REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
D	Pg 2, outline letter Y changed to S; case outline changed from figure 1 to F-9. Delete subgroup 9 from final electrical test parameters in table II. Change military drawing part numbers in 6.4; CAGE 50364. Convert to military drawing format. Inactivated device types 01-03 and 06-08 for R package type.	87 May 7	M.A. Frye
E	Added eight new devices for vendor CAGE 27014. Changes to table I. Added 3.2.2.1 and 3.2.2.2. Correction in vendor similar part number for vendor CAGE 50364. Changes to pin designation on figure 3 for device types 02, 07, and 08. Change on terminal connections for device types 03 and 08 on figure 1. Reinstated 4.3.1c and 4.3.1d to group A inspections. Added subgroup 9 to final electrical test parameter for programmed devices. Also added subgroups 2, 3, 7, and 8 to groups C and D end-point electrical parameters in table II. Added subgroups 10 and 11 to group A test requirements. Editorial changes throughout.	88 JUN 13	M.A. Frye

REV																							
SHEET																							
REV																							
SHEET																							
REV STATUS OF SHEETS	REV	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		

PMIC N/A

STANDARDIZED MILITARY DRAWING

THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE

AMSC N/A

PREPARED BY: James E. Jamison

CHECKED BY: Ray Monnin

APPROVED BY: M.A. Frye

DRAWING APPROVAL DATE: 2 JULY 1982

REVISION LEVEL: E

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUITS, DIGITAL, BIPOLAR, PROGRAMMABLE LOGIC, MONOLITHIC SILICON

SIZE	CAGE CODE	
A	67268	81035

SHEET 1 OF 20

DESC FORM 193
SEP 87

* U.S. GOVERNMENT PRINTING OFFICE: 1987 — 748-129/60911

5962-E868

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:

81035	01	R	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, 10	PAL10H8 H8A	10-input 8-output AND-OR gate array
02, 11	PAL12H6 H6A	12-input 6-output AND-OR gate array
03, 12	PAL14H4 H4A	14-input 4-output AND-OR gate array
04, 13	PAL16H2 H2A	16-input 2-output AND-OR gate array
05	PAL16C1	16-input 2-output AND-OR/AND-OR/invert gate array
06, 14	PAL10L8 L8A	10-input 8-output AND-OR invert gate array
07, 15	PAL12L6 L6A	12-input 6-output AND-OR invert gate array
08, 16	PAL14L4 L4A	14-input 4-output AND-OR invert gate array
09, 17	PAL16L2 L2A	16-input 2-output AND-OR invert gate array

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

Outline letter	Case outline
R	D-8 (20-lead, 1.060" x .310" x .200"), dual-in-line package
2	C-2 (20-lead, .358" x .358" x .100"), square chip carrier package
S	F-9 (20-lead, .540" x .300" x.100"), flat package

1.3 Absolute maximum ratings.

Supply voltage range	-0.5 V dc to 12.0 V dc
Input voltage range	-1.5 V dc to 5.5 V dc
Storage temperature range	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+260°C
Thermal resistance, junction-to-case (θ_{JC}) 1/:	
Cases R, S, and 2	See MIL-M-38510, appendix C
Output voltage applied	-1.5 V dc to 12 V dc
Output sink current	100 mA
Maximum power dissipation (P_D) 2/	2.0 W
Maximum junction temperature (T_J)	+175°C

1.4 Recommended operating conditions.

Supply voltage	4.5 V minimum to 5.5 V maximum
Minimum high level input voltage	2.0 V dc
Maximum low level input voltage	0.8 V dc
Case operating temperature range	-55°C to +125°C

1/ Heat sinking is recommended to reduce the junction temperature.
2/ Must withstand the added P_D due to short circuit test, e.g., I_{OS}.

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.

3.2.2.1 Unprogrammed devices. The truth table for unprogrammed devices for contracts involving no altered item drawing shall be as specified on figure 2. When required in groups A, B, or C (see 4.3.1c), the devices shall be programmed by the manufacturer prior to test in a checkerboard pattern (a minimum of 50 percent of the total number of gates programmed) or to any altered item drawing pattern which includes at least 25 percent of the total number of gates programmed.

3.2.2.2 Programmed devices. The truth table for programmed devices shall be as specified by an attached altered item drawing.

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 I and apply over the full case operating temperature range.

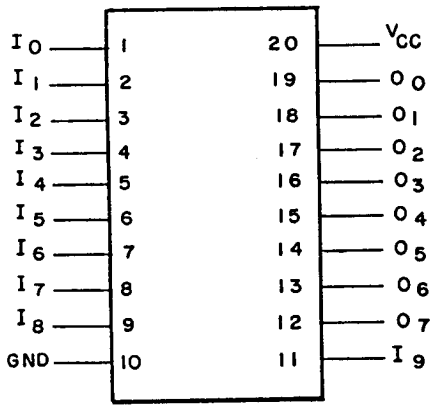
3.4 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in 6.4 herein.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ V_{SS} = 0 V, 4.5 V $\le V_{CC} \le$ 5.5 V unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Low level input voltage	V_{IL}		1,2,3	All		0.8	V
High level input voltage	V_{IH}		1,2,3	All	2		V
Input clamp voltage	V_{IC}	V_{CC} = 4.5 V, I_I = -18 mA	1,2,3	All		-1.5	V
Low level input current	I_{IL}	V_{CC} = 5.5 V, V_I = 0.4 V	1,2,3	All		-0.25	mA
High level input current	I_{IH}	V_{CC} = 5.5 V, V_I = 2.4 V	1,2,3	All		25	µA
Maximum input current	I_I	V_{CC} = 5.5 V, V_I = 5.5 V	1,2,3	All		1.0	mA
Low level output voltage	V_{OL}	V_{CC} = 4.5 V, $V_{IL} \le$ 0.8 V $V_{IH} \ge$ 2 V, I_{OL} = 8 mA	1,2,3	All		0.5	V
High level output voltage	V_{OH}	V_{CC} = 4.5 V, $V_{IL} \le$ 0.8 V $V_{IH} \ge$ 2 V, I_{OL} = -2 mA	1,2,3	All	2.4		V
Output short circuit current	I_{OS}	V_{CC} = 5 V, V_O = 0 V	1,2,3	All	-30	-130	mA
DC supply current	I_{CC}	V_{CC} = 5.5 V	1,2,3	All		90	mA
Propagation delay data input to output	t_{PHL}	V_{CC} = 5.0 V, C_L = 50 pF ±10% R_1 = 560Ω, R_2 = 1.1 kΩ (See test method 3003, MIL-STD-883)	9,10,11	01-09		45	ns
				10-17		30	
Propagation delay data input to output	t_{PLH}	For each output: R_1 is pullup to V_{CC}, R_2 is pulldown to gnd. Input pulse levels are gnd to 3.0 V. Input and output timing reference levels are 1.5 V.	9,10,11	01-09		45	ns
				10-17		30	

