

		REVISIONS																
		LTR	DESCRIPTION						DATE		APPROVED							
		A	Added suggested source of supply and changed requirements for inspection of product for delivery.						26 Aug 88		Randy Larson							
		B	Changed incremental delay for dash number -09 in table I. Editorial changes throughout.						26 Nov 91		R. Gosciniak							
		C	Changes in accordance with NOR 5999-R003-92.						09 Sep 92		D. Moore							
		D	Added 3.3.2, 4.1.3, and note 5 to figure 1. Changed 3.3.3, several AC requirements, and step delay for -09 and -10 in table I. Deleted vendor CAGE 56289. Renumbered most of section 3 paragraphs. Editorial changes throughout.						22 Dec 93		D. Moore							
		E	Editorial and boilerplate updates made throughout.						24 Jun 08		Michael A. Radecki							
		CURRENT DESIGN ACTIVITY CAGE CODE 037Z3 DEFENSE LOGISTICS AGENCY DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43218-3990																
Prepared in accordance with ASME Y14.100																		
Source control drawing																		
REV STATUS OF PAGES		REV	E	E	E	E	E	E	E									
		PAGES	1	2	3	4	5	6	7	8								
PMIC N/A		PREPARED BY Dan McGrath						DESIGN ACTIVITY DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OH 45444-5000										
Original date of drawing 85-06-13		CHECKED BY Randy Larson						TITLE DELAY LINES, PROGRAMMABLE 16 PIN COMPATIBLE, 3 BIT, TTL COMPATIBLE										
		APPROVED BY Ivan R. Jones																
		SIZE A	CODE IDENT. NO. 14933						DWG NO. 85019									
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1.1 Scope. This drawing describes the requirements for a family of programmable, 16-pin compatible, 3-bit, TTL compatible delay lines.

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



2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in [sections 3](#) and [4](#) of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents in [sections 3](#) and [4](#) of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

FEDERAL SPECIFICATIONS

- [MIL-DTL-31000](#) - Technical Data Packages, General Specification For.
- [MIL-PRF-83532](#) - Delay Lines, Active, General Specifications for.

FEDERAL STANDARDS

- [MIL-STD-202](#) - Test Method Standard, Electronic and Electrical Component Parts.
- [MIL-STD-883](#) - Test Method Standard, Microcircuits.
- [MIL-STD-1276](#) - Leads for Electronic Component Parts.

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or <http://assist.daps.dla.mil/> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Interface and physical dimensions.

3.2 Drawing precedence. This drawing takes precedence over documents referred to herein and shall be interpreted in accordance with [MIL-DTL-31000](#).

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3.3 Materials.

3.3.1 Case material. Case material shall be molded or encapsulated epoxy and shall be in accordance with [MIL-PRF-83532](#).

3.3.2 Integrated circuits (IC's). IC's shall meet the requirements of [MIL-STD-883](#), level B, as a minimum.

3.3.3 Terminals. Terminals shall be type LR (0.52) G-**C* in accordance with [MIL-STD-1276](#). The use of pure tin plating as an undercoat or final finish is prohibited effective 6 months from the date of revision D to this drawing.

