

INCH POUND

MIL-M-38510/508A
27 FEBRUARY 2006
SUPERSEDING
MIL-M-38510/508
15 NOVEMBER 1990

MILITARY SPECIFICATION

MICROCIRCUITS, MEMORY, DIGITAL, CMOS ONE-TIME PROGRAMMABLE ARRAY LOGIC,
MONOLITHIC SILICON

Inactive for new design after 28 July 1995.

This specification is approved for use by all Departments
and Agencies of the Department of Defense.

The requirements for acquiring the product herein shall consist of this specification sheet and MIL-PRF 38535.

1. SCOPE

1.1 Scope. This specification covers the detail requirements for monolithic silicon, CMOS, programmable array logic microcircuits which employ a one-time programmable EPROM cell as the programming element. Two product assurance classes (B and S) and a choice of case outlines and lead finishes are provided and are reflected in the complete part or identifying number (PIN). For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535, (see 6.4).

1.2 Part or Identifying Number (PIN). The PIN is in accordance with MIL-PRF-38535, and as specified herein.

1.2.1 Device type. The device types are as follows:

| <u>Device type</u> | <u>Circuit</u> | <u>t_{PD}</u> |
|--------------------|---|-----------------------|
| 01 | 22 input, 10 output, AND-OR logic array | 30 ns |
| 02 | 22 input, 10 output, AND-OR logic array | 25 ns |
| 03 | 22 input, 10 output, AND-OR logic array | 20 ns |
| 04 | 22 input, 10 output, AND-OR logic array | 15 ns |

1.2.2 Device class. The device class is the product assurance level as defined in MIL-PRF-38535.

1.2.3 Case outlines. The case outlines are as designated in MIL-STD-1835 and as follows:

| <u>Outline letter</u> | <u>Descriptive designator</u> | <u>Terminals</u> | <u>Package style</u> |
|-----------------------|-------------------------------|------------------|-----------------------------|
| K | GDFP2-F24, CDFP3-F24 | 24 | Flat package |
| L | GDIP3-T24, CDIP4-T24 | 24 | Dual in line package |
| 3 | CQCC1-N28 | 28 | Square chip carrier package |

Comments, suggestions, or questions on this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAS, P. O. Box 3990, Columbus, OH 43218-3990, or emailed to memory@dsccl.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <http://assist.daps.dla.mil>.

1.3 Absolute maximum ratings.

| | |
|--|------------------------|
| Supply voltage range | -0.5 V dc to +7.0 V dc |
| Input voltage range <u>1/</u> | -2.0 V dc to +7.0 V dc |
| Storage temperature range | -65°C to +150°C |
| Lead temperature (soldering, 10 seconds) | +260°C |
| Thermal resistance, junction-to-case (θ_{JC}) <u>2/</u> | (See MIL-STD-1835) |
| Output voltage applied in high Z state range <u>1/</u> | -0.5 V dc to +7.0 V dc |
| Output sink current | 16 mA |
| Maximum power dissipation (P_D) | 1.2 W |
| Maximum junction temperature (T_J) | +175°C |
| Data retention..... | 10 years minimum |

1.4 Recommended operating conditions.

| | |
|---|--------------------------------------|
| Supply voltage range..... | 4.5 V dc minimum to 5.5 V dc maximum |
| Minimum high level input voltage (V_{IH}) | 2.0 V dc |
| Maximum low level input voltage (V_{IL}) | 0.8 V dc |
| Case operating temperature range (T_C) | -55°C to +125°C |

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 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 cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications and standards. The following specifications and standards 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.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-PRF-38535 - Integrated Circuits (Microcircuits) Manufacturing, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-883 - Test Method Standard for Microelectronics.
MIL-STD-1835 - Interface Standard Electronic Component Case Outlines.

(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 specification 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 Qualification. Microcircuits furnished under this specification shall be products that are manufactured by a manufacturer authorized by the qualifying activity for listing on the applicable qualified manufacturers list before contract award (see 4.2 and 6.3). When manufacturer programmed devices are delivered to the user, an altered item drawing shall be prepared by the contracting activity to specify the required program configuration.

1/ Minimum voltage is -0.6 V dc which may undershoot to -2.0 V dc for pulses less than 20 ns. Maximum output voltage is $V_{CC} + 0.75$ V dc which may overshoot to + 7.0 V dc for pulses less than 20 ns.

2/ Must withstand the added P_D due to short circuit condition; e.g., I_{OS} .

3.2 Item requirements. The individual item requirements shall be in accordance with MIL-PRF-38535 and as specified herein or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein.

3.3 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535 and herein.