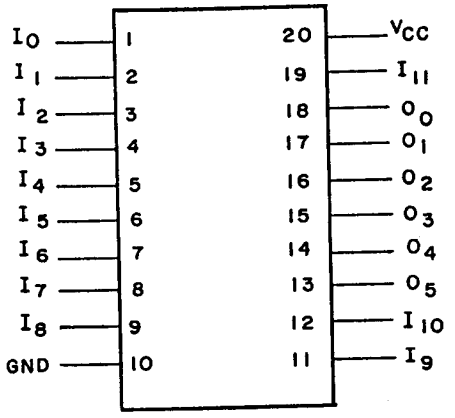
Device types 01, 06, 10, and 14

Cases R and S



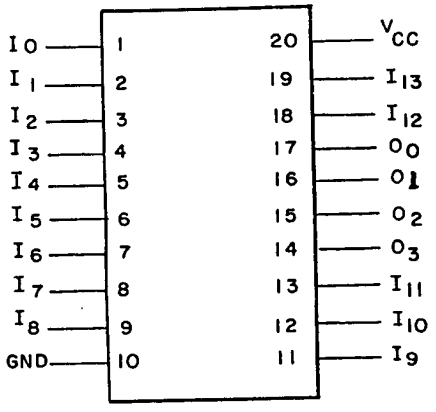
Device types 02, 07, 11, and 15

Cases R and S



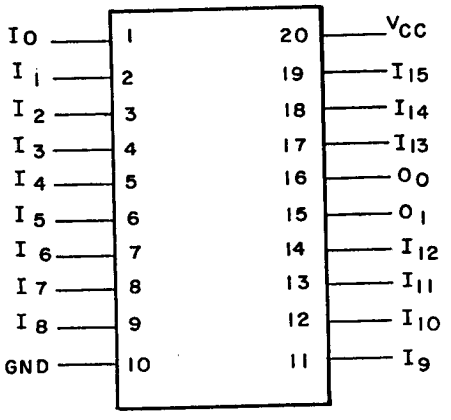
Device types 03, 08, 12, and 16

Cases R and S



Device types 04, 05, 09, 13, and 17

Cases R and S



NOTE: Case outline 2 has same pin sequence and identification as case outlines R and S.

FIGURE 1. Terminal connections.

Device types 01, 06, 10, and 14

Address										Output level								Device types
I_9	I_8	I_7	I_6	I_5	I_4	I_3	I_2	I_1	I_0	O_7	O_6	O_5	O_4	O_3	O_2	O_1	O_0	
X	X	X	X	X	X	X	X	X	X	L	L	L	L	L	L	L	L	01, 10
X	X	X	X	X	X	X	X	X	X	H	H	H	H	H	H	H	H	06, 14

Device types 02, 07, 11, and 15

Address												Output level						Device types
I_{11}	I_{10}	I_9	I_8	I_7	I_6	I_5	I_4	I_3	I_2	I_1	I_0	O_5	O_4	O_3	O_2	O_1	O_0	
X	X	X	X	X	X	X	X	X	X	X	X	L	L	L	L	L	L	02, 11
X	X	X	X	X	X	X	X	X	X	X	X	H	H	H	H	H	H	07, 15

Device types 03, 08, 12, and 16

Address														Output level				Device types
I_{13}	I_{12}	I_{11}	I_{10}	I_9	I_8	I_7	I_6	I_5	I_4	I_3	I_2	I_1	I_0	O_3	O_2	O_1	O_0	
X	X	X	X	X	X	X	X	X	X	X	X	X	X	L	L	L	L	03, 12
X	X	X	X	X	X	X	X	X	X	X	X	X	X	H	H	H	H	08, 16

