

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part number. The complete part number shall be as shown in the following example:

84010	01	K	X
Drawing number	Device type (1.2.1)	Case outline (1.2.2)	Lead finish per MIL-M-38510

1.2.1 Device types. The device types shall identify the circuit function as follows:

Device type	Generic number	Circuit
01	54ALS874	Dual 4-bit D-type Flip-Flop with clear and 3-state outputs
02	54ALS876	Dual 4-bit D-type Flip-Flop with preset and 3-state inverted outputs

1.2.2 Case outlines. The case outlines shall be as designated in appendix C of MIL-M-38510, and as follows:

Outline letter	Case outline
K	F-6 (24-lead, 3/8" x 5/8"), flat package
L	D-9 (24-lead, 1/4" x 1-1/4"), dual-in-line package
3	C-4 (28-terminal, .450" x .450"), square chip carrier package

1.3 Absolute maximum ratings.

Supply voltage range	- - - - -	-0.5 V to +7.0 V
Input voltage range	- - - - -	-1.2 V at -18 mA to +7.0 V
Storage temperature	- - - - -	-65°C to +150°C
Maximum power dissipation (P_D) per flip-flop 1/-	- - - - -	22 mW
Lead temperature (soldering, 10 seconds)	- - - - -	+300°C
Thermal resistance, junction-to-case (θ_{JC})	- - - - -	See MIL-M-38510, appendix C
Junction temperature (T_J)	- - - - -	+175°C

1.4 Recommended operating conditions.

Supply voltage (V_{CC})	- - - - -	+4.5 V minimum to +5.5 V maximum
Minimum high level input voltage (V_{IH})	- - - - -	2.0 V
Maximum low level input voltage (V_{IL})	- - - - -	0.7 V
Case operating temperature range (T_C)	- - - - -	-55°C to +125°C
Width of CLOCK pulse (t_p CLOCK)	- - - - -	20 ns

1/ Must withstand added P_D due to short circuit test (e.g. I_O).

MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO	SIZE A	DWG NO 84010
	REV B	PAGE 2

Width of CLEAR pulse (tp CLEAR):
 Device type 01 - - - - - 15 ns
 Width of PRESET pulse (tp PRESET):
 Device type 02 - - - - - 10 ns
 Data setup time - - - - - 15 ns
 CLR or PR inactive state setup time:
 Device type 01 - - - - - 15 ns
 Device type 02 - - - - - 10 ns
 Data hold time (tp HOLD) - - - - - 4 ns

2. APPLICABLE DOCUMENTS

2.1 Government specification and standard. Unless otherwise specified, the following specification and standard, of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

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

(Copies of the specification and standard required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.2 Truth tables. The truth tables shall be as specified on figure 2.

3.2.3 Logic diagrams. The logic diagrams shall be as specified on figure 3.

3.2.4 Case outlines. The case outlines shall be in accordance with 1.2.2 herein.

3.3 Electrical performance characteristics. Unless otherwise specified, the electrical performance characteristics are as specified in table 1 and apply over the full recommended case operating temperature range.

3.4 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in 6.4 herein.

MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO	SIZE		DWG NO	
	A		84010	
	REV	B	PAGE	3