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

3.3.2 Truth tables.

3.3.2.1 Unprogrammed or erased devices. The truth tables for unprogrammed devices for contracts involving no altered item drawing shall be as specified on figure 2. When required in groups A, B, C, or D (see 4.4), the devices shall be programmed by the manufacturer prior to test. A minimum of 50 percent of the total number of cells shall be programmed or at least 25 percent of the total number of cells to any altered item drawing.

3.3.2.2 Programmed devices. The truth table for programmed devices shall be as specified by the altered item drawing.

3.3.3 Logic diagram. The logic diagrams for unprogrammed devices shall be as specified on figure 3.

3.3.4 Case outlines. The case outlines shall be in accordance with 1.2.3 herein.

3.4 Lead material and finish. The lead material and finish shall be in accordance with MIL-PRF-38535 (see 6.6).

3.5 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I. The electrical tests for each subgroup are described in table I. Any additional detailed information or electrical test requirements not covered in table I (i.e., pin for pin conditions and testing sequence) shall be maintained and available upon request from the qualifying activity.

3.6 Electrical test requirements. The electrical test requirements for each device class shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

3.7 Marking. Marking shall be in accordance with MIL-PRF-38535. For programmed devices, the altered item drawing number shall be added to the marking by the programming activity.

3.8 Processing options. Since the device is capable of being programmed by either the manufacturer or the user to result in a wide variety of configurations, two processing options are provided for selection in the contract, using an altered item drawing.

3.8.1 Unprogrammed device delivered to the user. All testing shall be verified through group A testing as defined in 3.3.2.1, table II. It is recommended that users perform subgroups 1, 2, and 3 along with 7 and 8 at required access speeds after programming to verify the specific program configuration.

3.8.2 Manufacturer programmed device delivered to the user. All testing requirements and quality assurance provisions herein, including the requirements of the altered item drawing, shall be satisfied by the manufacturer prior to delivery.

3.9 Microcircuit group assignment. The devices covered by this specification shall be in microcircuit group number 42 (see MIL-PRF-38535, appendix A).

4. VERIFICATION

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38535 or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not effect the form, fit, or function as described herein.

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-38535. Qualification data for subgroups 7 and 8 shall be attributes only.

4.3 Screening. Screening shall be in accordance with MIL-PRF-38535, and shall be conducted prior to qualification and conformance inspection. The following additional criteria shall apply:

- a. Delete the sequence specified in 3.1.9 through 3.1.13 of method 5004 and substitute lines 1 through 5 of table II herein.
- b. The burn-in test duration, test condition, and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document control by the device manufacturer's Technology Review Board (TRB) in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015 of MIL-STD-883.
- c. Interim and final electrical tests shall be as specified in table II, except interim electrical tests prior to burn in are optional at the discretion of the manufacturer.
- d. Post dynamic burn in electrical parameter measurements may, at the manufacturer's option, be performed separately or included in the final electrical parameter measurements.
- e. Additional screening for space level product shall be as specified in MIL-PRF-38535.
- f. A data retention stress test shall be included as part of the screening procedure and shall consist of the following steps: (Step 1 through 4 are performed at the wafer level.)
 - (1) Program 100 percent of the total number of cells, excluding the security bit.
 - (2) Bake, unbiased, for 72 hours at +140°C or for 48 hours at +150°C or for 8 hours at +200°C, or 2 hours at +300°C for unassembled devices only.
 - (3) Perform margin test using $V_m = +5.7$ V at +25°C using loose timing (i.e., $t_{ACC} = 1$ μ s).
 - (4) Erase.

4.4 Technology Conformance Inspection (TCI). Technology conformance inspection shall be in accordance with MIL-PRF-38535 and herein for groups A, B, C, and D inspections (see 4.4.1 through 4.4.4).

4.4.1 Group A inspection. Group A inspection shall be in accordance with table III of MIL-PRF-38535 and as follows:

- a. Tests shall be as specified in table II herein.
- b. Subgroups 5 and 6 of table III of MIL-PRF-38535 shall be omitted.
- c. Subgroups 4 (C_{IN} and C_{OUT} measurements) shall be measured only for the initial qualification and after process or design changes which may affect capacitance. Sample size is 15 devices with no failures, and all input and output terminals tested.
- d. Unprogrammed devices shall be tested for programmability and ac performance compliance to the requirements of group A, subgroups 9, 10, and 11.
 - (1) 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 3.3.2.1). 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 four total device failures allowable.
 - (2) Ten devices from the programmability sample shall be submitted to the requirements of group A, subgroups 9, 10, and 11. If more than two 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 four total device failures allowable.

4.4.2 Group B inspection. Group B inspection shall be in accordance with table II of MIL-PRF-38535.

a. Electrical parameters shall be as specified in table II herein.

