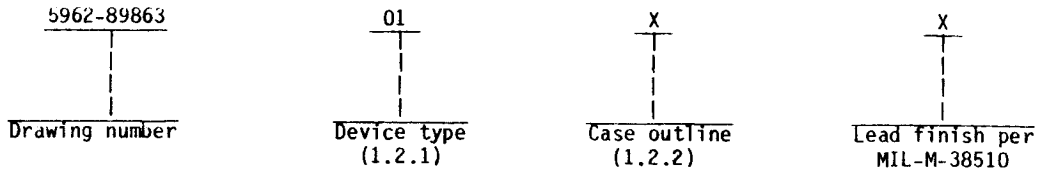


**DISTRIBUTION STATEMENT A.** Approved for public release; distribution is unlimited.

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



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

| Device type | Generic number | Circuit function | Access time |
|-------------|----------------|------------------|-------------|
| 01          | See 6.6        | 512 X 9 FIFO     | 80 ns       |
| 02          | See 6.6        | 512 X 9 FIFO     | 65 ns       |
| 03          | See 6.6        | 512 X 9 FIFO     | 50 ns       |
| 04          | See 6.6        | 512 X 9 FIFO     | 40 ns       |
| 05          | See 6.6        | 512 X 9 FIFO     | 30 ns       |
| 06          | See 6.6        | 512 X 9 FIFO     | 25 ns       |

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                                                                |
|----------------|-----------------------------------------------------------------------------|
| X              | D-10 (28-lead, 1.490" x .610" x .232"), dual-in-line package                |
| Y              | D-15 (28-lead, 1.485" x .310" x .230"), dual-in-line package                |
| Z              | C-12 (32-terminal, .560" x .458" x .120"), rectangular chip carrier package |
| U              | F-11 (28-lead, .740" x .380" x .090"), flat package                         |

## 1.3 Absolute maximum ratings.

|                                                           |                             |
|-----------------------------------------------------------|-----------------------------|
| Supply voltage to ground potential - - - - -              | -0.5 V dc to +7.0 V dc      |
| DC voltage applied to outputs in high Z state -           | -0.5 V dc to +7.0 V dc      |
| DC input voltage - - - - -                                | -3.0 V dc to +7.0 V dc      |
| DC output current - - - - -                               | 20 mA                       |
| Maximum power dissipation $\frac{1}{2}$ - - - - -         | 1.0 W                       |
| Lead temperature (soldering, 10 seconds) - - -            | +260°C                      |
| Thermal resistance, junction-to-case ( $\theta_{JC}$ ): - | See MIL-M-38510, appendix C |
| Junction temperature ( $T_J$ ) $\frac{2}{2}$ - - - - -    | +150°C                      |
| Storage temperature range - - - - -                       | -65°C to +150°C             |
| Temperature under bias - - - - -                          | -55°C to +125°C             |

1/ Must withstand the added  $P_D$  due to short circuit test (e.g.,  $I_{OS}$ ).

2/ Maximum junction temperature may be increased to +175°C during burn-in and steady-state life.

|                                                                                                     |                  |                |            |
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#### 1.4 Recommended operating conditions.

|                                            |           |                        |
|--------------------------------------------|-----------|------------------------|
| Supply voltage ( $V_{CC}$ )                | - - - - - | +4.5 V dc to +5.5 V dc |
| Ground voltage (GND)                       | - - - - - | 0 V dc                 |
| Input high voltage ( $V_{IH}$ )            | - - - - - | 2.2 V dc minimum       |
| Input low voltage ( $V_{IL}$ )             | - - - - - | 0.8 V dc maximum       |
| Case operating temperature range ( $T_C$ ) | - - - - - | -55°C to +125°C        |

#### 2. APPLICABLE DOCUMENTS

2.1 Government specification, standard, and bulletin. Unless otherwise specified, the following specification, standard, and bulletin 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.

##### BULLETIN

###### MILITARY

MIL-BUL-103 - List of Standardized Military Drawings (SMDs).

(Copies of the specification, standard, and bulletin 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 Case outlines. The case outlines shall be in accordance with 1.2.2 herein.