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C < T _C < +125°C, unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
High-level output voltage	V _{OH}	V _{CC} = 4.5 V V _{IN} = 0.7 V or 2.0 V I _{OH} = -1.0 mA	1, 2, 3	2.4		V
Low-level output voltage	V _{OL}	V _{CC} = 4.5 V V _{IN} = 0.7 V or 2.0 V I _{OL} = 12 mA	1, 2, 3		0.4	V
Input clamp voltage	V _{IC}	V _{CC} = 4.5 V T _C = +25°C I _{IN} = -18 mA	1		-1.5	V
Low-level input current	I _{IL1}	V _{CC} = 5.5 V V _{IN} = 0.4 V	1, 2, 3		-200	μA
High-level input current	I _{IH1}	V _{CC} = 5.5 V V _{IN} = 2.7 V	1, 2, 3		20	μA
	I _{IH2}	V _{CC} = 5.5 V V _{IN} = 7.0 V	1, 2, 3		100	μA
Output current	I _O	V _{CC} = 5.5 V V _{OUT} = 2.25 V <u>1/</u>	1, 2, 3	-15	-112	mA
Output current, high level, outputs OFF	I _{OZH}	V _{CC} = 5.5 V V _{OUT} = 2.7 V	1, 2, 3		20	μA
Output current, low level, outputs OFF	I _{OZL}	V _{CC} = 5.5 V V _{OUT} = 0.4 V	1, 2, 3		-20	μA
Supply current, outputs high	I _{CCH}	V _{CC} = 5.5 V V _{IN} = 0 V	Device type 01	1, 2, 3	21	mA
			Device type 02	1, 2, 3	21	
Supply current, outputs low	I _{CCL}	V _{CC} = 5.5 V V _{IN} = 0 V	Device type 01	1, 2, 3	30	mA
			Device type 02	1, 2, 3	29	
Supply current, outputs disabled	I _{CCZ}	V _{CC} = 5.5 V V _{OC} = 5.0 V	1, 2, 3		32	mA

See footnote at end of table.

MILITARY DRAWING

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO

SIZE

A

DWG NO

84010

REV

8

PAGE

4

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C, unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Maximum clock frequency	f _{MAX}	V _{CC} = 5.0 V C _L = 50 pF ±10% R _L = 500Ω	9, 10, 11	25		MHz
Propagation delay time, high to low, CLR or PR to output	t _{PHL1}	V _{CC} = 5.0 V C _L = 50 pF ±10% R _L = 500Ω ±5%	9, 10, 11	4	23	ns
Propagation delay time, CLK to output	t _{PLH2}		9, 10, 11	4	18	ns
	t _{PHL2}		9, 10, 11	4	16	ns
Output enable time	t _{PZL}		9, 10, 11	4	21	ns
	t _{PZH}		9, 10, 11	4	24	ns
Output disable time	t _{PLZ}		9, 10, 11	3	22	ns
	t _{PHZ}		9, 10, 11	2	15	ns

1/ The output conditions have been chosen to produce a current that closely approximates one-half of the true short-circuit output current, I_{OS}.

MILITARY DRAWING

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO

SIZE

A

DWG NO.

84010

REV

B

PAGE

5

3.5 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in 6.4. The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall state that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.6 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.7 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.8 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

a. Burn-in test (method 1015 of MIL-STD-883).

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2) $T_A = +125^{\circ}\text{C}$, minimum.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

a. Tests shall be as specified in table II herein.

b. Subgroups 4, 5, 6, and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Subgroup 7 tests shall verify the truth table.

4.3.2 Groups C and D inspections.

a. End-point electrical parameters shall be as specified in table II herein.

b. Steady-state life test (method 1005 of MIL-STD-883) conditions:

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2) $T_A = +125^{\circ}\text{C}$, minimum.

(3) Test duration: 1,000 hours, except as permitted by appendix B of MIL-M-38510 and method 1005 of MIL-STD-883.

MILITARY DRAWING

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO

SIZE

A

DWG NO.

