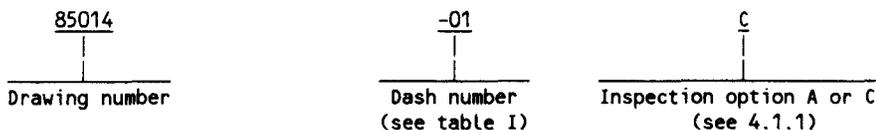




1. SCOPE

1.1 Scope. This drawing describes the requirements for a family of TTL interfaced active delay lines with 14 pins and 10 taps.

1.2 Part or Identifying Number (PIN). The DESC drawing PIN shall be as shown in the following example:



2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standard. The following specifications and standard form a part of this drawing to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

MILITARY

- DOD-D-1000 - Drawing, Engineering and Associated List.
- MIL-M-38510 - Microcircuit, General Specification for.
- MIL-D-83532 - Delay Lines, Active, General Specification for.

STANDARD

MILITARY

- MIL-STD-883 - Test Methods and Procedures for Microelectronics.

(Unless otherwise indicated, copies of federal and military specifications and standards, are available from the standardization documents order desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, this drawing shall take precedence. Nothing in this drawing, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Interpretation. This drawing shall be interpreted in accordance with DOD-D-1000.

3.2 Workmanship. Workmanship shall be in accordance with MIL-D-83532.

3.3 Materials.

3.3.1 Case. Case material shall be molded or encapsulated epoxy and shall conform to MIL-D-83532.

3.3.2 Terminals. Terminal material and finish shall be in accordance with MIL-M-38510.

3.3.3 Microcircuits. Microcircuits shall meet the requirements of MIL-STD-883, level B (minimum).

3.4 Design, construction, and dimensions. See figure 1.

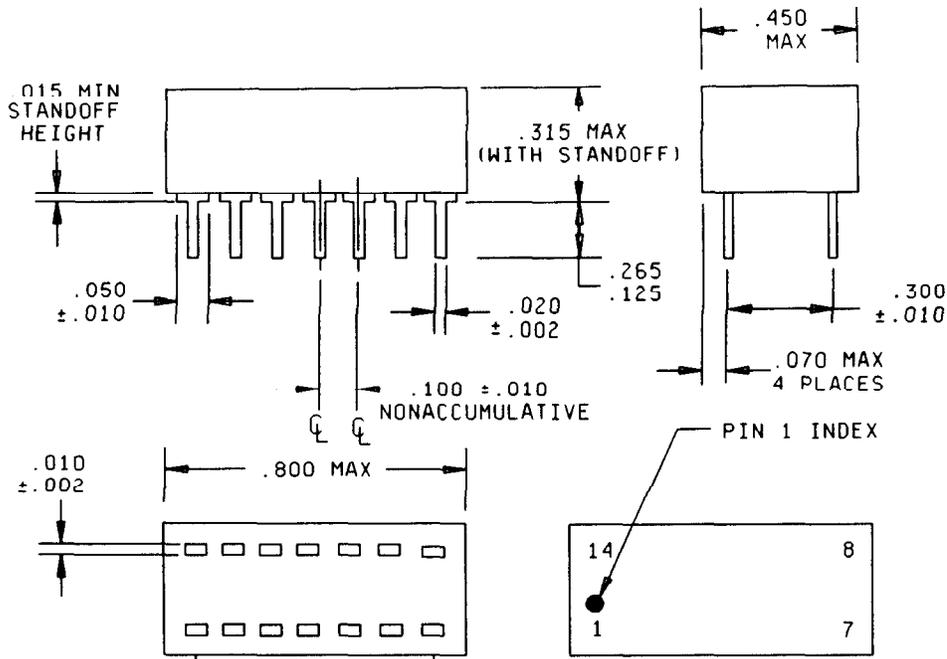
3.5 PIN's. See table I.