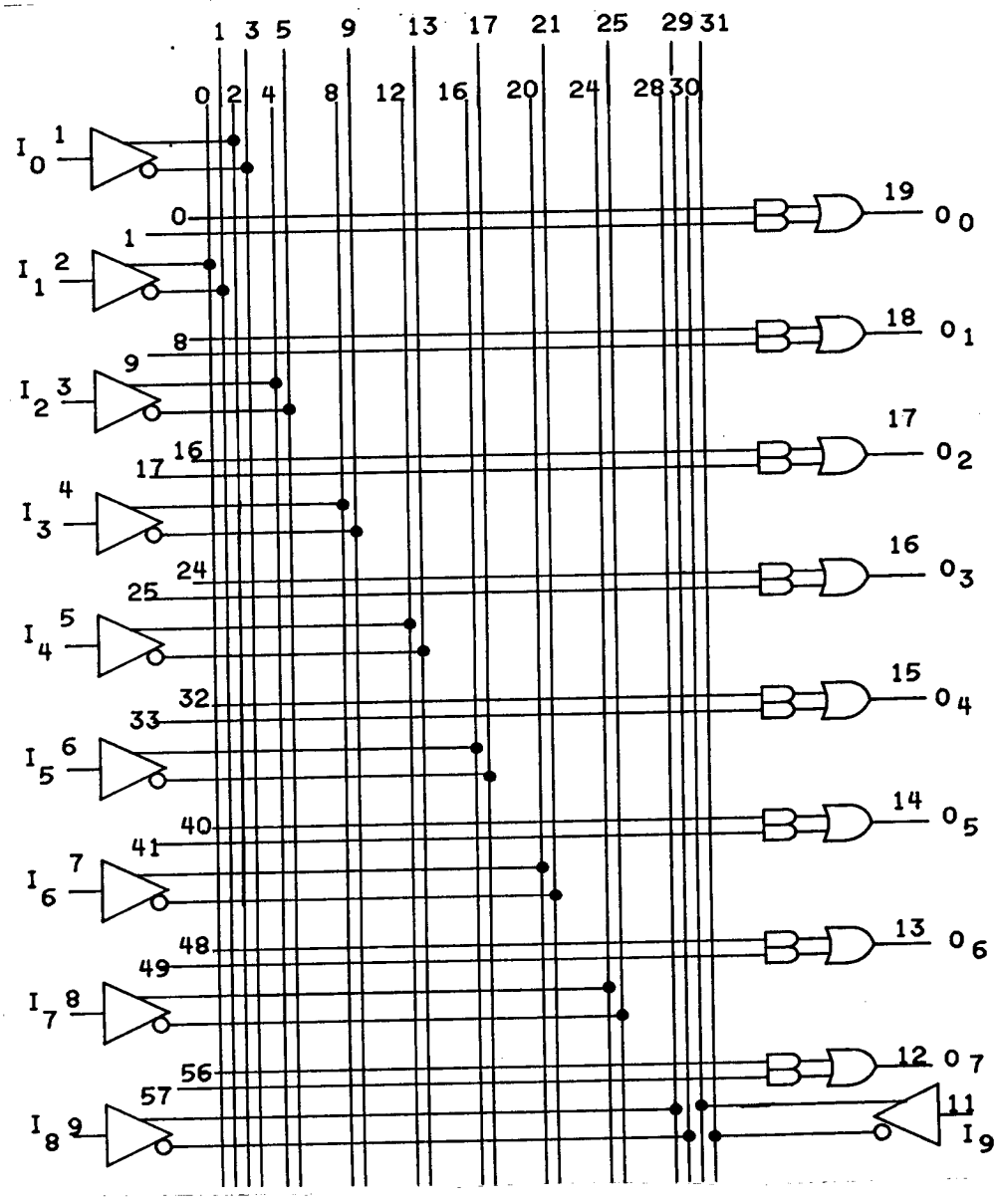
Device types 04, 05, 09, 13, and 17

Address																Output level		Device types
I_{15}	I_{14}	I_{13}	I_{12}	I_{11}	I_{10}	I_9	I_8	I_7	I_6	I_5	I_4	I_3	I_2	I_1	I_0	O_1	O_0	
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L	L	04, 13
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	H	L	05
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	H	H	09, 17

Note: X = Don't care

FIGURE 2. Truth table (unprogrammed).

Device types 01 and 10



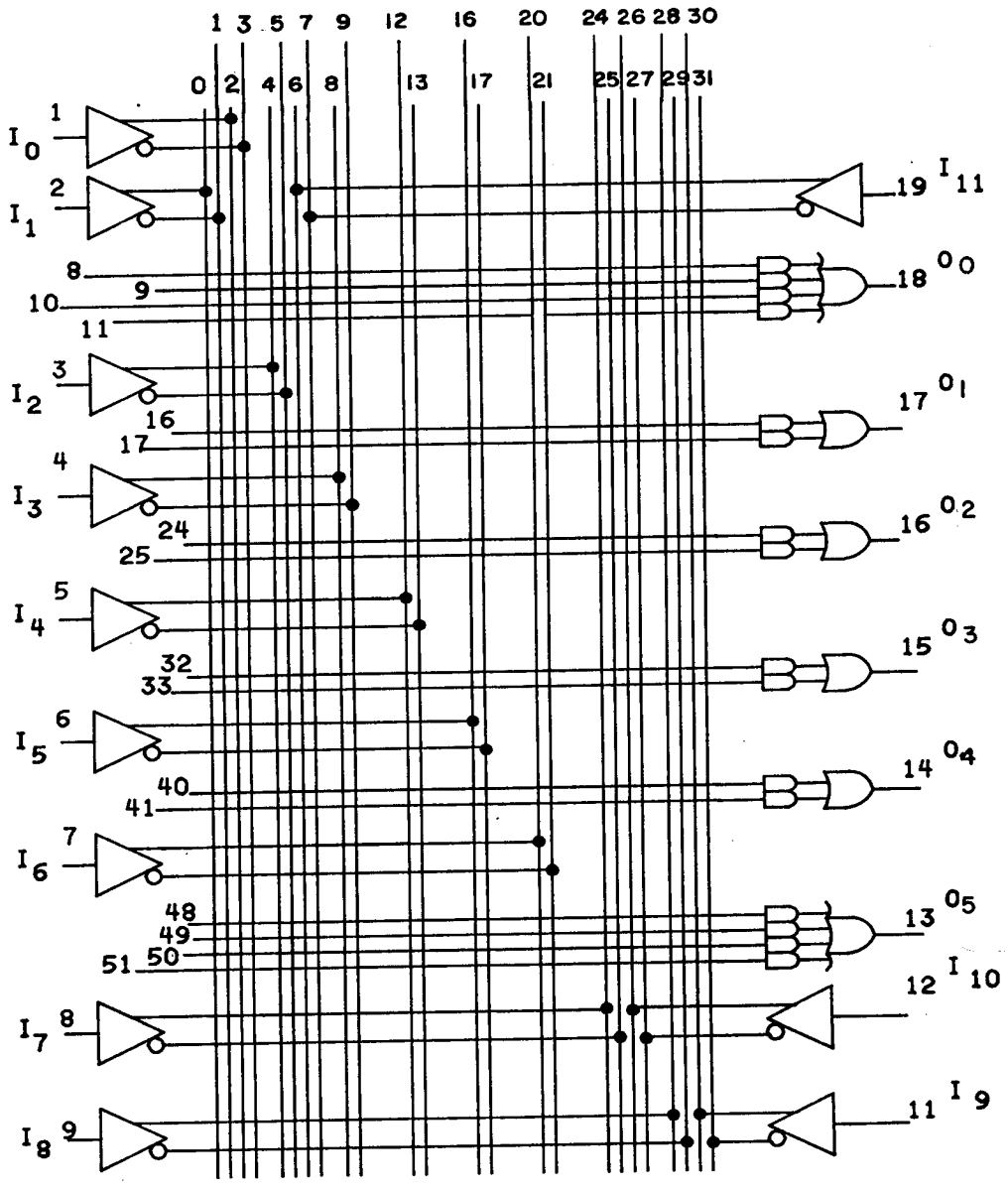
NOTE: Each intersection of numbered lines indicates a fusible link.

FIGURE 3. Unprogrammed logic diagram.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		81035
		REVISION LEVEL E	SHEET 7