4.4.3 Group C inspection. Group C inspection shall be in accordance with table IV of MIL-PRF-38535 and as follows:

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

b. The steady-state life test duration, test condition, and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document control by the device manufacturer's Technology Review Board (TRB) in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.

4.4.4 Group D inspection. Group D inspection shall be in accordance with table V of MIL-PRF-38535 and as follows:

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

b. The devices selected for testing shall be programmed with a minimum of 50 percent of the total number of cells programmed or to any altered item drawing pattern which includes at least 25 percent of the total number of cells programmed.

4.5 Methods of inspection. Methods of inspection shall be as specified in the appropriate tables and as follows:

4.5.1 Voltage and current. All voltages given are referenced to the microcircuit ground terminal. Currents given are conventional current and positive when flowing into the referenced terminal.

4.6 Programming procedure. The programming procedure shall be as specified by the device manufacturer and shall be made available upon request.

TABLE I. Electrical performance characteristics.

| Parameter | Symbol | Test conditions -55°C ≤ T _C ≤ +125°C GND = 0 V 4.5 V ≤ V _{CC} ≤ 5.5 V unless otherwise specified | Group A subgroups (test method) | Device types | Limits | | Unit |
|---|------------------|--|--|-----------------|--------|-----|------|
| | | | | | Min | Max | |
| High level output voltage | V _{OH} | V _{CC} = 4.5 V, V _{IL} = 0.0 V V _{IH} = 5.0 V, I _{OH} = -2.0 mA | 1,2,3 (3006) | All | 2.4 | | V |
| Low level output voltage | V _{OL} | V _{CC} = 4.5 V, V _{IL} = 0.0 V V _{IH} = 5.0 V, I _{OL} = 12 mA | 1,2,3 (3007) | All | | 0.5 | V |
| Input high level voltage <u>1/</u> | V _{IH} | V _{CC} = 4.5 V | 1,2,3 (3008) | All | 2.0 | | V |
| Input low level voltage <u>1/</u> | V _{IL} | V _{CC} = 4.5 V | 1,2,3 (3008) | All | | 0.8 | V |
| High impedance output leakage current <u>2/</u> | I _{OZL} | V _{CC} = 5.5 V, V _{IL} = 0.0 V V _{IH} = 5.0 V, V _O = 0.0 V | 1,2,3 (3020) | All | -40 | | μA |
| High impedance output leakage current <u>2/</u> | I _{OZH} | V _{CC} = 5.5 V, V _{IL} = 0.0 V V _{IH} = 5.0 V, V _O = 5.5 V | 1,2,3 (3021) | All | | 40 | μA |
| High level input current | I _{IH} | V _{CC} = 5.5 V, V _{IH} = 5.5 V | 1,2,3 (3010) | All | | 10 | μA |
| Low level input current | I _{IL} | V _{CC} = 5.5 V, V _{IL} = 0.0 V | 1,2,3 (3009) | All | -10 | | μA |
| Supply current | I _{CC} | V _{CC} = 5.5 V I/O = open Pins (IO - I11) = 0.0 V | 1,2,3 (3005) | All | | 120 | mA |
| Output short circuit current <u>3/ 4/</u> | I _{OS} | V _{CC} = 5.5 V, V _O = 0.5 V | 1,2,3 (3011) | All | -30 | -90 | mA |
| Input capacitance <u>4/</u> | C _I | V _{CC} = 5.0 V, V _I = 0.0 V T _C = +25°C, f = 1 MHz (see 4.4.1c) | 4 (3012) | All | | 10 | pF |
| Output capacitance <u>4/</u> | C _O | V _{CC} = 5.0 V, V _O = 0.0 V T _C = +25°C, f = 1 MHz (see 4.4.1c) | 4 (3012) | All | | 10 | pF |
| Input or feedback to nonregistered output | t _{PD} | V _{CC} = 4.5 V See figure 4 | 9,10,11 (3003) | 01 | | 30 | ns |
| | | | | 02 | | 25 | |
| | | | | 03 | | 20 | |
| | | | | 04 | | 15 | |
| Clock to output <u>5/</u> | t _{CO} | V _{CC} = 4.5 V See figure 4 | 9,10,11 (3003) | 01 | | 20 | ns |
| | | | | 02,03 | | 15 | |
| | | | | 04 | | 10 | |
| Input to output enable | t _{PZH} | V _{CC} = 4.5 V See figure 4 | 9,10,11 (3003) | 01,02 | | 25 | ns |
| | | | | 03 | | 20 | |
| | | | | 04 | | 15 | |
| Input to output enable | t _{PZL} | V _{CC} = 4.5 V See figure 4 | 9,10,11 (3003) | 01,02 | | 25 | ns |
| | | | | 03 | | 20 | |
| | | | | 04 | | 15 | |
| Input to output disable | t _{PHZ} | V _{CC} = 4.5 V See figure 4 | 9,10,11 (3003) | 01,02 | | 25 | ns |
| | | | | 03 | | 20 | |
| | | | | 04 | | 15 | |