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TABLE I. Electrical performance characteristics.

| Test                        | Symbol                        | Conditions <sup>1/</sup><br>-55°C < T <sub>C</sub> < +125°C<br>4.5 V < V <sub>CC</sub> < 5.5 V<br>unless otherwise specified                                                                                                                   | Group A<br>subgroups | Device<br>types | Limits |     | Unit |
|-----------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------|--------|-----|------|
|                             |                               |                                                                                                                                                                                                                                                |                      |                 | Min    | Max |      |
| Output high voltage         | V <sub>OH</sub>               | V <sub>CC</sub> = 4.5 V, I <sub>OH</sub> = -2.0 mA<br>V <sub>IN</sub> = V <sub>IH</sub> , V <sub>IL</sub>                                                                                                                                      | 1, 2, 3              | A11             | 2.4    |     | V    |
| Output low voltage          | V <sub>OL</sub>               | V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 8.0 mA<br>V <sub>IN</sub> = V <sub>IH</sub> , V <sub>IL</sub>                                                                                                                                       | 1, 2, 3              | A11             |        | 0.4 | V    |
| Input high voltage          | V <sub>IH</sub> <sup>2/</sup> |                                                                                                                                                                                                                                                | 1, 2, 3              | A11             | 2.2    |     | V    |
| Input low voltage           | V <sub>IL</sub> <sup>2/</sup> |                                                                                                                                                                                                                                                | 1, 2, 3              | A11             |        | 0.8 | V    |
| Input leakage current       | I <sub>IX</sub>               | V <sub>IN</sub> = 5.5 V to GND                                                                                                                                                                                                                 | 1, 2, 3              | A11             | -10    | +10 | uA   |
| Output leakage current      | I <sub>OZ</sub>               | V <sub>CC</sub> = 5.5 V,<br>V <sub>OUT</sub> = 5.5 V and GND                                                                                                                                                                                   | 1, 2, 3              | A11             | -10    | +10 | uA   |
| Operating supply<br>current | I <sub>CC1</sub>              | V <sub>CC</sub> = 5.5 V, I <sub>OUT</sub> = 0 mA<br><br>f = 1/trc<br><br>W, R, D <sub>0</sub> - D <sub>8</sub> pins are<br>toggling between 0 V and 3 V<br>FF, X0/HF = 0 mA<br>Q <sub>0</sub> - Q <sub>8</sub> = 0 mA<br><br>MR, FL/RT = 3.0 V | 1, 2, 3              | 01,02           |        | 115 | mA   |
|                             |                               |                                                                                                                                                                                                                                                |                      | 03              |        | 130 |      |
|                             |                               |                                                                                                                                                                                                                                                |                      | 04,05           |        | 140 |      |
|                             |                               |                                                                                                                                                                                                                                                |                      | 06              |        | 147 |      |
| Standby current             | I <sub>CC2</sub>              | V <sub>CC</sub> = 5.5 V, I <sub>OUT</sub> = 0 mA<br>All inputs = V <sub>IH</sub><br><br>FF, X0/HF = 0 mA<br>Q <sub>0</sub> - Q <sub>8</sub> = 0 mA                                                                                             | 1, 2, 3              | A11             |        | 30  | mA   |
| Power down current          | I <sub>CC3</sub>              | V <sub>CC</sub> = 5.5 V, I <sub>OUT</sub> = 0 mA<br>All inputs = V <sub>CC</sub> - 0.2 V<br><br>FF, X0/HF = 0 mA<br>Q <sub>0</sub> - Q <sub>8</sub> = 0 mA                                                                                     | 1, 2, 3              | A11             |        | 25  | mA   |

See footnotes at end of table.

|                                                                                                     |                  |                |            |
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TABLE I. Electrical performance characteristics - Continued.