☆U.S. GOVERNMENT PRINTING OFFICE: 1987 - 748-129-60913

Device types 02 and 11



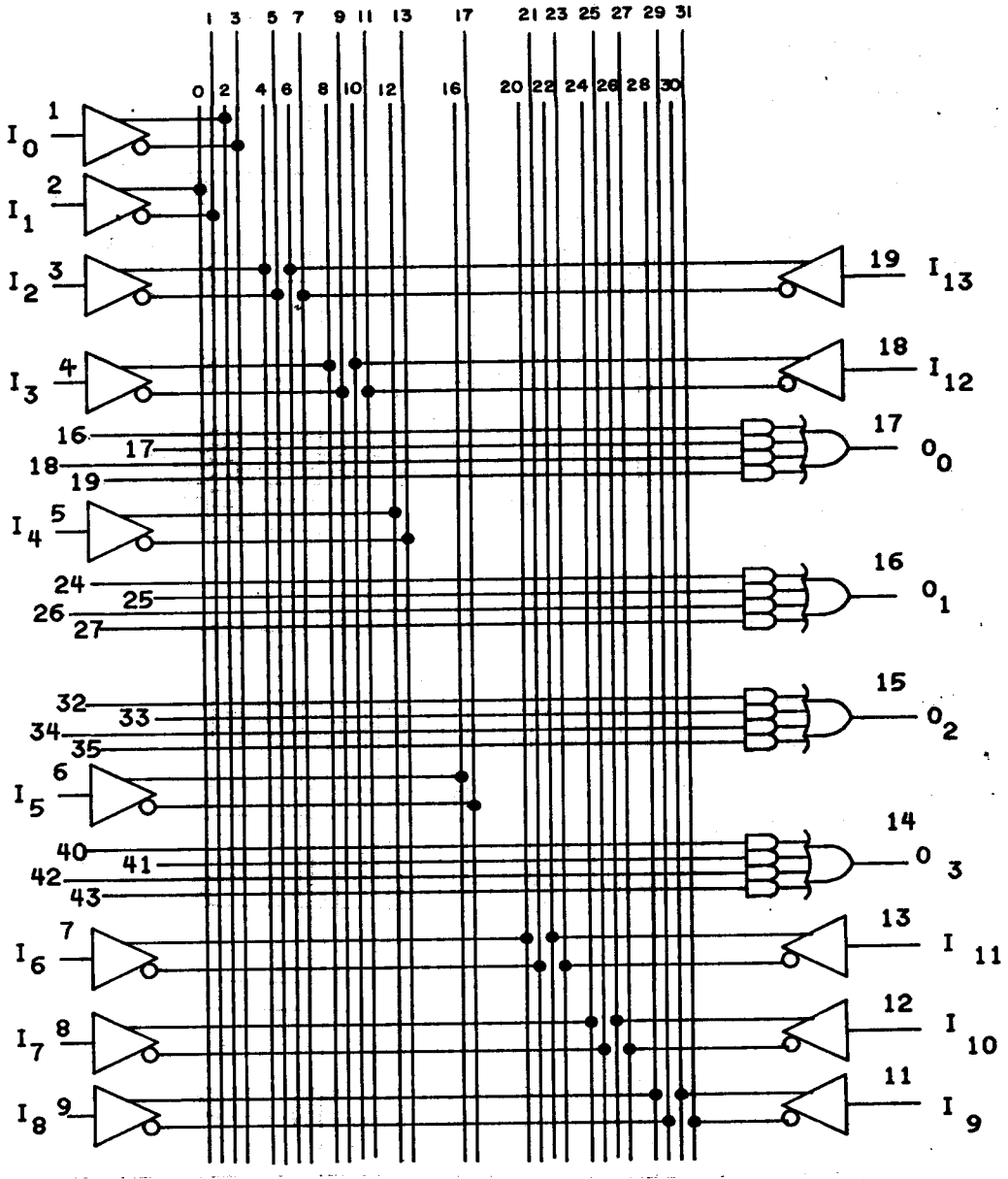
NOTE: Each intersection of numbered lines indicates a fusible link.

FIGURE 3. Unprogrammed logic diagram - Continued.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		81035
		REVISION LEVEL E	SHEET 8

☆U.S. GOVERNMENT PRINTING OFFICE: 1987 - 748-129-60913

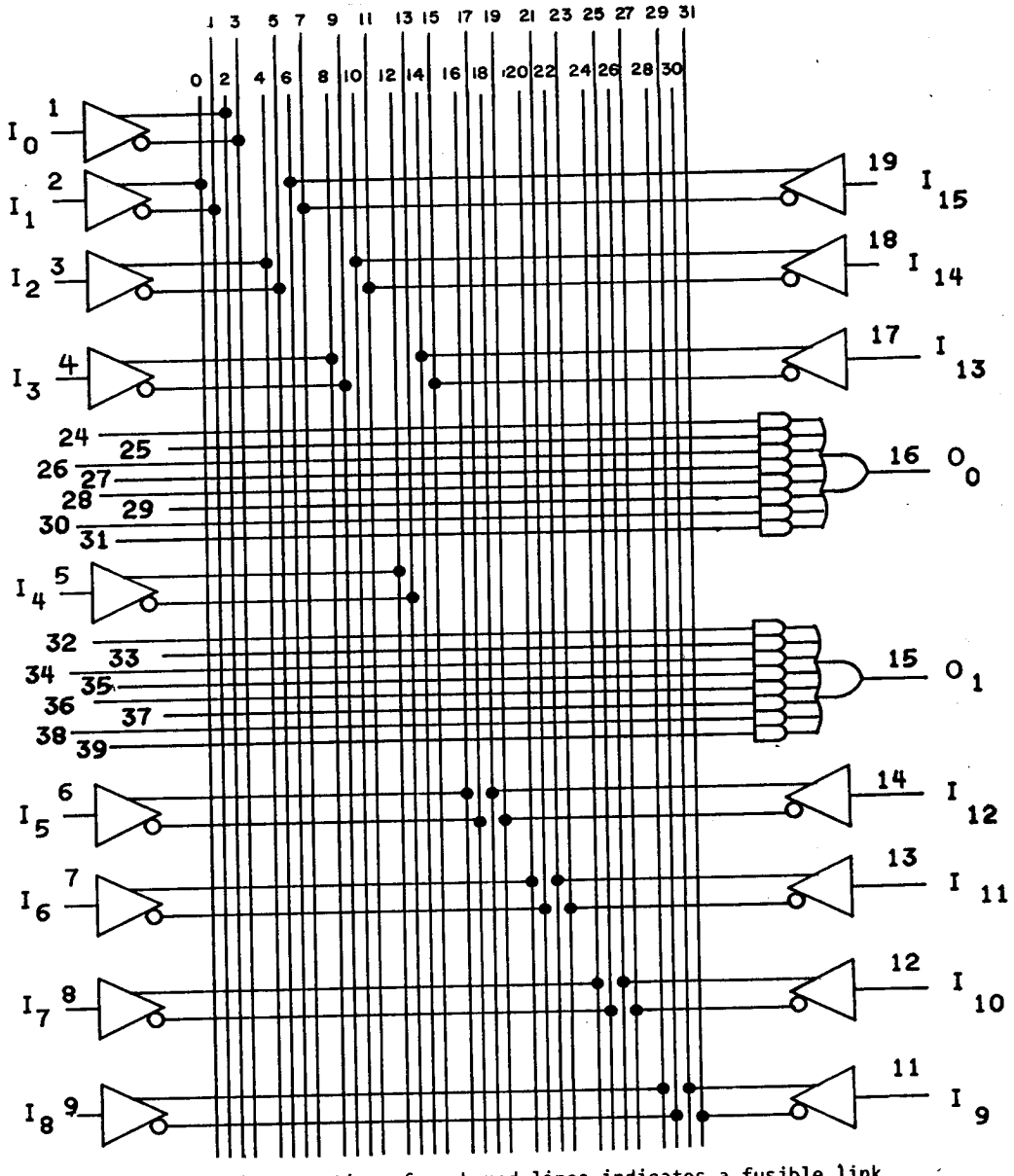
Device types 03 and 12



NOTE: Each intersection of numbered lines indicates a fusible link.