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

| Parameter | Symbol | Test conditions -55°C ≤ T _C ≤ +125°C GND = 0 V 4.5 V ≤ V _{CC} ≤ 5.5 V unless otherwise specified | Group A subgroups (test method) | Device types | Limits | | Unit | | |
|---|------------------|--|--|-----------------|--------|-----|------|----|--|
| | | | | | Min | Max | | | |
| Input to output disable | t _{PLZ} | V _{CC} = 4.5 V See figure 4 | 9,10,11 (3003) | 01,02 | | 25 | ns | | |
| | | | | 03 | | 20 | | | |
| | | | | 04 | | 15 | | | |
| Clock pulse width <u>4/</u> | t _{WH} | | 9,10,11 (3003) | | 01 | 20 | | ns | |
| | | | | | 02,03 | 15 | | | |
| | | | | | 04 | 6 | | | |
| Clock pulse width <u>4/</u> | t _{WL} | | 9,10,11 (3003) | | 01 | 20 | | ns | |
| | | | | | 02,03 | 15 | | | |
| | | | | | 04 | 6 | | | |
| Setup time | t _S | | 9,10,11 (3003) | | 01 | 20 | | ns | |
| | | | | | 02 | 18 | | | |
| | | | | | 03 | 17 | | | |
| | | 04 | | | 12 | | | | |
| Hold time | t _H | 9,10,11 (3003) | | All | 0 | | ns | | |
| Maximum clock frequency <u>6/</u> | f _{MAX} | 9,10,11 (3003) | | 01 | 25 | | MHz | | |
| | | | | 02 | 30 | | | | |
| | | | | 03 | 31.2 | | | | |
| | | | | 04 | 45 | | | | |
| Asynchronous reset pulse width | t _{AW} | 9,10,11 (3003) | | 01 | 30 | | ns | | |
| | | | | 02 | 25 | | | | |
| | | | | 03 | 20 | | | | |
| | | | | 04 | 15 | | | | |
| Asynchronous reset recovery time | t _{AR} | 9,10,11 (3003) | | 01 | 30 | | ns | | |
| | | | | 02 | 25 | | | | |
| | | | | 03 | 20 | | | | |
| | | | | 04 | 15 | | | | |
| Asynchronous reset to registered output reset | t _{AP} | 9,10,11 (3003) | | 01 | | 30 | ns | | |
| | | | | 02,03 | | 25 | | | |
| | | | | 04 | | 20 | | | |

- 1/ These are absolute values with respect to device ground and all overshoots due to system or tester noise are included.
- 2/ I/O terminal leakage is the worst case of I_{IX} or I_{OZ}.
- 3/ For test purposes, not more than one output should be shorted at a time. Short circuit test duration should not exceed one second.
- 4/ Tested initially and after any design or process changes that affect that parameter, and therefore shall be guaranteed to the limits specified in table I.
- 5/ Test applies only to registered outputs.
- 6/ f_{MAX} is derived by testing t_S and t_{CO} and is not tested directly. f_{MAX} = 1/(t_S + t_{CO}).

TABLE II. Burn-in and Electrical test requirements.

| Line No. | MIL-PRF-38535 Test requirements | Class S devices <u>1/ 2/</u> | | | Class B devices <u>1/ 2</u> | | |
|----------|---|------------------------------|--------------------------|---------------------------|-----------------------------|--------------------------|---------------------------|
| | | Reference paragraph | Table I 3/ subgroups | Table III Delta 4/ limits | Reference paragraph | Table I 3/ subgroups | Table III Delta 4/ limits |
| 1 | Interim electrical parameters | | 1 | | | | |
| 2 | Static burn-in I | 4.3b | Required | | | | |
| 3 | Same as line 1. | | 1* | Δ | | | |
| 4 | Static burn-in II | 4.3b | Required | | | | |
| 5 | Same as line 1. | | 1* | Δ | | | |
| 6 | Dynamic burn-in | 4.3b | Required | | 4.3b | Required | |
| 7 | Same as line 1. | 4.3d | 1* | | | | |
| 8 | Final electrical test parameters | | 1*, 2, 3, 7, 8 5/ | Δ | | 1*, 2, 3, 7, 8 | |
| 9 | Group A test requirements | 4.4.1 | 1, 2, 3, 7, 8, 9, 10, 11 | | 4.4.1 | 1, 2, 3, 7, 8, 9, 10, 11 | |
| 10 | Group B end-point electrical test parameters when using the method 5005 QCI option. | 4.4.2 | 1, 2, 3, 7, 8, 9, 10, 11 | Δ | | | |
| 11 | Group C end-point electrical test parameters | | 1, 2, 3, 7, 8, 9, 10, 11 | | 4.4.3 | 1, 2, 3, 7, 8 5/ 6/ | Δ |
| 12 | Group D end-point electrical test parameters | 4.4.4 | 1, 2, 3, 7, 8 | | 4.4.4 | 1, 2, 3, 7, 8 | |

1/ Blank spaces indicate tests are not applicable.