3.4 Configuration and dimensions. See [figure 1](#).

3.5 AC requirements.

3.5.1 Total delay time. See [table I](#).

3.5.2 Temperature coefficient of delay. 500 ppm/°C +0.5 ns maximum.

3.5.3 Delay tolerance. 1 ns or ±5 percent, whichever is greater.

3.5.4 Rise time. Rise time shall be 4 ns maximum.

3.5.5 Input pulse voltage. 3.0 V maximum.

3.5.6 Input pulse spacing. 3 times pulse width.

3.5.7 Inherent delay. 6 ±2 ns.

3.5.8 Pulse width. 150 percent of maximum delay.

3.5.9 Truth table. See [table II](#).

3.6 DC requirements.

3.6.1 Supply voltage (V_{CC}). 4.75 to 5.25 V dc.

3.6.2 Logic 1 input current. 30 mA maximum at 3.0 V.

3.6.3 Logic 0 input current. -30 mA maximum at 0.45 V.

3.6.4 Logic 1, V_{OUT} . 2.4 V minimum.

3.6.5 Logic 0, V_{OUT} . 0.4 V maximum.

3.6.6 Logic 1 input voltage. 2.0 V minimum.

3.6.7 Logic 0 input voltage. 0.8 V maximum.

3.6.8 Output current, low (I_{OL}). 20.0 mA maximum.

3.6.9 Output current, high (I_{OH}). -1.0 mA maximum.

3.6.10 Power current (I_{CC}). 100 mA maximum.

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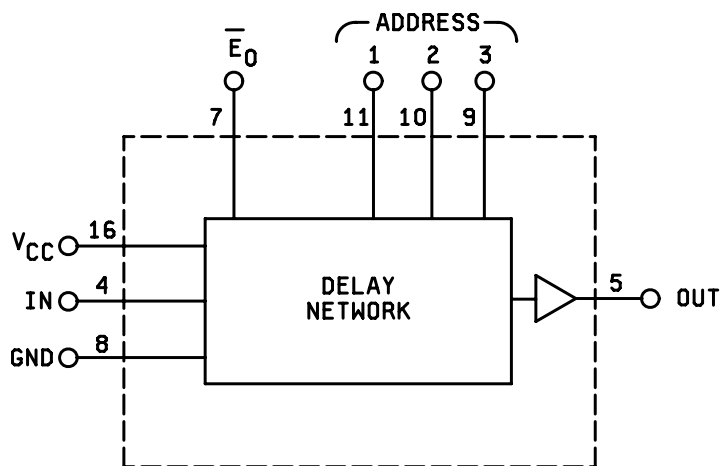
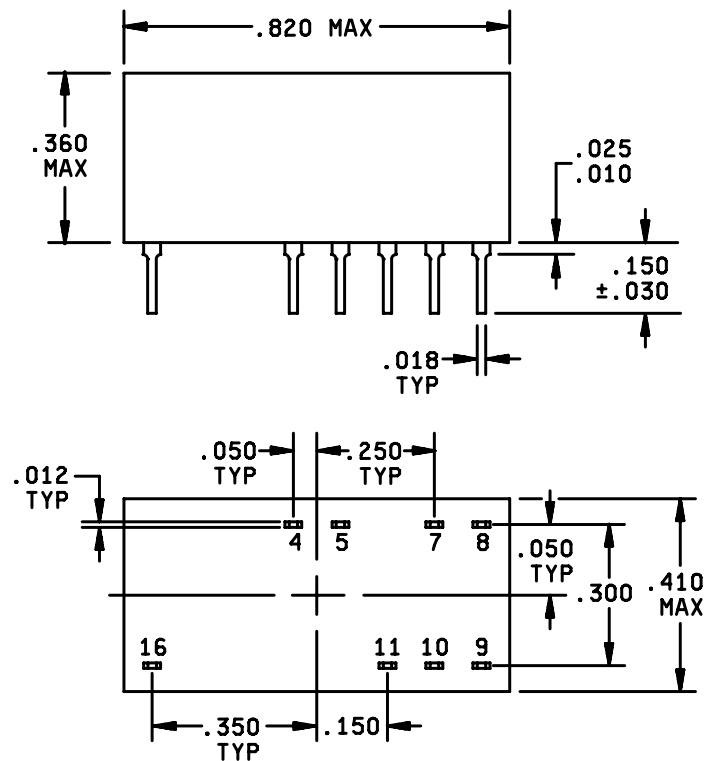
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Inches	mm
.010	0.25
.012	0.30
.018	0.46
.025	0.64
.030	0.76
.050	1.27
.150	3.81
.250	6.35
.300	7.62
.350	8.89
.360	9.14
.410	10.41
.820	20.83

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is $\pm .010$ (0.25 mm).
4. Location and shape of standoffs optional. Height shall be as shown.
5. Leads shall be free of case meniscus and other foreign material and shall be solderable for a minimum of .010 inch above the seating plane of the delay line.

FIGURE 1. Configuration and dimensions.

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TABLE I. PIN's and delay times.

PIN 85019-	Incremental delay per step	Total delay <u>1</u> / change
01	.5 ns $\pm$.3 ns	3.5 ns
02	1 ns $\pm$.4 ns	7 ns
03	2 ns $\pm$.8 ns	14 ns
04	3 ns $\pm$ 1.0 ns	21 ns
05	5 ns $\pm$ 1.5 ns	35 ns
06	10 ns $\pm$ 1.5 ns	70 ns
07	15 ns $\pm$ 1.5 ns	105 ns
08	20 ns $\pm$ 1.5 ns	140 ns
09	40 ns $\pm$ 2.5 ns	280 ns
10	50 ns $\pm$ 3.5 ns	350 ns

1/ Delay value does not include T_0 delay.

TABLE II. Truth table.

Enable	Address (bit no.)			Delay out	1 = High 0 = Low ϕ = Don't care T_0 = Reference or inherent delay of circuit T_1 to T_7 = Multiplier of incremental delay
	3	2	1		
0	0	0	0	T_0	
0	0	0	1	T_1	
0	0	1	0	T_2	
0	0	1	1	T_3	
0	1	0	0	T_4	
0	1	0	1	T_5	
0	1	1	0	T_6	
0	1	1	1	T_7	
1	ϕ	ϕ	ϕ	0	

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3.7 Environmental requirements.

3.7.1 Thermal shock. Method 107, test condition B-1, [MIL-STD-202](#), 5 minutes at temperature extremes, and in accordance with [MIL-PRF-83532](#).