FIGURE 3. Unprogrammed logic diagram - Continued.

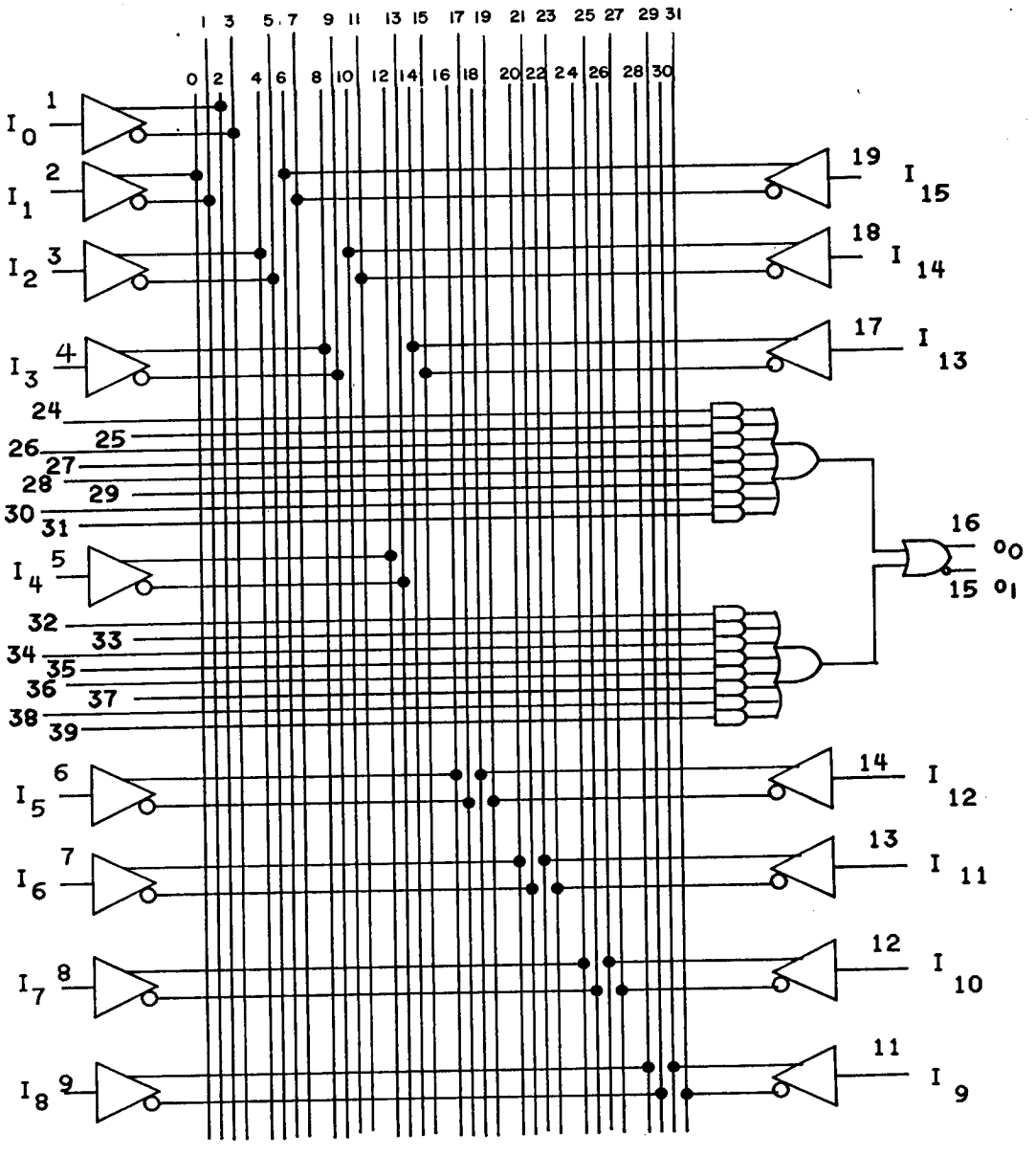
Device types 04 and 13



NOTE: Each intersection of numbered lines indicates a fusible link.

FIGURE 3. Unprogrammed logic diagram - Continued.