3.6 Delay time. Delay time from input to all taps shall be as specified in tables I and II.

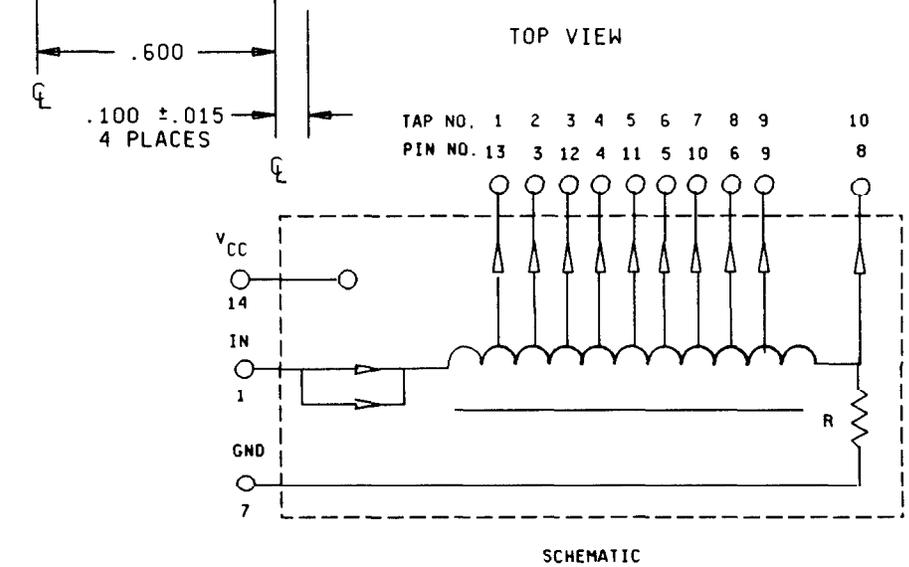
3.7 Delay time variation with temperature. See tables I and II.

3.8 Delay tolerance. See tables I and II.

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Inches	mm
.002	0.05
.010	0.25
.015	0.38
.020	0.51
.050	1.27
.060	1.52
.070	1.78
.100	2.54
.125	3.18
.265	6.73
.300	7.62
.315	8.00
.450	11.43
.600	15.24
.800	20.32



NOTES:

1. Dimensions are in inches.
2. Metric equivalents are for general information only.
3. Unless otherwise specified, tolerance is  $\pm 0.005$  (0.13 mm).
4. Pin number 2 is not connected and may be omitted at the manufacturer's option.
5. Location and shape of standoffs are optional. Height shall be as indicated.
6. Leads shall be free of case meniscus and other foreign material and shall be solderable for a minimum of .010 inch (0.25 mm) above the seating plane of the delay line.

FIGURE 1. Design, construction, and dimensions.

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TABLE I. Dash numbers and delay characteristics at 25°C,  $V_{CC} = 5.00 \pm 0.01$  volts. 1/

Dash number	Tap 1 pin 13	Tap 2 pin 3	Tap 3 pin 12	Tap 4 pin 4	Tap 5 pin 11	Tap 6 pin 5	Tap 7 pin 10	Tap 8 pin 6	Tap 9 pin 9	Tap 10 pin 8
01	6 ±2 ns	1 ±2 ns	2 ±2 ns	3 ±2 ns	4 ±2 ns	5 ±2 ns	6 ±2 ns	7 ±2ns	8 ±2 ns	9 ±2 ns
02	6 ±2 ns	2 ±2 ns	4 ±2 ns	6 ±2 ns	8 ±2 ns	10 ±2 ns	12 ±2 ns	14 ±2 ns	16 ±2 ns	18 ±2 ns
03	6 ±2 ns	2.5 ±2 ns	5 ±2 ns	7.5 ±2 ns	10 ±2 ns	12.5 ±2 ns	15 ±2 ns	17.5 ±2 ns	20 ±2 ns	22.5 ±2 ns
04	5 ±2 ns	10 ±2 ns	15 ±2 ns	20 ±2 ns	25 ±2 ns	30 ±2 ns	35 ±2 ns	40 ±2 ns	45 ±5%	50 ±5%
05	10 ±2 ns	20 ±2 ns	30 ±2 ns	40 ±2 ns	50 ±5%	60 ±5%	70 ±5%	80 ±5%	90 ±5%	100 ±5%
06	15 ±2 ns	30 ±2 ns	45 ±5%	60 ±5%	75 ±5%	90 ±5%	105 ±5%	120 ±5%	135 ±5%	150 ±5%
07	20 ±2 ns	40 ±2 ns	60 ±5%	80 ±5%	100 ±5%	120 ±5%	140 ±5%	160 ±5%	180 ±5%	200 ±5%
08	25 ±2 ns	50 ±5%	75 ±5%	100 ±5%	125 ±5%	150 ±5%	175 ±5%	200 ±5%	225 ±5%	250 ±5%
09	30 ±2 ns	60 ±5%	90 ±5%	120 ±5%	150 ±5%	180 ±5%	210 ±5%	240 ±5%	270 ±5%	300 ±5%
10	40 ±2 ns	80 ±5%	120 ±5%	160 ±5%	200 ±5%	240 ±5%	280 ±5%	320 ±5%	360 ±5%	400 ±5%
11	50 ±5%	100 ±5%	150 ±5%	200 ±5%	250 ±5%	300 ±5%	350 ±5%	400 ±5%	450 ±5%	500 ±5%
12	60 ±5%	120 ±5%	180 ±5%	240 ±5%	300 ±5%	360 ±5%	420 ±5%	480 ±5%	540 ±5%	600 ±5%
13	70 ±5%	140 ±5%	210 ±5%	280 ±5%	350 ±5%	420 ±5%	490 ±5%	560 ±5%	630 ±5%	700 ±5%