2/ For subgroups 9, 10, and 11 only, the worst value measured per device need be recorded when variables data is required (e.g., during qualification).

3/ * indicates PDA applies to subgroup 1.

4/ Δ indicates delta limits shall be required only in table III, subgroup 1, where specified, and the delta values shall be computed with reference to the previous interim electrical parameters (line 1). Refer to table III for required parameters and limits to be tested.

5/ The device manufacturer may at his option, either complete subgroup 1 electrical parameter measurements, including delta measurements, within 96 hours after burn in completion (removal of bias); or may complete subgroup 1 electrical measurements without delta measurements within 24 hours after burn in completion (removal of bias).

6/ For class B, delta limits shall be required on initial qualification or after any design changes which may affect the parameters listed in table III. Delta values shall be computed with reference to the previous interim electrical parameters.

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| Device types | 01, 02, 03, and 04 | |
|-----------------|--------------------|-------------------|
| Case outlines | K, L | 3 |
| Terminal number | Terminal Symbol | |
| 1 | CP/I ₀ | NC |
| 2 | I ₁ | CP/I ₀ |
| 3 | I ₂ | I ₁ |
| 4 | I ₃ | I ₂ |
| 5 | I ₄ | I ₃ |
| 6 | I ₅ | I ₄ |
| 7 | I ₆ | I ₅ |
| 8 | I ₇ | NC |
| 9 | I ₈ | I ₆ |
| 10 | I ₉ | I ₇ |
| 11 | I ₁₀ | I ₈ |
| 12 | GND | I ₉ |
| 13 | I ₁₁ | I ₁₀ |
| 14 | I/O ₀ | GND |
| 15 | I/O ₁ | NC |
| 16 | I/O ₂ | I ₁₁ |
| 17 | I/O ₃ | I/O ₀ |
| 18 | I/O ₄ | I/O ₁ |
| 19 | I/O ₅ | I/O ₂ |
| 20 | I/O ₆ | I/O ₃ |
| 21 | I/O ₇ | I/O ₄ |
| 22 | I/O ₈ | NC |
| 23 | I/O ₉ | I/O ₅ |
| 24 | V _{CC} | I/O ₆ |
| 25 | --- | I/O ₇ |
| 26 | --- | I/O ₈ |
| 27 | --- | I/O ₉ |
| 28 | --- | V _{CC} |

FIGURE 1. Terminal Connections.

| Truth Table | | | | | | | | | | | | | | | | | | | | | |
|-------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Input pins | | | | | | | | | | | Output pins | | | | | | | | | | |
| CP/I ₀ | I ₁ | I ₂ | I ₃ | I ₄ | I ₅ | I ₆ | I ₇ | I ₈ | I ₉ | I ₁₀ | I ₁₁ | I/O ₀ | I/O ₁ | I/O ₂ | I/O ₃ | I/O ₄ | I/O ₅ | I/O ₆ | I/O ₇ | I/O ₈ | I/O ₉ |
| X | X | X | X | X | X | X | X | X | X | X | X | Z | Z | Z | Z | Z | Z | Z | Z | Z | Z |

NOTES:

1. Z = High impedance
2. X = Don't care

FIGURE 2. Truth tables (unprogrammed).