84010

REV

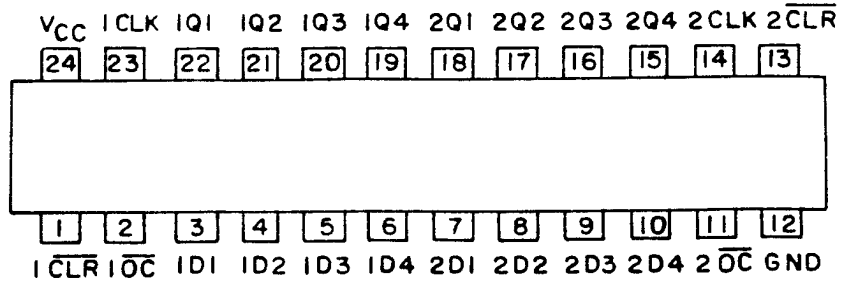
B

PAGE

6

Device type 01

Cases L and K



Case 3

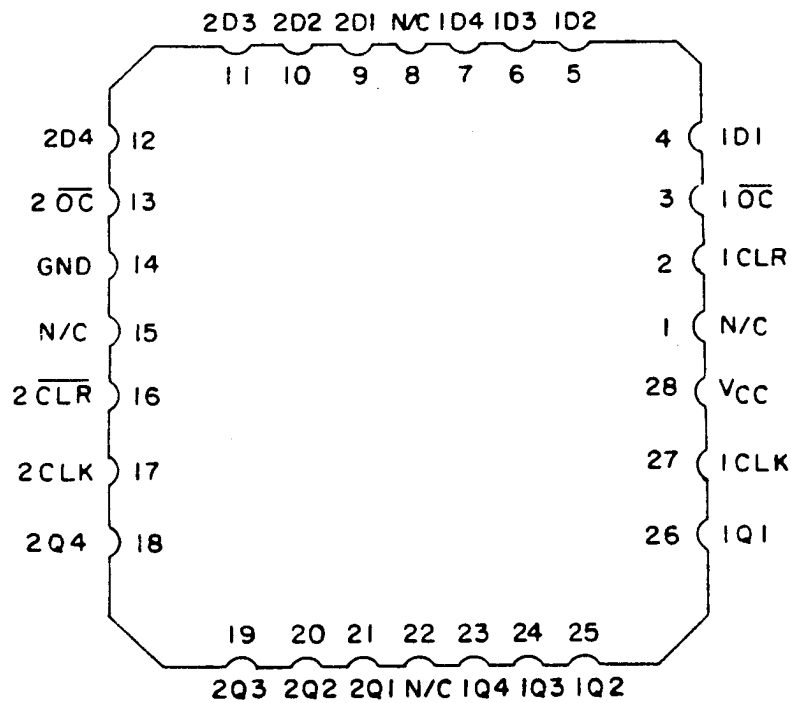


FIGURE 1. Terminal connections (top view).

MILITARY DRAWING

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO

SIZE
A

DWG NO.