1/ Delays at taps 2 through 10 are referenced to tap 1 for dash numbers 01, 02, and 03.

TABLE II Dash numbers and delay characteristics at -55°C, and +125°C,  $V_{CC} = 5.00 \pm 0.01$  volts. 1/

Dash number	Tap 1 pin 13	Tap 2 pin 3	Tap 3 pin 12	Tap 4 pin 4	Tap 5 pin 11	Tap 6 pin 5	Tap 7 pin 10	Tap 8 pin 6	Tap 9 pin 9	Tap 10 pin 8
01	6 ±3 ns	1 ±3 ns	2 ±3 ns	3 ±3 ns	4 ±3 ns	5 ±3 ns	6 ±3 ns	7 ±3 ns	8 ±3 ns	9 ±3 ns
02	6 ±3 ns	2 ±3 ns	4 ±3 ns	6 ±3 ns	8 ±3 ns	10 ±3 ns	12 ±3 ns	14 ±3 ns	16 ±3 ns	18 ±3 ns
03	6 ±3 ns	2.5 ±3 ns	5 ±3 ns	7.5 ±3 ns	10 ±3 ns	12.5 ±3 ns	15 ±3 ns	17.5 ±3 ns	20 ±3 ns	22.5 ±3 ns
04	5 ±3 ns	10 ±3 ns	15 ±3 ns	20 ±3 ns	25 ±3 ns	30 ±3 ns	35 ±3ns	40 ±8%	45 ±8%	50 ±8%
05	10 ±3 ns	20 ±3 ns	30 ±3 ns	40 ±8%	50 ±8%	60 ±8%	70 ±8%	80 ±8%	90 ±8%	100 ±8%
06	15 ±3 ns	30 ±3 ns	45 ±8%	60 ±8%	75 ±8%	90 ±8%	105 ±8%	120 ±8%	135 ±8%	150 ±8%
07	20 ±3 ns	40 ±8%	60 ±8%	80 ±8%	100 ±8%	120 ±8%	140 ±8%	160 ±8%	180 ±8%	200 ±8%
08	25 ±3 ns	50 ±8%	75 ±8%	100 ±8%	125 ±8%	150 ±8%	175 ±8%	200 ±8%	225 ±8%	250 ±8%
09	30 ±3 ns	60 ±8%	90 ±8%	120 ±8%	150 ±8%	180 ±8%	210 ±8%	240 ±8%	270 ±8%	300 ±8%
10	40 ±8%	80 ±8%	120 ±8%	160 ±8%	200 ±8%	240 ±8%	280 ±8%	320 ±8%	360 ±8%	400 ±8%
11	50 ±8%	100 ±8%	150 ±8%	200 ±8%	250 ±8%	300 ±8%	350 ±8%	400 ±8%	450 ±8%	500 ±8%
12	60 ±8%	120 ±8%	180 ±8%	240 ±8%	300 ±8%	360 ±8%	420 ±8%	480 ±8%	540 ±8%	600 ±8%
13	70 ±8%	140 ±8%	210 ±8%	280 ±8%	350 ±8%	420 ±8%	490 ±8%	560 ±8%	630 ±8%	700 ±8%

1/ Delays at taps 2 through 10 are referenced to tap 1 for dash numbers 01, 02, and 03.

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TABLE III. DC characteristics.