Device type 05



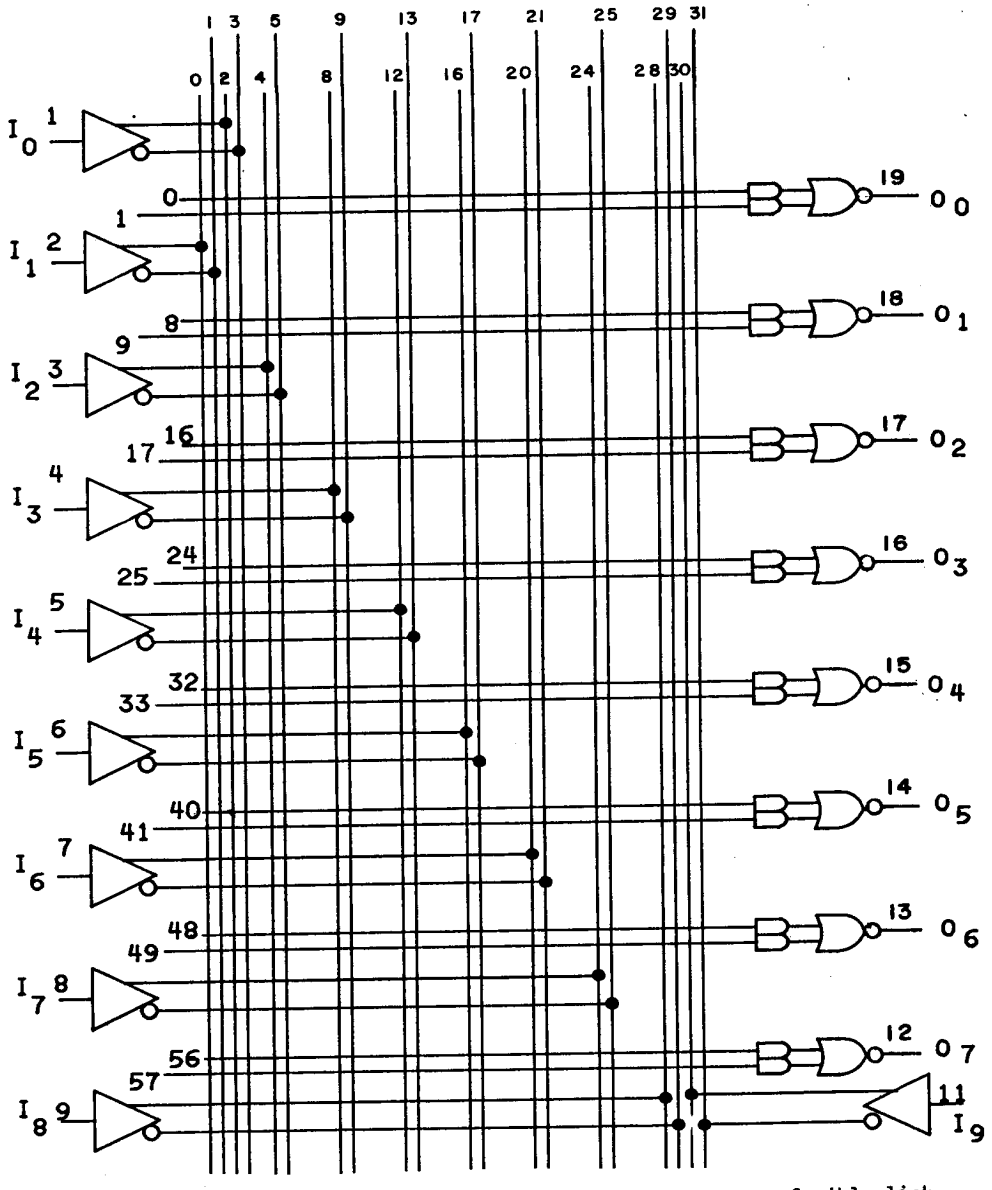
NOTE: Each intersection of numbered lines indicates a fusible link.

FIGURE 3. Unprogrammed logic diagram - Continued.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		81035
		REVISION LEVEL E	SHEET 11

☆U.S. GOVERNMENT PRINTING OFFICE: 1987 - 748-129-60913

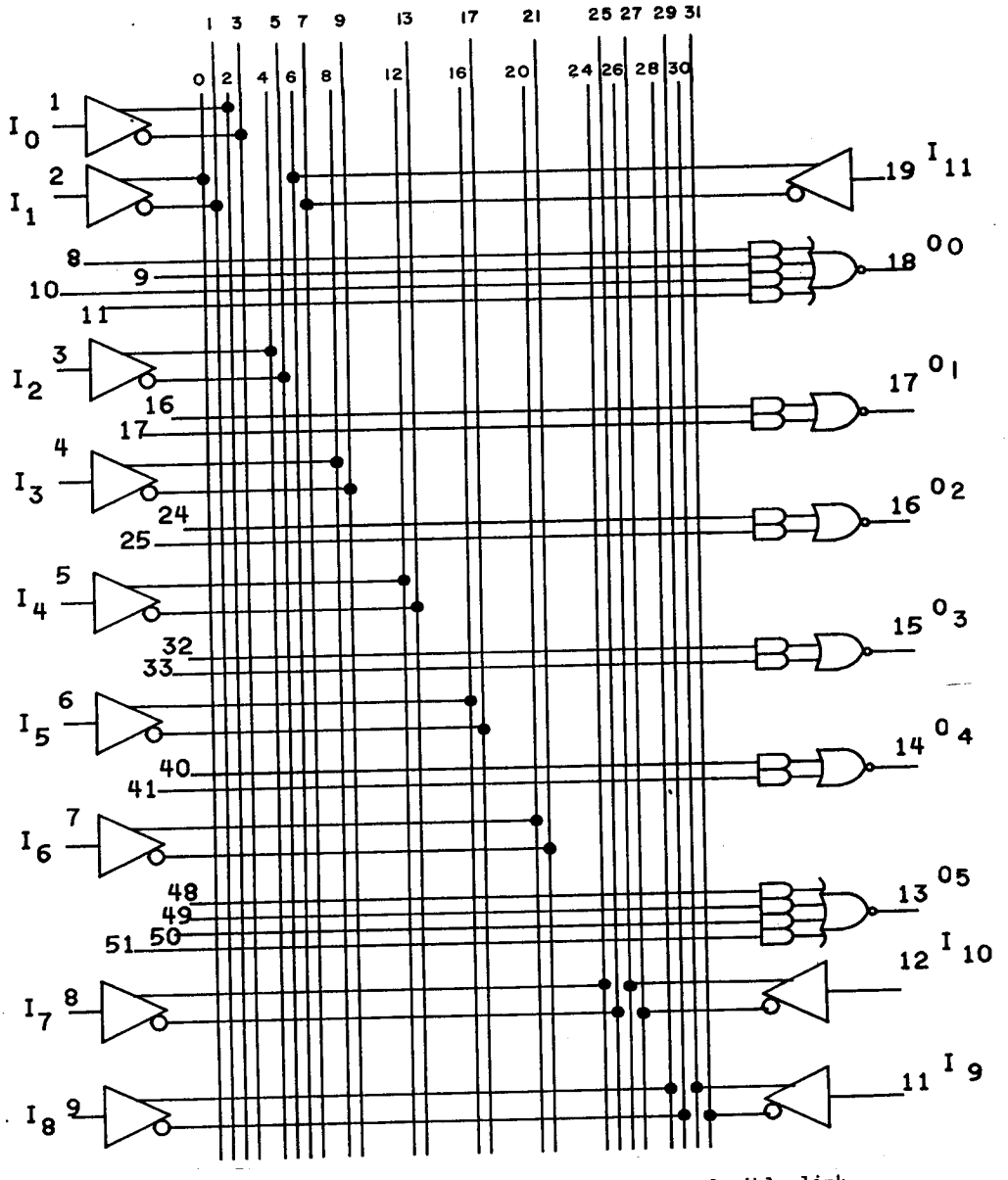
Device types 06 and 14



NOTE: Each intersection of numbered lines indicates a fusible link.

FIGURE 3. Unprogrammed logic diagram - Continued.