| Test                    | Symbol                   | Conditions 1/<br>-55°C < T <sub>C</sub> < +125°C<br>4.5 V < V <sub>CC</sub> < 5.5 V<br>unless otherwise specified | Group A<br>subgroups | Device<br>types   | Limits   |     | Unit |
|-------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------|-------------------|----------|-----|------|
|                         |                          |                                                                                                                   |                      |                   | Min      | Max |      |
| Input capacitance       | C <sub>IN</sub><br>3/    | V <sub>CC</sub> = 5.0 V<br>T <sub>A</sub> = +25°C, f = 1 MHz<br>See 4.3.1c                                        | 4                    | A11               |          | 8   | pF   |
| Output capacitance      | C <sub>OUT</sub><br>3/   | V <sub>CC</sub> = 5.0 V<br>T <sub>A</sub> = +25°C, f = 1 MHz<br>See 4.3.1c                                        | 4                    | A11               |          | 8   | pF   |
| Functional tests        |                          | See 4.3.1d                                                                                                        | 7,8                  | A11               |          |     |      |
| Read cycle time         | t <sub>RC</sub>          | See figure 3                                                                                                      | 9, 10, 11            | 01                | 100      |     | ns   |
|                         |                          |                                                                                                                   |                      | 02                | 80       |     |      |
|                         |                          |                                                                                                                   |                      | 03                | 65       |     |      |
|                         |                          |                                                                                                                   |                      | 04                | 50       |     |      |
|                         |                          |                                                                                                                   |                      | 05                | 40       |     |      |
|                         |                          |                                                                                                                   |                      | 06                | 35       |     |      |
| Access time             | t <sub>A</sub>           |                                                                                                                   | 9, 10, 11            | 01                |          | 80  | ns   |
|                         |                          |                                                                                                                   |                      | 02                |          | 65  |      |
|                         |                          |                                                                                                                   |                      | 03                |          | 50  |      |
|                         |                          |                                                                                                                   |                      | 04                |          | 40  |      |
|                         |                          |                                                                                                                   |                      | 05                |          | 30  |      |
|                         |                          |                                                                                                                   |                      | 06                |          | 25  |      |
| Read recovery time      | t <sub>RR</sub>          |                                                                                                                   | 9, 10, 11            | 01                | 20       |     | ns   |
|                         |                          |                                                                                                                   |                      | 02,03<br>04,05,06 | 15<br>10 |     |      |
| Read pulse width        | t <sub>PR</sub>          |                                                                                                                   | 9, 10, 11            | 01                | 80       |     | ns   |
|                         |                          |                                                                                                                   |                      | 02                | 65       |     |      |
|                         |                          |                                                                                                                   |                      | 03                | 50       |     |      |
|                         |                          |                                                                                                                   |                      | 04                | 40       |     |      |
|                         |                          |                                                                                                                   |                      | 05                | 30       |     |      |
|                         |                          |                                                                                                                   |                      | 06                | 25       |     |      |
| Read low to low Z       | t <sub>LZR</sub><br>3/4/ |                                                                                                                   | 9, 10, 11            | A11               | 3        |     | ns   |
| Read high to data valid | t <sub>DVR</sub>         |                                                                                                                   | 9, 10, 11            | A11               | 3        |     | ns   |
| Read high to high Z     | t <sub>HZR</sub><br>3/4/ |                                                                                                                   | 9, 10, 11            | 01,02,03          |          | 30  | ns   |
|                         |                          |                                                                                                                   |                      | 04                |          | 25  |      |
|                         |                          |                                                                                                                   |                      | 05                |          | 20  |      |
|                         |                          |                                                                                                                   |                      | 06                |          | 18  |      |
| Write cycle time        | t <sub>WC</sub>          |                                                                                                                   | 9, 10, 11            | 01                | 100      |     | ns   |
|                         |                          |                                                                                                                   |                      | 02                | 80       |     |      |
|                         |                          |                                                                                                                   |                      | 03                | 65       |     |      |
|                         |                          |                                                                                                                   |                      | 04                | 50       |     |      |
|                         |                          |                                                                                                                   |                      | 05                | 40       |     |      |
|                         |                          |                                                                                                                   |                      | 06                | 35       |     |      |