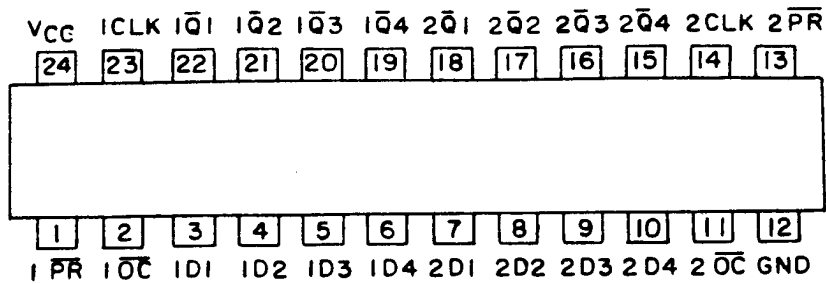
84010

REV B

PAGE 7

Device type 02

Cases L and K



Case 3

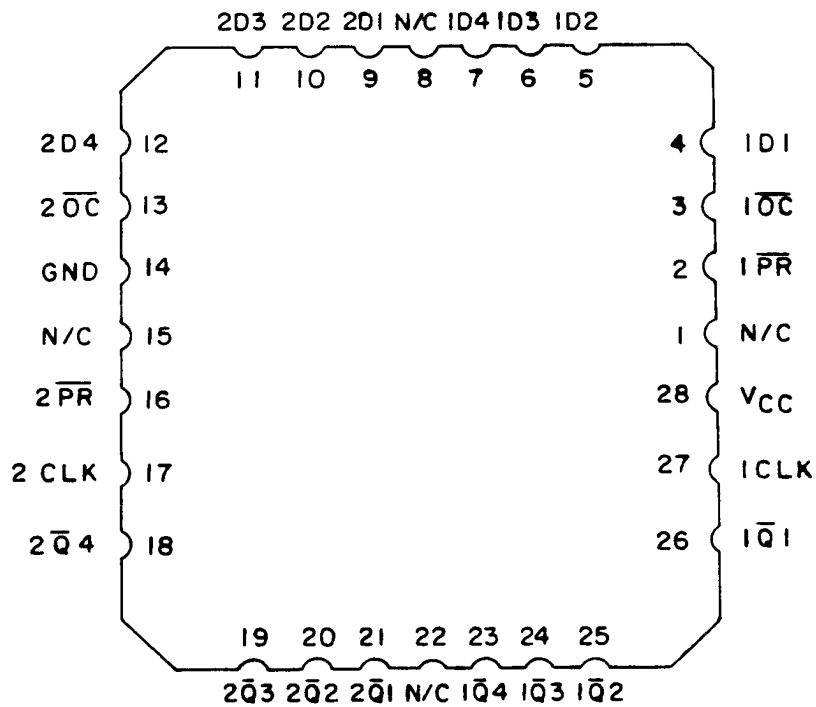


FIGURE 1. Terminal connections (top view) - Continued.

MILITARY DRAWING

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO

SIZE
A

DWG NO.

84010

REV B

PAGE 8

Device type 01

CLEAR		CLOCK	OUTPUT CONTROL	OUTPUT
\overline{CLR}	D	CLK	\overline{OC}	Q
X	X	X	H	Z
L	X	X	L	L
H	H	↑	L	H
H	L	↑	L	L
H	X	L	L	Q ₀

H = High level (steady-state)
 L = Low level (steady-state)
 X = Irrelevant
 ↑ = Transition from the low to high level
 Q₀ = The level of Q before the indicated steady-state input conditions were established.
 Z = High impedance state

Device type 02

PRESET		CLOCK	OUTPUT CONTROL	OUTPUT
\overline{PR}	D	CLK	\overline{OC}	\overline{Q}
X	X	X	H	Z
L	X	X	L	L
H	H	↑	L	L
H	L	↑	L	H
H	X	L	L	Q ₀

H = High level (steady-state)
 L = Low level (steady-state)
 X = Irrelevant
 ↑ = Transition from the low to high level
 Q₀ = The level of \overline{Q} before the indicated steady-state input conditions were established.
 Z = High impedance state

FIGURE 2. Truth tables.

MILITARY DRAWING

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO

SIZE

A

DWG NO.