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INPUT LINES

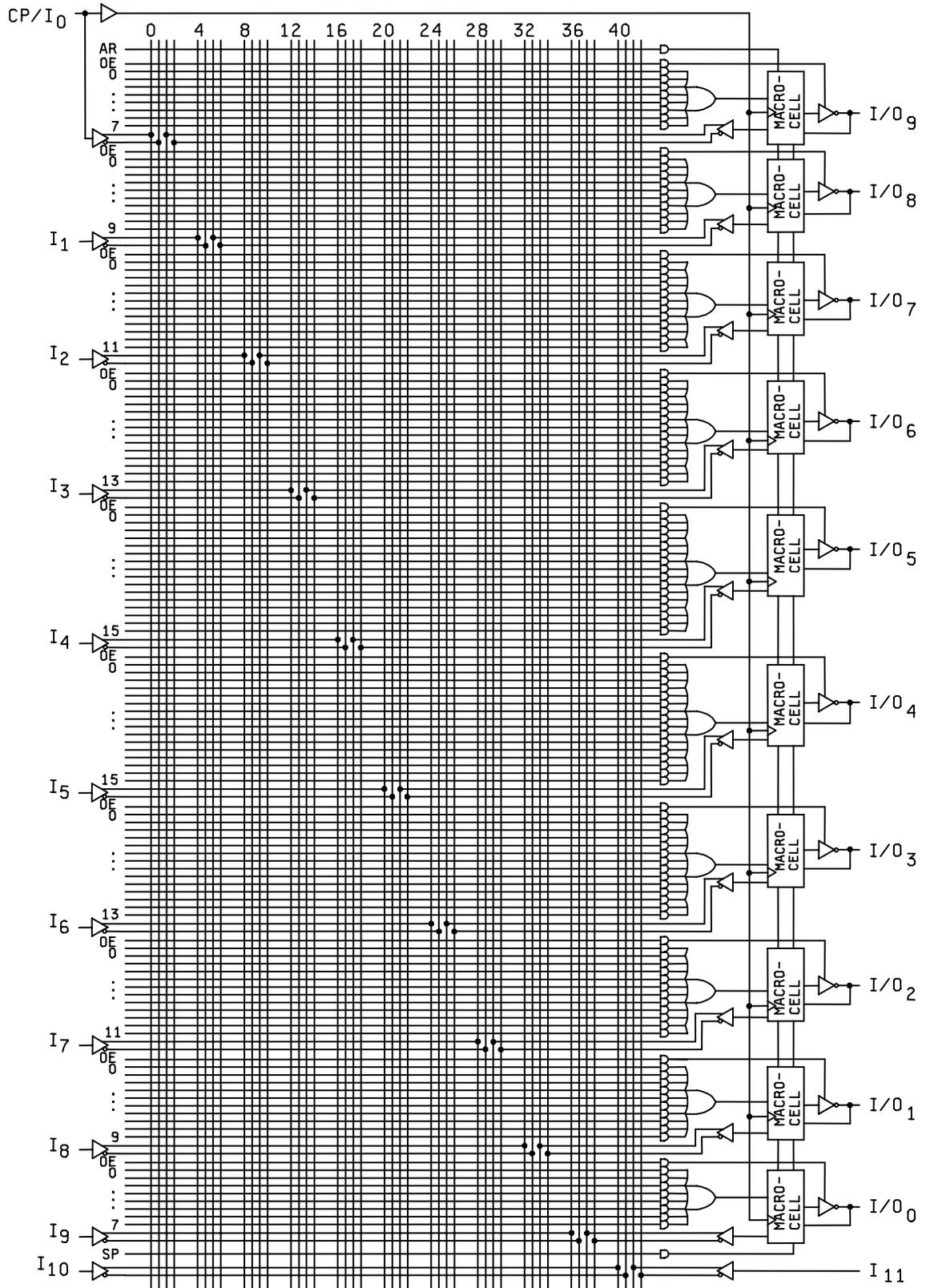


FIGURE 3. Logic diagram (Unprogrammed) .