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

| Test                           | Symbol            | Conditions<br>$-55^{\circ}\text{C} < T_C < +125^{\circ}\text{C}$<br>$4.5\text{ V} < V_{CC} < 5.5\text{ V}$<br>unless otherwise specified | Group A<br>subgroups | Device<br>types | Limits |     | Unit |
|--------------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------|--------|-----|------|
|                                |                   |                                                                                                                                          |                      |                 | Min    | Max |      |
| Write pulse width              | $t_{PW}$          | See figure 3                                                                                                                             | 9, 10, 11            | 01              | 80     |     | ns   |
|                                |                   |                                                                                                                                          |                      | 02              | 65     |     |      |
|                                |                   |                                                                                                                                          |                      | 03              | 50     |     |      |
|                                |                   |                                                                                                                                          |                      | 04              | 40     |     |      |
|                                |                   |                                                                                                                                          |                      | 05              | 30     |     |      |
|                                |                   |                                                                                                                                          |                      | 06              | 25     |     |      |
| Write high to low $\angle$     | $t_{HWZ}$<br>3/4/ |                                                                                                                                          | 9, 10, 11            | All             | 10     |     | ns   |
| Write recovery time            | $t_{WR}$          |                                                                                                                                          | 9, 10, 11            | 01              | 20     |     | ns   |
|                                |                   |                                                                                                                                          |                      | 02, 03          | 15     |     |      |
|                                |                   |                                                                                                                                          |                      | 04, 05, 06      | 10     |     |      |
| Data setup time                | $t_{SD}$          |                                                                                                                                          | 9, 10, 11            | 01              | 40     |     | ns   |
|                                |                   |                                                                                                                                          |                      | 02, 03          | 30     |     |      |
|                                |                   |                                                                                                                                          |                      | 04              | 20     |     |      |
|                                |                   |                                                                                                                                          |                      | 05              | 18     |     |      |
|                                |                   |                                                                                                                                          |                      | 06              | 15     |     |      |
| Data hold time                 | $t_{HD}$          |                                                                                                                                          | 9, 10, 11            | 01, 02          | 10     |     | ns   |
|                                |                   |                                                                                                                                          |                      | 03              | 5      |     |      |
|                                |                   |                                                                                                                                          |                      | 04, 05, 06      | 0      |     |      |
| Master reset cycle time        | $t_{MRSC}$        |                                                                                                                                          | 9, 10, 11            | 01              | 100    |     | ns   |
|                                |                   |                                                                                                                                          |                      | 02              | 80     |     |      |
|                                |                   |                                                                                                                                          |                      | 03              | 65     |     |      |
|                                |                   |                                                                                                                                          |                      | 04              | 50     |     |      |
|                                |                   |                                                                                                                                          |                      | 05              | 40     |     |      |
|                                |                   |                                                                                                                                          |                      | 06              | 35     |     |      |
| Master reset pulse width       | $t_{PMR}$         |                                                                                                                                          | 9, 10, 11            | 01              | 80     |     | ns   |
|                                |                   |                                                                                                                                          |                      | 02              | 65     |     |      |
|                                |                   |                                                                                                                                          |                      | 03              | 50     |     |      |
|                                |                   |                                                                                                                                          |                      | 04              | 40     |     |      |
|                                |                   |                                                                                                                                          |                      | 05              | 30     |     |      |
|                                |                   |                                                                                                                                          |                      | 06              | 25     |     |      |
| Master reset recovery time     | $t_{RMR}$         |                                                                                                                                          | 9, 10, 11            | 01              | 20     |     | ns   |
|                                |                   |                                                                                                                                          |                      | 02, 03          | 15     |     |      |
|                                |                   |                                                                                                                                          |                      | 04, 05, 06      | 10     |     |      |
| Read high to master reset high | $t_{RPW}$<br>3/   |                                                                                                                                          | 9, 10, 11            | 01              | 80     |     | ns   |
|                                |                   |                                                                                                                                          |                      | 02              | 65     |     |      |
|                                |                   |                                                                                                                                          |                      | 03              | 50     |     |      |
|                                |                   |                                                                                                                                          |                      | 04              | 40     |     |      |
|                                |                   |                                                                                                                                          |                      | 05              | 30     |     |      |
|                                |                   |                                                                                                                                          |                      | 06              | 25     |     |      |

See footnotes at end of table.

|                                                                                                     |  |                  |                |            |
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TABLE I. Electrical performance characteristics - Continued.