Test	Symbol	Conditions -55°C < T <sub>c</sub> < +125°C	Limits		Unit
			Min	Max	
High level output voltage	V <sub>OH</sub>	V <sub>CC</sub> = 4.5 V V <sub>IH</sub> = 2.0 V I <sub>OH</sub> = -1 mA	2.5		V
Low level output voltage	V <sub>OL</sub>	V <sub>CC</sub> = 4.5 V V <sub>IL</sub> = 0.8 V I <sub>OL</sub> = 20 mA		0.5	V
Input clamp voltage	V <sub>IC</sub>	V <sub>CC</sub> = 4.5 V I <sub>I</sub> = -18 mA T <sub>C</sub> = +25°C		-1.2	V
High level input current	I <sub>IH1</sub>	V <sub>CC</sub> = 5.5 V V <sub>IH</sub> = 2.7 V		100	μA
	I <sub>IH2</sub>	V <sub>CC</sub> = 5.5 V V <sub>IH</sub> = 5.5 V		2000	μA
Low level input current	I <sub>IL</sub>	V <sub>CC</sub> = 5.5 V V <sub>IL</sub> = 0.5 V		-4.00	mA
Short circuit output current	I <sub>OS</sub>	V <sub>CC</sub> = 5.5 V V <sub>OS</sub> = 0.0 V (Not more than one output shorted at a time)	-40	-150	mA
Low level supply current	I <sub>CCL</sub>	V <sub>CC</sub> = 5.5 V <sub>I</sub> = 0.0 V		130	mA

3.9 Rise time (applied to leading edge only). Rise time shall be 4 nanoseconds (ns) maximum for dash numbers -01 through -11. Rise time shall be 5 ns maximum for dash numbers -12 and -13. Conditions (T<sub>c</sub> -55°C to +125°C): V<sub>CC</sub> = 5.0 V; TR<sub>I</sub> ≤ 3 ns; C<sub>L</sub> = 50 pF; R<sub>L</sub> = 500 ohms.

3.10 Input pulse width. Delay lines shall be capable of passing a minimum input pulse width of 50 percent of total delay time.

3.11 DC characteristics. See table III.

3.12 Logic 1 fanout. Twenty per unit maximum (one tap capable of driving 20 TTL inputs).

3.13 Logic 0 fanout. Ten per tap maximum (one tap capable of driving 10 TTL inputs).

3.14 Thermal shock. In accordance with MIL-D-83532.

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- 3.15 Sealing. In accordance with MIL-D-83532.
- 3.16 Terminal strength. In accordance with MIL-D-83532.
- 3.17 Vibration. In accordance with MIL-D-83532.
- 3.18 Shock. In accordance with MIL-D-83532.
- 3.19 Immersion. In accordance with MIL-D-83532.
- 3.20 Moisture resistance. In accordance with MIL-D-83532.
- 3.21 Solderability. In accordance with MIL-D-83532.
- 3.22 Resistance to solvents. In accordance with MIL-D-83532.
- 3.23 Operating temperature range. Operating temperature range shall be -55°C to +125°C.
- 3.24 Marking. Delay lines shall be marked with the complete DESC drawing PIN (see 1.2), the DESC CAGE code (14933), and the manufacturer's CAGE code as a minimum. The "JAN" or "J" marking shall not be used.
- 3.25 Certificate of compliance. Each vendor desiring to be listed as a suggested source of supply (see 6.3) shall submit a certificate of compliance to DESC-EMM. The certificate shall state that the vendor's product meets all the requirements of this drawing.

4. QUALITY ASSURANCE PROVISIONS

4.1 Quality conformance inspection.

4.1.1 Inspection of product for delivery. Inspection of product for delivery shall consist of option A or option C (see table IV) as stipulated by the acquiring activity. The tests listed shall be performed in the order shown and shall be in accordance with the group A inspection of MIL-D-83532.

TABLE IV. Inspection of product for delivery.

Option A	Option C
Subgroup I	Subgroup I
Thermal shock (15 cycles)	Delay time
Seal	Rise time
Delay time	DC characteristics
Rise time	
DC characteristics	
Subgroup II	Subgroup II
Delay time at temperature extremes	Delay time at temperature extremes
Dimensions	Dimensions
Visual inspection	Visual inspection

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be as specified in the contract or purchase order.