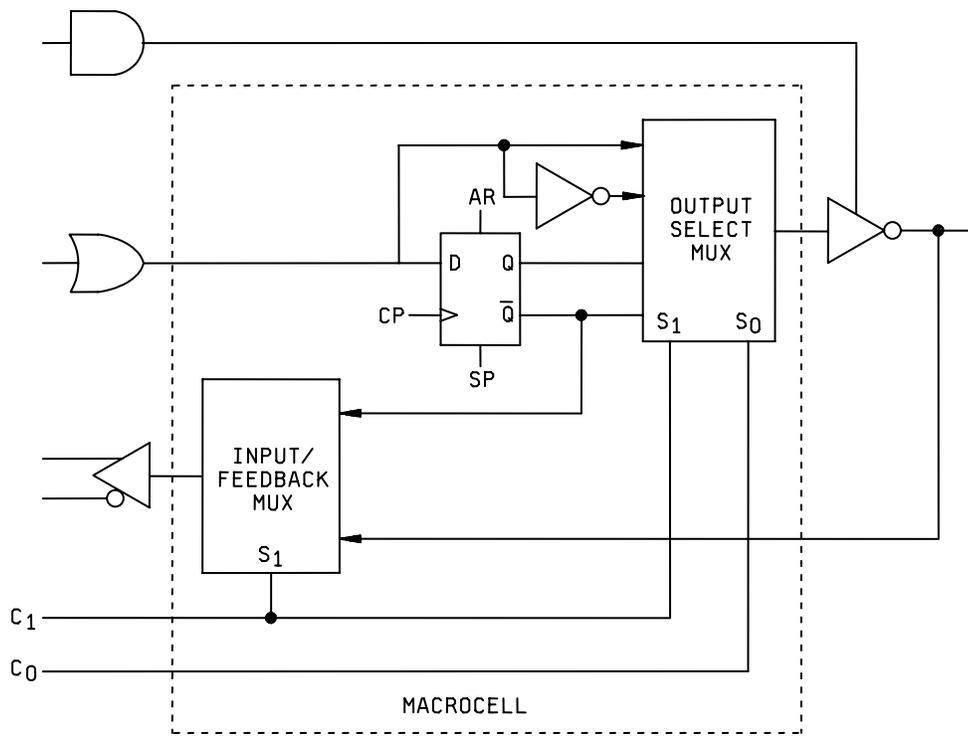
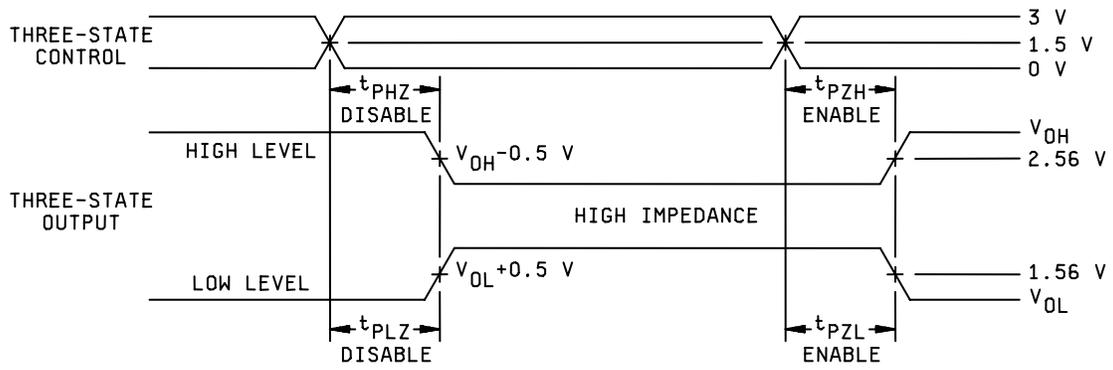
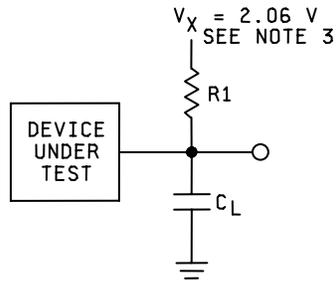
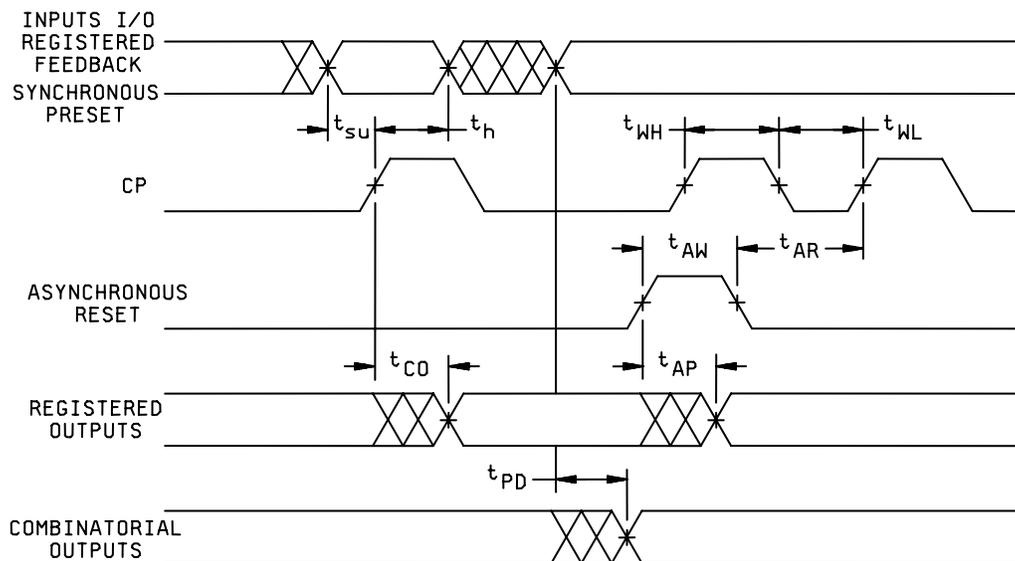


FIGURE 3. Logic diagram (Unprogrammed)– Continued.



OUTPUT CONTROL SWITCHING WAVEFORM

FIGURE 4. Switching time test circuit and waveforms.