84010

REV B

PAGE 9

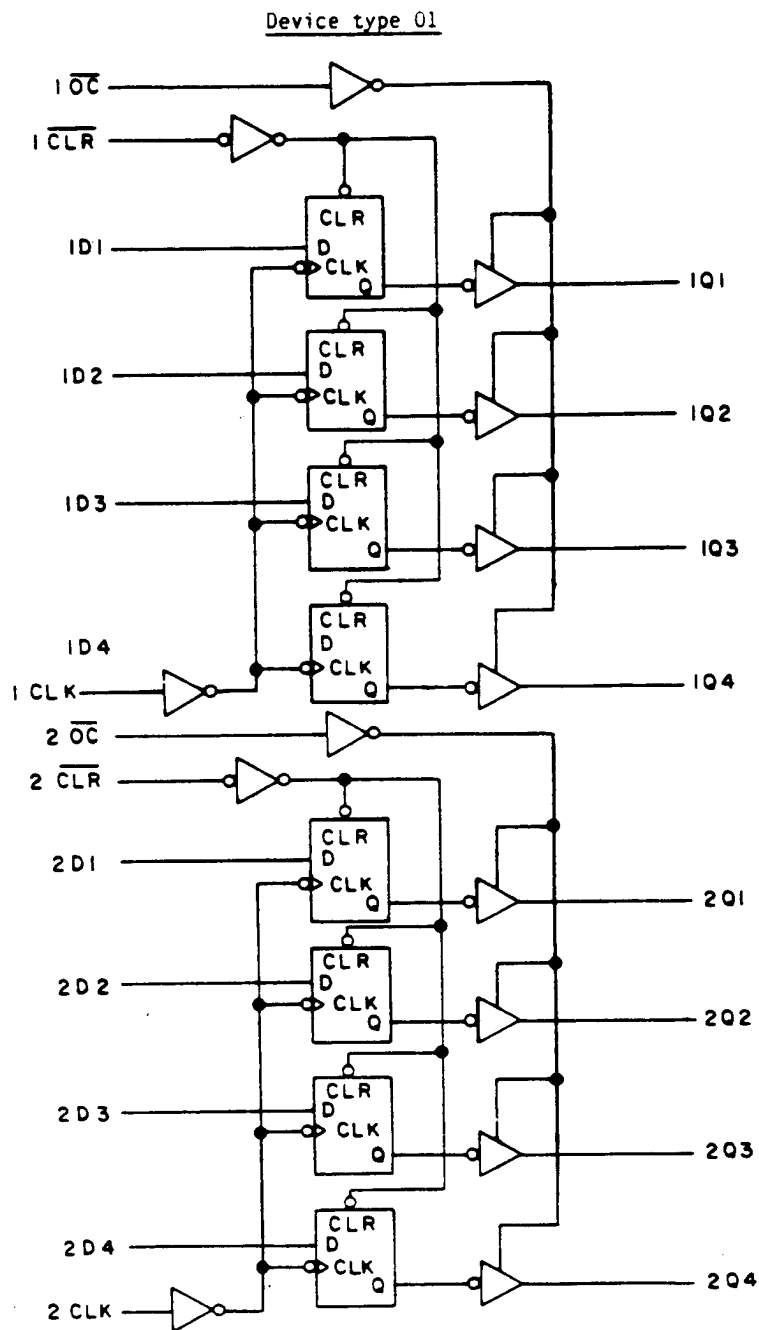


FIGURE 3. Logic diagrams.

MILITARY DRAWING

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO

SIZE

A

DWG NO.