| Test                                    | Symbol         | Conditions<br>$-55^{\circ}\text{C} < T_C < +125^{\circ}\text{C}$<br>$4.5\text{ V} < V_{CC} < 5.5\text{ V}$<br>unless otherwise specified | Group A<br>subgroups | Device<br>types      | Limits   |     | Unit |
|-----------------------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|----------|-----|------|
|                                         |                |                                                                                                                                          |                      |                      | Min      | Max |      |
| Write high to master<br>reset high      | $t_{WPW_{3/}}$ | See figure 3                                                                                                                             | 9, 10, 11            | 01                   | 80       |     | ns   |
|                                         |                |                                                                                                                                          |                      | 02                   | 65       |     |      |
|                                         |                |                                                                                                                                          |                      | 03                   | 50       |     |      |
|                                         |                |                                                                                                                                          |                      | 04                   | 40       |     |      |
|                                         |                |                                                                                                                                          |                      | 05                   | 30       |     |      |
|                                         |                |                                                                                                                                          |                      | 06                   | 25       |     |      |
| Retransmit cycle time                   | $t_{RTC}$      |                                                                                                                                          | 9, 10, 11            | 01                   | 100      |     | ns   |
|                                         |                |                                                                                                                                          |                      | 02                   | 80       |     |      |
|                                         |                |                                                                                                                                          |                      | 03                   | 65       |     |      |
|                                         |                |                                                                                                                                          |                      | 04                   | 50       |     |      |
|                                         |                |                                                                                                                                          |                      | 05                   | 40       |     |      |
|                                         |                |                                                                                                                                          |                      | 06                   | 35       |     |      |
| Retransmit pulse width                  | $t_{PRT}$      |                                                                                                                                          | 9, 10, 11            | 01                   | 80       |     | ns   |
|                                         |                |                                                                                                                                          |                      | 02                   | 65       |     |      |
|                                         |                |                                                                                                                                          |                      | 03                   | 50       |     |      |
|                                         |                |                                                                                                                                          |                      | 04                   | 40       |     |      |
|                                         |                |                                                                                                                                          |                      | 05                   | 30       |     |      |
|                                         |                |                                                                                                                                          |                      | 06                   | 25       |     |      |
| Retransmit recovery time                | $t_{RTR}$      |                                                                                                                                          | 9, 10, 11            | 01                   | 20       |     | ns   |
|                                         |                |                                                                                                                                          |                      | 02, 03<br>04, 05, 06 | 15<br>10 |     |      |
| Master reset to empty<br>flag low       | $t_{EFL}$      |                                                                                                                                          | 9, 10, 11            | 01                   |          | 100 | ns   |
|                                         |                |                                                                                                                                          |                      | 02                   |          | 80  |      |
|                                         |                |                                                                                                                                          |                      | 03                   |          | 65  |      |
|                                         |                |                                                                                                                                          |                      | 04                   |          | 50  |      |
|                                         |                |                                                                                                                                          |                      | 05                   |          | 40  |      |
|                                         |                |                                                                                                                                          |                      | 06                   |          | 35  |      |
| Master reset to half-<br>full flag high | $t_{HFH}$      |                                                                                                                                          | 9, 10, 11            | 01                   |          | 100 | ns   |
|                                         |                |                                                                                                                                          |                      | 02                   |          | 80  |      |
|                                         |                |                                                                                                                                          |                      | 03                   |          | 65  |      |
|                                         |                |                                                                                                                                          |                      | 04                   |          | 50  |      |
|                                         |                |                                                                                                                                          |                      | 05                   |          | 40  |      |
|                                         |                |                                                                                                                                          |                      | 06                   |          | 35  |      |
| Master reset to full<br>flag high       | $t_{FFH}$      |                                                                                                                                          | 9, 10, 11            | 01                   |          | 100 | ns   |
|                                         |                |                                                                                                                                          |                      | 02                   |          | 80  |      |
|                                         |                |                                                                                                                                          |                      | 03                   |          | 65  |      |
|                                         |                |                                                                                                                                          |                      | 04                   |          | 50  |      |
|                                         |                |                                                                                                                                          |                      | 05                   |          | 40  |      |
|                                         |                |                                                                                                                                          |                      | 06                   |          | 35  |      |
| Read low to empty flag<br>low           | $t_{REF}$      |                                                                                                                                          | 9, 10, 11            | 01, 02               |          | 60  | ns   |
|                                         |                |                                                                                                                                          |                      | 03                   |          | 45  |      |
|                                         |                |                                                                                                                                          |                      | 04                   |          | 35  |      |
|                                         |                |                                                                                                                                          |                      | 05                   |          | 30  |      |
|                                         |                |                                                                                                                                          |                      | 06                   |          | 25  |      |
| Read high to full flag<br>high          | $t_{RFF}$      |                                                                                                                                          | 9, 10, 11            | 01, 02               |          | 60  | ns   |
|                                         |                |                                                                                                                                          |                      | 03                   |          | 45  |      |
|                                         |                |                                                                                                                                          |                      | 04                   |          | 35  |      |
|                                         |                |                                                                                                                                          |                      | 05                   |          | 30  |      |
|                                         |                |                                                                                                                                          |                      | 06                   |          | 25  |      |