NOTES:

- $C_L = 50 \text{ pF}$ minimum, including jig and probe capacitance.
 t_{PHZ} and t_{PLZ} are specified with $C_L = 5 \text{ pF}$.
 $R1 = 105 \text{ ohms} \pm 1 \text{ percent}$.
- $V_{IH} = 3.0 \text{ V}$, $V_{IL} = 0.0 \text{ V}$.
- For t_{PZH} , t_{PZL} , t_{PHZ} , and t_{PLZ} :

| Test | V_X | Output Measurement level |
|-----------|-------|--------------------------|
| t_{PZH} | 2.06 | 2.56 V |
| t_{PZL} | 2.06 | 1.56 V |
| t_{PHZ} | 1.5 | $V_{OH} - 0.5 \text{ V}$ |
| t_{PLZ} | 2.60 | $V_{OH} + 0.5 \text{ V}$ |

FIGURE 4. Switching time test circuit and waveforms - Continued.

TABLE III. Delta limits at +25°C.

| Parameter ^{1/} | Device types |
|--------------------------------------|---------------------------|
| | All |
| I _{CC} | ± 2 mA |
| I _{OZH} I _{OZL} | ± 10 % of specified value |
| I _{IH} I _{IL} | ±10 % of specified value |

^{1/} The above parameter shall be recorded before and after the required burn in and life tests to determine the delta (Δ).

5. PACKAGING

5.1 Packaging requirements. 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 activity within the Military Service or Defense Agency, or within the military service's system command. 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

(This section contains information of a general or explanatory nature that may be helpful, but it is not mandatory)

6.1 Intended use. Microcircuits conforming to this specification are intended for logistic support of existing equipment.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. PIN and compliance identifier, if applicable (see 1.2).
- c. Requirement for delivery of one copy of the conformance inspection data pertinent to the device inspection lot to be supplied with each shipment by the device manufacturer, if applicable.
- d. Requirement for certificate of compliance, if applicable.
- e. Requirements for notification of change of product or process to the acquiring activity in addition to notification to the qualifying activity, if applicable.
- f. Requirements for failure analysis (including required test condition of method 5003 of MIL-STD-883), corrective action and reporting of results, if applicable.
- g. Requirement for product assurance options.
- h. Requirements for special lead lengths or lead forming, if applicable. These requirements should not affect the PIN. Unless otherwise specified, these requirements will not apply to direct purchase by or direct shipment to the Government.
- i. Requirements for programming the device, including processing option.
- j. Requirements for "JAN" marking.
- k. Packaging requirements (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List QML-38535 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from DSCC-VQ, 3990 E. Broad Street, Columbus, Ohio 43123-1199.

6.4 Superseding information. The requirements of MIL-M-38510 have been superseded to take advantage of the available Qualified Manufacturer Listing (QML) system provided by MIL-PRF-38535. Previous references to MIL-M-38510 in this document have been replaced by appropriate references to MIL-PRF-38535. All technical requirements now consist of this specification and MIL-PRF-38535. The MIL-M-38510 specification sheet number and PIN have been retained to avoid adversely impacting existing government logistics systems and contractor's parts lists.

6.5 Abbreviations, symbols and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-PRF-38535 and MIL-HDBK-1331, and as follows:

GND Electrical ground (common terminal)
 V_{IN} Voltage level at an input terminal.
 I_{IN} Current flowing into an input terminal.

6.6 Logistic support. Lead materials and finishes (see 3.4) are interchangeable. Unless otherwise specified, microcircuits acquired for Government logistic support will be acquired to device class B (see 1.2.2), and lead material and finish A (see 3.4). Longer length leads and lead forming should not affect the PIN. It is intended that spare devices for logistic support be acquired in the unprogrammed condition (see 3.8.1) and programmed by the maintenance activity, except where use of quantities for devices with a specific program or pattern justify stocking of preprogrammed devices.

6.7 Substitutability. The cross-reference information below is presented for the convenience of users. Microcircuits covered by this specification will functionally replace the listed generic industry type. Generic industry microcircuit types may not have equivalent operational performance characteristics across military temperature ranges or reliability factors equivalent to MIL-M-38510 device types and may have slight physical variations in relation to case size. The presence of this information should not be deemed as permitting substitution of generic industry types for MIL-M-38510 types or as a waiver of any of the provisions of MIL-PRF-38535.

| <u>Device type</u> | <u>Commercial type</u> |
|--------------------|------------------------|
| 01 | C22V10-30 |
| 02 | C22V10-25 |
| 03 | C22V10-20 |
| 04 | C22V10-15 |

6.8 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:
 Army – CR
 Navy – EC
 Air Force – 11
 DLA - CC

Preparing activity:
 DLA - CC

Review activities:
 Army – MI, SM
 Navy – AS, CG, MC, SH, TD
 Air Force – 03, 19, 99

(Project 5962-2005-050)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <http://assist.daps.dla.mil>.