± 2.5	13.0	2.5 ±0.6		7.0
24DIP-3560	60 ± 3.0	15.0	3.0 ±0.6		7.0
24DIP-3580	80 ± 4.0	18.0	4.0 ±0.8		7.0
24DIP-35100	100 ± 5.0	22.0	5.0 ±1.0		7.0
24DIP-35120	120 ± 5.5	25.0	6.0 ±1.2		7.0
24DIP-35140	140 ± 6.0	28.0	7.0 ±1.4		9.0
24DIP-35150	150 ± 7.0	29.0	7.5 ±1.5		9.0
24DIP-35160	160 ± 8.0	31.0	8.0 ±1.6		9.0
24DIP-35180	180 ± 9.0	34.0	9.0 ±1.8		9.0
24DIP-35200	200 ±10.0	36.0	10.0 ±2.0		9.0
24DIP-35250	250 ±12.0	49.0	12.5 ±2.2		12.0
24DIP-35300	300 ±14.0	52.0	15.0 ±2.5		12.0
24DIP-35350	350 ±16.0	60.0	17.5 ±2.7		12.0
24DIP-35400	400 ±18.0	65.0	20.0 ±3.0		12.0
24DIP-35450	450 ±19.0	70.0	22.5 ±3.2		18.0
24DIP-35500	500 ±20.0	78.0	25.0 ±3.5		18.0
24DIP-35600	600 ±22.0	90.0	30.0 ±3.8		24.0
24DIP-35700	700 ±24.0	105.0	35.0 ±4.0		24.0
24DIP-35800	800 ±26.0	115.0	40.0 ±4.2		24.0
24DIP-35900	900 ±28.0	130.0	45.0 ±4.5		30.0
24DIP-351000	1000 ±30.0	140.0	50.0 ±5.0	350	30.0
24DIP-5040	40 ± 2.0	14.0	2.0 ±0.5	500	7.0
24DIP-5050	50 ± 2.5	16.0	2.5 ±0.6		7.0
24DIP-5060	60 ± 3.0	19.0	3.0 ±0.6		7.0
24DIP-5080	80 ± 4.0	22.0	4.0 ±0.8		7.0
24DIP-50100	100 ± 5.0	26.0	5.0 ±1.0		9.0
24DIP-50120	120 ± 5.5	30.0	6.0 ±1.2		9.0
24DIP-50140	140 ± 6.0	34.0	7.0 ±1.4		9.0
24DIP-50150	150 ± 7.0	35.0	7.5 ±1.5		9.0
24DIP-50160	160 ± 8.0	36.0	8.0 ±1.6		9.0
24DIP-50180	180 ± 9.0	39.0	9.0 ±1.8		12.0
24DIP-50200	200 ±10.0	44.0	10.0 ±2.0		12.0
24DIP-50250	250 ±12.0	50.0	12.5 ±2.2		12.0
24DIP-50300	300 ±14.0	55.0	15.0 ±2.5		12.0
24DIP-50350	350 ±16.0	62.0	17.5 ±2.7		14.0
24DIP-50400	400 ±18.0	72.0	20.0 ±3.0		14.0
24DIP-50450	450 ±19.0	78.0	22.5 ±3.2		24.0
24DIP-50500	500 ±20.0	85.0	25.0 ±3.5		24.0
24DIP-50600	600 ±22.0	95.0	30.0 ±3.8		24.0
24DIP-50700	700 ±24.0	105.0	35.0 ±4.0		30.0
24DIP-50800	800 ±26.0	115.0	40.0 ±4.2		30.0
24DIP-50900	900 ±28.0	130.0	45.0 ±4.5		36.0
24DIP-501000	1000 ±30.0	140.0	50.0 ±5.0	500	36.0

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

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 ϕ
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

ϕReferenced from input of delay line.

The Leader in Passive Delay Line and Active Digital Module Technology

EC² manufactures products in T²L Schottky, T²L 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 EC² products are *always* manufactured of the finest materials obtainable, 100% tested and

MADE IN USA

Catalog No. C/041585R