6. NOTES

6.1 Intended use. Delay lines conforming to this drawing are intended for use when military specifications do not exist and when devices that will perform the required function are not available for OEM application. Items conforming to this drawing will replace similar items manufactured in accordance with contractor-prepared specifications and drawings.

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6.2 Ordering data. Acquisition documents should include:

- a. Complete DESC drawing PIN (see 1.2).
- b. Requirement for inclusion of one copy of the quality conformance inspection data with each shipment of parts delivered by the manufacturer (when applicable; see 4.1).
- c. Requirement for the manufacturer to notify the contracting activity in the event of a change in product.
- d. Requirements for packaging and packing.

6.3 Supersession data. Effective with revision E of this drawing, a suffix letter (see 1.2 and 4.1.1) shall be used in the PIN by the acquiring activity to denote the extent of acceptance testing desired. PIN's which include an 'A' suffix supersede all PIN's listed in previous revisions.

6.4 Suggested sources of supply. Suggested sources of supply are listed below. Additional suggested sources will be added as they become available. Vendor PIN's are provided for reference only. Do not use these numbers for acquisition or marking purposes. This table is not a qualified products list or an approved source list. These vendors have submitted certificates of compliance to DESC; however, parts may be ordered from any manufacturer who agrees to supply items conforming to all the requirements of this drawing.

1/ DESC drawing PIN 85014-	Vendor CAGE codes and similar PIN's 2/						
	CAGE 32155	CAGE 22519	CAGE 00222	CAGE 62694	CAGE 50965	CAGE 16714	CAGE 20933
01	AAG-0010	DDU7-8497-1	S10TC 10	L-31-847	4514-01	DSP014-01	00T294
02	AAG-0020	DDU7-8497-2	S10TC 20	L-31-848	4514-02	DSP014-02	00T295
03	AAG-0025	DDU7-8497-3	S10TC 25	L-31-849	4514-03	DSP014-03	00T296
04	AAG-0050	DDU7-8497-4	S10TC 50	L-31-850	4514-04	DSP014-04	00T297
05	AAG-0100	DDU7-8497-5	S10TC 100	L-31-852	4514-05	DSP014-05	10T441
06	AAG-0150	DDU7-8497-6	S10TC 150	L-31-854	4514-06	DSP014-06	10T442
07	AAG-0200	DDU7-8497-7	S10TC 200	L-31-856	4514-07	DSP014-07	10T443
08	AAG-0250	DDU7-8497-8	S10TC 250	L-31-857	4514-08	DSP014-08	10T444
09	AAG-0300	DDU7-8497-9	S10TC 300	L-31-858	4514-09	DSP014-09	10T445
10	AAG-0400	DDU7-8497-10	S10TC 400	L-31-860	4514-10	DSP014-10	10T446
11	AAG-0500	DDU7-8497-11	S10TC 500	L-31-862	4514-11	DSP014-11	10T447
12	AAG-0600	DDU7-8497-12	S10TC 600	L-31-864	4514-12	DSP014-12	10T592
13	AAG-0700	DDU7-8497-13	S10TC 700	L-31-865	4514-13	DSP014-13	10T593

1/ Complete DESC PIN shall include a suffix letter (see 1.2).

2/ Do not use vendor PIN's for procurement or marking purposes.

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<u>Vendor CAGE code</u>	<u>Vendor name and address</u>
00222	ESC Electronics Corporation 534 Bergen Boulevard Palisades Park, NJ 07650 (201) 947-0400
16714	Rhombus Industries, Incorporated 15801 Chemical Lane Huntington Beach, CA 92649 (714) 898-0960
20933	Kappa Technologies, Incorporated 1443 Pinewood St. Rahway, NJ 07065 (908) 396-9400
22519	Data Delay Devices, Incorporated 3 Mount Prospect Avenue Clifton, NJ 07013 (201) 773-2299
50965	Princeton Advanced Components, Incorporated 860 State Rd. Princeton, NJ 08540 (609) 924-2444
62694	JBM Electronics, Incorporated 1 Commerce Drive Bedford, NH 03110 (603) 623-0222
32155	Polara Engineering, Incorporated 4115 W. Artesia Avenue Fullerton, CA 92633 (714) 521-0900

6.4 Assistance. Questions or comments concerning this drawing should be directed to DESC-EMM, 1507 Wilmington Pike, Dayton, OH 45444-5270, telephone (513) 296-5255.

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