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

| Test                                                   | Symbol                         | Conditions<br>-55°C < T <sub>C</sub> < +125°C<br>4.5 V < V <sub>CC</sub> < 5.5 V<br>unless otherwise specified | Group A<br>subgroups | Device<br>types | Limits |     | Unit |
|--------------------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------|-----------------|--------|-----|------|
|                                                        |                                |                                                                                                                |                      |                 | Min    | Max |      |
| Write high to empty<br>flag high                       | t <sub>WEF</sub>               | See figure 3                                                                                                   | 9, 10, 11            | 01,02           |        | 60  | ns   |
|                                                        |                                |                                                                                                                |                      | 03              |        | 45  |      |
|                                                        |                                |                                                                                                                |                      | 04              |        | 35  |      |
|                                                        |                                |                                                                                                                |                      | 05              |        | 30  |      |
|                                                        |                                |                                                                                                                |                      | 06              |        | 25  |      |
| Write low to full flag<br>low                          | t <sub>WFF</sub>               |                                                                                                                | 9, 10, 11            | 01,02           |        | 60  | ns   |
|                                                        |                                |                                                                                                                |                      | 03              |        | 45  |      |
|                                                        |                                |                                                                                                                |                      | 04              |        | 35  |      |
|                                                        |                                |                                                                                                                |                      | 05              |        | 30  |      |
|                                                        |                                |                                                                                                                |                      | 06              |        | 25  |      |
| Write low to half-full<br>flag low                     | t <sub>WHF</sub>               |                                                                                                                | 9, 10, 11            | 01              |        | 100 | ns   |
|                                                        |                                |                                                                                                                |                      | 02              |        | 80  |      |
|                                                        |                                |                                                                                                                |                      | 03              |        | 65  |      |
|                                                        |                                |                                                                                                                |                      | 04              |        | 50  |      |
|                                                        |                                |                                                                                                                |                      | 05              |        | 40  |      |
| Read high to half-full<br>flag high                    | t <sub>RHF</sub>               |                                                                                                                | 9, 10, 11            | 06              |        | 35  | ns   |
|                                                        |                                |                                                                                                                |                      | 01              |        | 100 |      |
|                                                        |                                |                                                                                                                |                      | 02              |        | 80  |      |
|                                                        |                                |                                                                                                                |                      | 03              |        | 65  |      |
|                                                        |                                |                                                                                                                |                      | 04              |        | 50  |      |
| Effective read from<br>write high                      | t <sub>RAE</sub> <sub>3/</sub> |                                                                                                                | 9, 10, 11            | 05              |        | 40  | ns   |
|                                                        |                                |                                                                                                                |                      | 06              |        | 35  |      |
|                                                        |                                |                                                                                                                |                      | 01,02           |        | 60  |      |
|                                                        |                                |                                                                                                                |                      | 03              |        | 45  |      |
|                                                        |                                |                                                                                                                |                      | 04              |        | 35  |      |
| Effective read pulse<br>width after empty<br>flag high | t <sub>RPE</sub>               |                                                                                                                | 9, 10, 11            | 05              |        | 30  | ns   |
|                                                        |                                |                                                                                                                |                      | 06              |        | 25  |      |
|                                                        |                                |                                                                                                                |                      | 01              | 80     |     |      |
|                                                        |                                |                                                                                                                |                      | 02              | 65     |     |      |
|                                                        |                                |                                                                                                                |                      | 03              | 50     |     |      |
| Effective write from<br>read high                      | t <sub>WAF</sub> <sub>3/</sub> |                                                                                                                | 9, 10, 11            | 04              |        | 40  | ns   |
|                                                        |                                |                                                                                                                |                      | 05              |        | 30  |      |
|                                                        |                                |                                                                                                                |                      | 06              |        | 25  |      |
|                                                        |                                |                                                                                                                |                      | 01,02           |        | 60  |      |
|                                                        |                                |                                                                                                                |                      | 03              |        | 45  |      |
| Effective write pulse<br>width after full<br>flag high | t <sub>WPF</sub>               |                                                                                                                | 9, 10, 11            | 04              |        | 35  | ns   |
|                                                        |                                |                                                                                                                |                      | 05              |        | 30  |      |
|                                                        |                                |                                                                                                                |                      | 06              |        | 25  |      |
|                                                        |                                |                                                                                                                |                      | 01              | 80     |     |      |
|                                                        |                                |                                                                                                                |                      | 02              | 65     |     |      |

See footnotes at end of table.

|                                                                                                     |                  |                |            |
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TABLE I. Electrical performance characteristics - Continued.

| Test                                   | Symbol           | Conditions, 1/<br>$-55^{\circ}\text{C} < T_C < +125^{\circ}\text{C}$<br>$4.5\text{ V} < V_{CC} < 5.5\text{ V}$<br>unless otherwise specified | Group A<br>subgroups | Device<br>types | Limits |     | Unit |
|----------------------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------|--------|-----|------|
|                                        |                  |                                                                                                                                              |                      |                 | Min    | Max |      |
| Expansion out low delay<br>from clock  | t <sub>XOL</sub> | See figure 3                                                                                                                                 | 9, 10, 11            | 01              |        | 80  | ns   |
|                                        |                  |                                                                                                                                              |                      | 02              |        | 65  |      |
|                                        |                  |                                                                                                                                              |                      | 03              |        | 50  |      |
|                                        |                  |                                                                                                                                              |                      | 04              |        | 40  |      |
|                                        |                  |                                                                                                                                              |                      | 05              |        | 30  |      |
|                                        |                  |                                                                                                                                              |                      | 06              |        | 25  |      |
| Expansion out high<br>delay from clock | t <sub>XOH</sub> |                                                                                                                                              | 9, 10, 11            | 01              |        | 80  | ns   |
|                                        |                  |                                                                                                                                              |                      | 02              |        | 65  |      |
|                                        |                  |                                                                                                                                              |                      | 03              |        | 50  |      |
|                                        |                  |                                                                                                                                              |                      | 04              |        | 40  |      |
|                                        |                  |                                                                                                                                              |                      | 05              |        | 30  |      |
|                                        |                  |                                                                                                                                              |                      | 06              |        | 25  |      |

- 1/ AC tests are performed with input rise and fall times of 5 ns or less, timing reference levels of 1.5 V, input pulse levels of 0 V to 3.0 V, and the output load on figure 4.
- 2/ These are absolute values with respect to device ground and all overshoots due to system or tester noise are included.
- 3/ 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.
- 4/ Transition is measured at steady-state high level -500 mV or steady-state low level +500 mV on the output from the 1.5 V level on the input.