3.7.2 Sealing. As specified in [MIL-PRF-83532](#).

3.7.3 Terminal strength. Method 211, test condition C, [MIL-STD-202](#), and in accordance with [MIL-PRF-83532](#).

3.7.4 Vibration. Method 204, test condition B, [MIL-STD-202](#), and in accordance with [MIL-PRF-83532](#).

3.7.5 Shock. Method 213, test condition D, [MIL-STD-202](#), and in accordance with [MIL-PRF-83532](#).

3.7.6 Immersion. Method 104, test condition A, [MIL-STD-202](#), and in accordance with [MIL-PRF-83532](#).

3.7.7 Moisture resistance. As specified in [MIL-PRF-83532](#).

3.7.8 Solderability. As specified in [MIL-PRF-83532](#).

3.7.9 Resistance to solvents. As specified in [MIL-PRF-83532](#).

3.7.10 Operating temperature range. -55°C to +125°C.

3.7.11 Storage temperature. -65°C to +130°C.

3.8 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.9 Manufacturer eligibility. To be eligible for listing as an approved source of supply, a manufacturer shall be listed on the [MIL-PRF-83532](#) Qualified Product List for at least one part, or perform the Group A and Group B inspections specified herein on a sample of parts agreed upon by the manufacturer and DSCC-VA.

3.10 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be an approved source of supply.

3.11 Pure tin. The use of pure tin, as an underplate or final finish is prohibited both internally and externally. Tin content of resistor components and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (see [6.3](#)).

3.12 Marking. Marking shall be in accordance with [MIL-PRF-83532](#), except that the PIN shall be as specified in [1.2](#).

3.13 Workmanship. Parts shall be free of flash pits, voids, and excessive mold marks. A Visible parting line is acceptable.

4. QUALITY ASSURANCE PROVISIONS

4.1. Sampling and inspection. Unless otherwise specified, sampling and inspection procedures shall be performed in accordance with the group A inspection for level A of [MIL-PRF-83532](#).

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5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

6.1 Intended use. Devices conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application.

6.2 Ordering data. The contract or purchase order should specify the following, as a minimum:

- a. Complete PIN (see 1.2).
- b. Requirement for the manufacturer to include one copy of the quality conformance inspection data with each shipment of parts (if applicable, see 4.1.2 and 6.2c).
- c. Statement of whether the manufacturer performs the group A inspection or provides certification of compliance with the group A inspection.
- d. Requirement for the manufacturer to notify the acquiring activity in the event of a change in the product.
- e. Requirements for packaging and packing.

6.3 Tin whisker growth. The use of alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead, by mass, have shown to inhibit the growth of tin whiskers. For additional information on this matter, refer to ASTM-B545 (Standard Specification for Electrodeposited Coatings of Tin).

6.4 Users of record. Coordination of this document for future revisions is coordinated only with the approved source(s) of supply and the users of record of this document. Requests to be added as a recorded user of this drawing may be achieved online at <mailto:relay@dla.mil> or if in writing to: Defense Supply Center, Columbus, ATTN: DSCC/VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-4481 or DSN 850-4481.

6.5 Approved source(s) of supply. Approved source(s) of supply are listed herein. Additional sources will be added as they become available. Assistance in the use of this drawing may be obtained online at <mailto:relay@dla.mil>, or by contacting Defense Supply Center, Columbus, ATTN: DSCC-VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-4481 or DSN 850-4481.

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PIN 85019-	Similar vendor PIN's <u>1/</u>		
	CAGE 00222	CAGE 22519	CAGE 16714
01	SPTT3-05	PDU-138-5	DSP-019-01
02	SPTT3-1	PDU-138-1	DSP-019-02
03	SPTT3-2	PDU-138-2	DSP-019-03
04	SPTT3-3	PDU-138-3	DSP-019-04
05	SPTT3-5	PDU-138-5	DSP-019-05
06	SPTT3-10	PDU-138-10	DSP-019-06
07	SPTT3-15	PDU-138-15	DSP-019-07
08	SPTT3-20	PDU-138-20	DSP-019-08
09	SPTT3-40	PDU-138-40	DSP-019-09
10	SPTT3-50	PDU-138-50	DSP-019-10

1/ Parts must be purchased to the DSCC PIN to assure that all performance requirements and tests are met.

<u>Vendor CAGE number</u>	<u>Vendor name and address</u>
00222	ESC Electronics Inc. 33 Comac Loop Ronkonkoma, NY 11779-6858 (631) 467-5328
16714	Rhombus Industries, Incorporated 313 N. Birch Street Santa Ana, CA 92701-5263 (714) 898-0960
22519	Data Delay Devices, Incorporated 3 Mount Prospect Avenue Clifton, NJ 07013-1915 (973) 773-2299

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