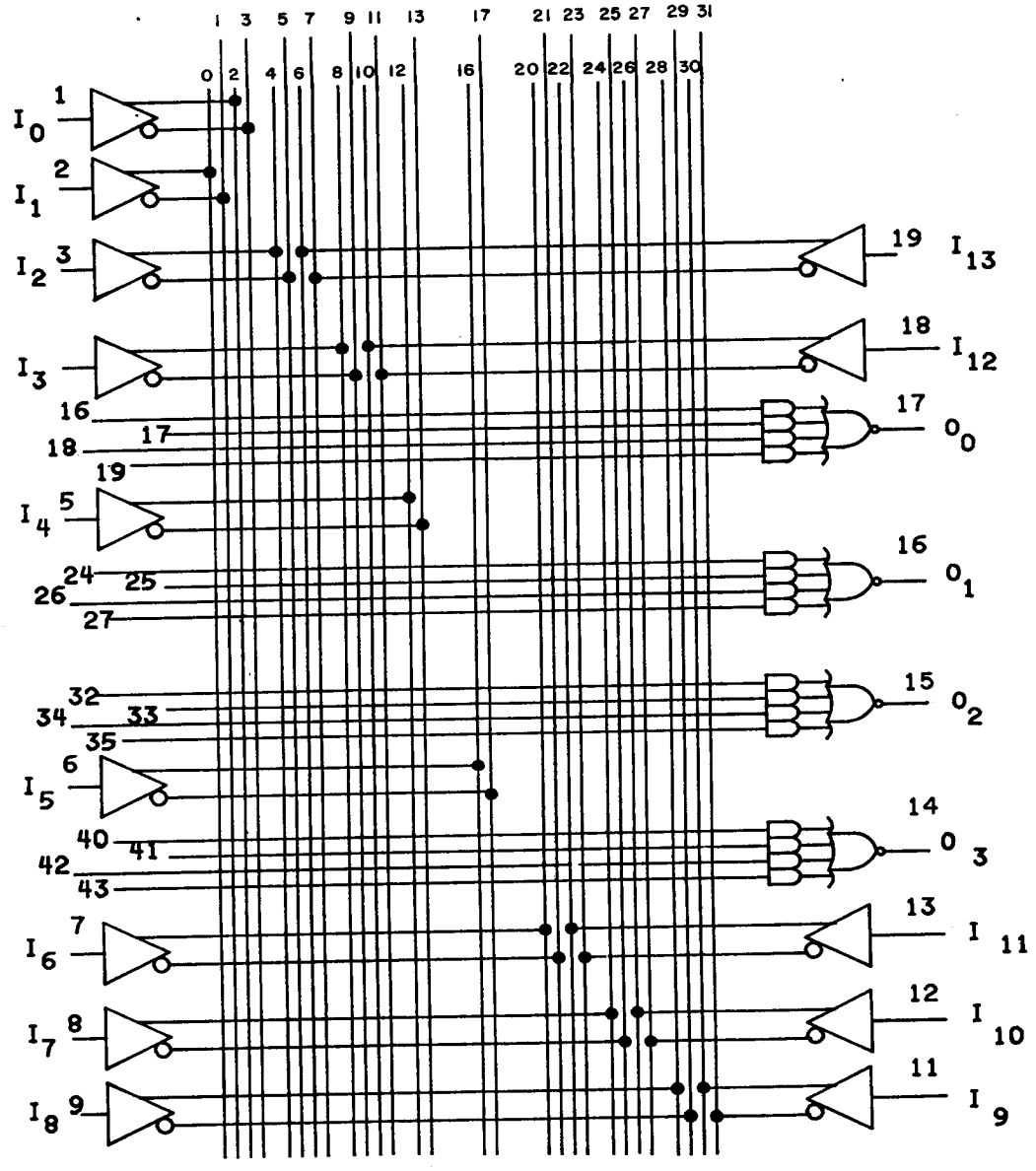
Device types 07 and 15



NOTE: Each intersection of numbered lines indicates a fusible link.

FIGURE 3. Unprogrammed logic diagram - Continued.

Device types 08 and 16



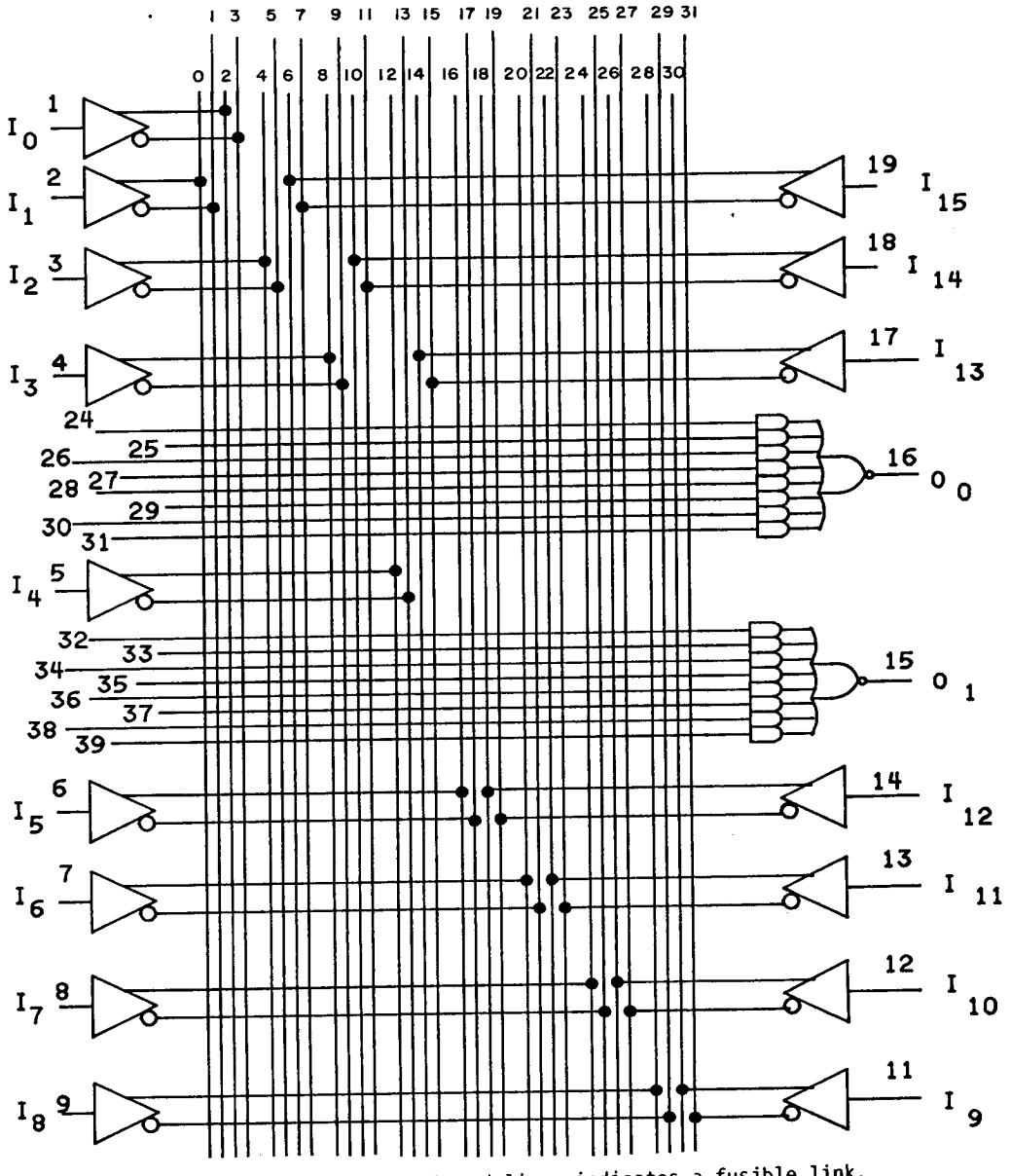
NOTE: Each intersection of numbered lines indicates a fusible link.