3.2.4 Die overcoat. Polyimide and silicone coatings are allowable as an overcoat on the die for alpha particle protection provided that each coated microcircuit inspection lot (see MIL-M-38510), shall be subjected to and pass the Internal Moisture Content Test, (see method 1018 of MIL-STD-883), the frequency of the internal water vapor testing may not be decreased unless approved by the preparing activity.

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

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

3.5 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in MIL-BUL-103 (see 6.6 herein).

3.6 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 MIL-BUL-103 (see 6.6 herein). The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

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| Device types    | All             |       |
|-----------------|-----------------|-------|
| Case outlines   | U, X, Y         | Z     |
| Terminal number | Terminal symbol |       |
| 1               | W               | NC    |
| 2               | ID8             | W     |
| 3               | ID3             | ID8   |
| 4               | ID2             | ID3   |
| 5               | ID1             | ID2   |
| 6               | ID0             | ID1   |
| 7               | XI              | ID0   |
| 8               | FF              | XI    |
| 9               | Q0              | FF    |
| 10              | Q1              | Q0    |
| 11              | Q2              | Q1    |
| 12              | Q3              | NC    |
| 13              | Q8              | Q2    |
| 14              | GND             | Q3    |
| 15              | R               | Q8    |
| 16              | Q4              | GND   |
| 17              | Q5              | NC    |
| 18              | Q6              | R     |
| 19              | Q7              | Q4    |
| 20              | XO/HF           | Q5    |
| 21              | EF              | Q6    |
| 22              | MR              | Q7    |
| 23              | FL/RT           | XO/HF |
| 24              | ID7             | EF    |
| 25              | ID6             | MR    |
| 26              | ID5             | FL/RT |
| 27              | ID4             | NC    |
| 28              | VCC             | ID7   |
| 29              | -               | ID6   |
| 30              | -               | ID5   |
| 31              | -               | ID4   |
| 32              | -               | VCC   |

NC = no connection

FIGURE 1. Terminal connections.

|                                                                                                     |                  |                |             |
|-----------------------------------------------------------------------------------------------------|------------------|----------------|-------------|
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Reset and retransmit  
Single device configuration/width expansion mode

| Mode       | Inputs          |                 |                 | Internal status     |                     | Outputs         |                 |                 |
|------------|-----------------|-----------------|-----------------|---------------------|---------------------|-----------------|-----------------|-----------------|
|            | $\overline{MR}$ | $\overline{RT}$ | $\overline{XI}$ | Read pointer        | Write pointer       | $\overline{EF}$ | $\overline{FF}$ | $\overline{HF}$ |
| Reset      | 0               | X               | 0               | Location zero       | Location zero       | 0               | 1               | 1               |
| Retransmit | 1               | 0               | 0               | Location zero       | Unchanged           | X               | X               | X               |
| Read/Write | 1               | 1               | 0               | Increment <u>1/</u> | Increment <u>1/</u> | X               | X               | X               |

1/ Pointer will increment if flag is high.

Reset and first load truth table  
Depth expansion/compound expansion mode

| Mode                    | Inputs          |                 |                 | Internal status |               | Outputs         |                 |
|-------------------------|-----------------|-----------------|-----------------|-----------------|---------------|-----------------|-----------------|
|                         | $\overline{MR}$ | $\overline{FL}$ | $\overline{XI}$ | Read pointer    | Write pointer | $\overline{EF}$ | $\overline{FF}$ |
| Reset first device      | 0               | 0               | <u>1/</u>       | Location zero   | Location zero | 0               | 1               |
| Reset all other devices | 0               | 1               | <u>1/</u>       | Location zero   | Location zero | 0               | 1               |
| Read/Write              | 1               | X               | <u>1/</u>       | X               | X             | X               | X               |

1/  $\overline{XI}$  is connected to  $\overline{X0}$  of previous device.

Note:  $\overline{MR}$  = Reset input,  $\overline{FL}/\overline{RT}$  = First load/retransmit  $\overline{EF}$  = Empty flag output,  
 $\overline{FF}$  = Full flag output,  $\overline{XI}$  = Expansion input, and  $\overline{HF}$  = Half-full flag output

FIGURE 2. Truth tables.