84010

REV B

PAGE 10

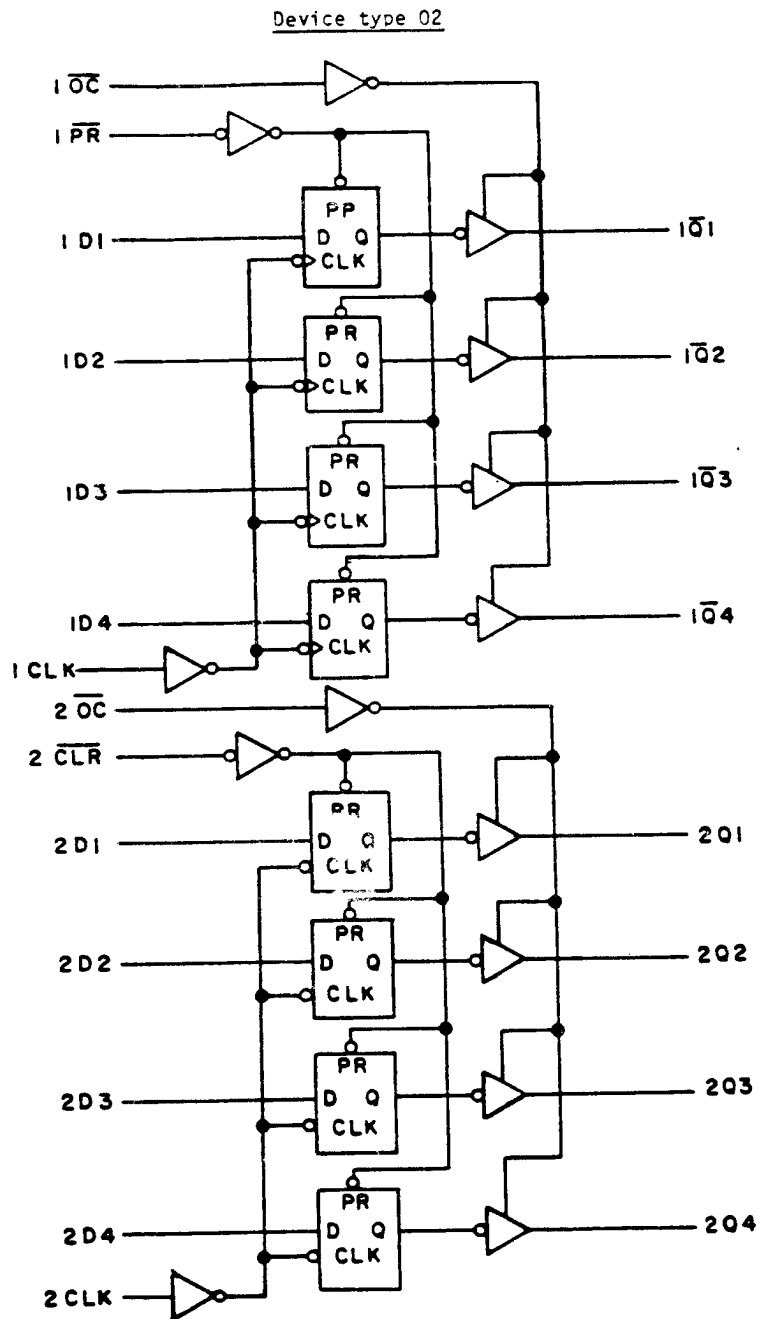


FIGURE 3. Logic diagrams - Continued.

MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO

SIZE
A

DWG NO.

84010

REV 8

PAGE 11

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	---
Final electrical test parameters (method 5004)	1*, 2, 3, 9
Group A test requirements (method 5005)	1, 2, 3, 7, 9, 10, 11**
Groups C and D end point electrical parameters (method 5005)	1, 2, 3

* PDA applies to subgroup 1.

** Subgroups 10 and 11, if not tested, shall be
guaranteed to the specified limits in table I.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits 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. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.2 Replaceability. Replaceability is determined as follows:

- Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.
- When a QPL source is established, the part numbered device specified in this drawing will be replaced by the microcircuit identified as part number M38510/3710XB--.

6.3 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone 513-296-5375.

MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO	SIZE		DWG NO	
	A		84010	
	REV	B	PAGE	12

6.4 Approved sources of supply. Approved sources of supply are listed herein. Additional sources will be added as they become available. The vendors listed herein have agreed to this drawing and a certificate of compliance (see 3.5) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part number <u>1/</u>	Replacement military specification part number
8401001KX	01295	SNJ54ALS8748W	M38510/37106BKX
8401001LX	01295	SNJ54ALS8748JT	M38510/37106BLX
84010013X	01295	SNJ54ALS8748FK	M38510/37106B3X
8401002KX	<u>2/</u>	54ALS876/BKXJC	M38510/37107BKX
8401002LX	<u>2/</u>	54ALS876/BLXJC	M38510/37107BLX
84010023X	<u>2/</u>	54ALS876/B3XJC	M38510/37107B3X

- 1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.
- 2/ Not available from an approved source.

Vendor CAGE number

01295

Vendor name and address

Texas Instruments, Inc.
P. O. Box 6448
Midland, TX 79701

MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO	SIZE A		DWG NO 84010
		REV B	PAGE 13