FIGURE 3. Unprogrammed logic diagram - Continued.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		81035
		REVISION LEVEL E	SHEET 14

☆U.S. GOVERNMENT PRINTING OFFICE: 1987 - 748-129-60913

Device types 09 and 17



NOTE: Each intersection of numbered lines indicates a fusible link.

FIGURE 3. Unprogrammed logic diagram - Continued.

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, D, or E using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2) T_A = +125°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, and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. For unprogrammed devices, a sample shall be selected to satisfy programmability requirements prior to performing subgroups 9, 10, and 11. Twelve devices shall be submitted to programming (see 3.2.2.1). If more than two devices fail to program, the lot shall be rejected. At the manufacturer's option, the sample may be increased to 24 total devices with no more than 4 total device failures allowable.

d. For unprogrammed devices, 10 devices from the programmability sample shall be submitted to the requirements of group A, subgroups 9, 10, and 11. If more than two total devices fail, the lot shall be rejected. At the manufacturer's option, the sample may be increased to 20 total devices with no more than 4 total device failures allowable.

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 conditions, method 1005 of MIL-STD-883.

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

(2) T_A = +125°C, minimum.

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

TABLE II. Electrical test requirements. 1/ 2/ 3/

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	1
Final electrical test parameters (method 5004) for unprogrammed devices	1*,2,3,7*,8
Final electrical test parameters (method 5004) for programmed devices	1*,2,3,7*,8,9
Group A test requirements (method 5005)	1,2,3,7,8,9, 10,11 4/
Groups C and D end-point electrical parameters (method 5005)	2,3,7,8

1/ (*) indicates PDA applies to subgroups 1 and 7.
2/ Any or all subgroups may be combined when using high-speed testers.
3/ Subgroups 7 and 8 functional tests shall verify that no fuses are blown for unprogrammed devices or that the altered item drawing pattern exists for programmed devices (see table II).
4/ 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:

a. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

b. When a QPL source is established, the part numbered device specified in this drawing will be replaced by the microcircuit identified as part number M38510/503XXBXX.

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

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 herein) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part number 1/	Replacement military specification part number
8103501RX 2/	50364 27014	PAL10H8MJ/883 DMPAL10H8J/883	M38510/50301BRX
81035012X	50364	PAL10H8ML/883	M38510/50301B2X
8103501SX	50364	PAL10H8MW/883	M38510/50301BSX
8103502RX 2/	50364 27014	PAL12H6MJ/883 DMPAL12H6J/883	M38510/50302BRX
81035022X	50364	PAL12H6ML/883	M38510/50302B2X
8103502SX	50364	PAL12H6MW/883	M38510/50302BSX
8103503RX 2/	50364 27014	PAL14H4MJ/883 DMPAL14H4J/883	M38510/50303BRX
81035032X	50364	PAL14H4ML/883	M38510/50303B2X
8103503SX	50364	PAL14H4MW/883	M38510/50303BSX
8103504RX	50364 27014	PAL16H2MJ/883 DMPAL16H2J/883	M38510/50304BRX
81035042X	50364	PAL16H2ML/883	M38510/50304B2X
8103504SX	50364	PAL16H2MW/883	M38510/50304BSX

See footnotes at end of table.

Military drawing part number	Vendor CAGE number	Vendor similar part number 1/	Replacement military specification part number
8103505RX	50364 27014	PAL16C1MJ/883 DMPAL16C1J/883	M38510/50305BRX
81035052X	50364	PAL16C1ML/883	M38510/50305B2X
8103505SX	50364	PAL16C1MW/883	M38510/50305BSX
8103506RX 2/	50364 27014	PAL10L8MJ/883 DMPAL10L8J/883	M38510/50306BRX
81035062X	50364	PAL10L8ML/883	M38510/50306B2X
8103506SX	50364	PAL10L8MW/883	M38510/50306BSX
8103507RX 2/	50364 27014	PAL12L6MJ/883 DMPAL12L6J/883	M38510/50307BRX
81035072X	50364	PAL12L6ML/883	M38510/50307B2X
8103507SX	50364	PAL12L6MW/883	M38510/50307BSX
8103508RX 2/	50364 27014	PAL14L4MJ/883 DMPAL14L4J/883	M38510/50308BRX
81035082X	50364	PAL14L4ML/883	M38510/50308B2X
8103508SX	50364	PAL14L4MW/883	M38510/50308BSX
8103509RX	50364 27014	PAL16L2MJ/883 DMPAL16L2J/883	M38510/50309BRX
81035092X	50364	PAL16L2ML/883	M38510/50309B2X
8103509SX	50364	PAL16L2MW/883	M38510/50309BSX
8103510RX	27014	PAL10H8AJ/883	M38510/50310BRX
8103511RX	27014	PAL12H6AJ/883	M38510/50311BRX
8103512RX	27014	PAL14H4AJ/883	M38510/50312BRX
8103513RX	27014	PAL16H2AJ/883	M38510/50313BRX
8103514RX	27014	PAL10L8AJ/883	M38510/50315BRX
8103515RX	27014	PAL12L6AJ/883	M38510/50316BRX

See footnotes at end of table.

Military drawing part number	Vendor CAGE number	Vendor similar part number 1/	Replacement military specification part number
8103516RX	27014	PAL14L4AJ/883	M38510/50317BRX
8103517RX	27014	PAL16L2AJ/883	M38510/50318BRX

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/ Inactive for new design; use part number M38510/5030XBRX

Vendor CAGE number	Vendor name and address	Fusible link
50364	Monolithic Memories, Incorporated 2175 Mission College Boulevard Santa Clara, CA 95051	Titanium-Tungsten
27014	National Semiconductor 2900 Semiconductor Drive Santa Clara, CA 95051	Titanium-Tungsten