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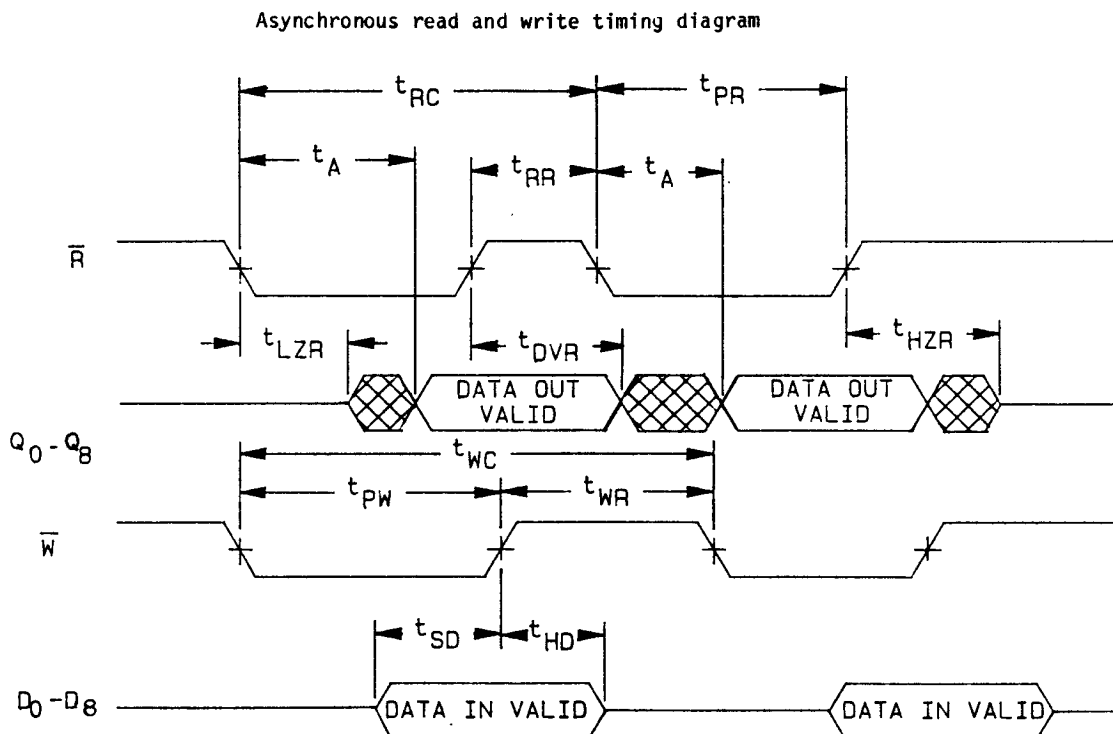
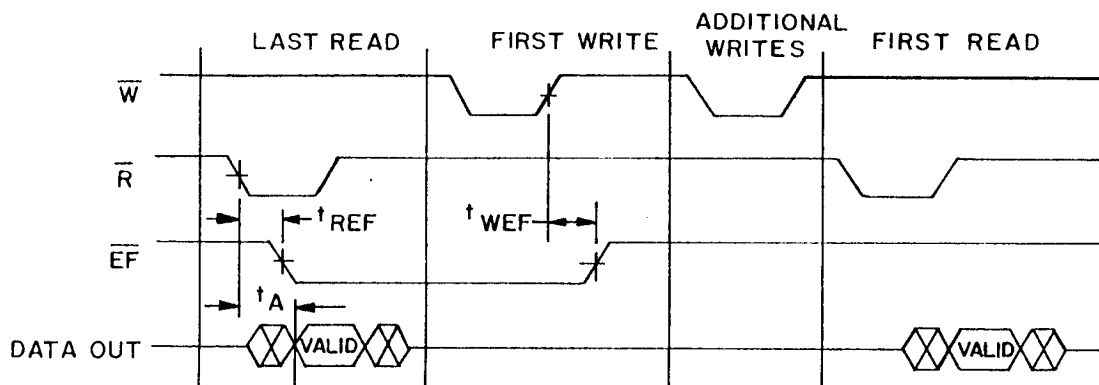


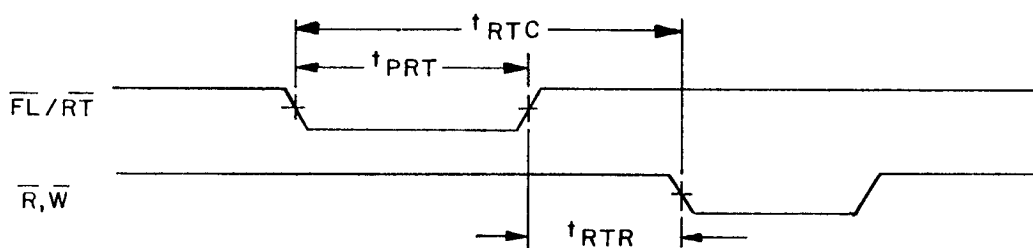
FIGURE 3. Timing waveforms.

|                                                                                                     |                  |                |             |
|-----------------------------------------------------------------------------------------------------|------------------|----------------|-------------|
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Last read to first write empty flag timing diagram



Retransmit timing diagram



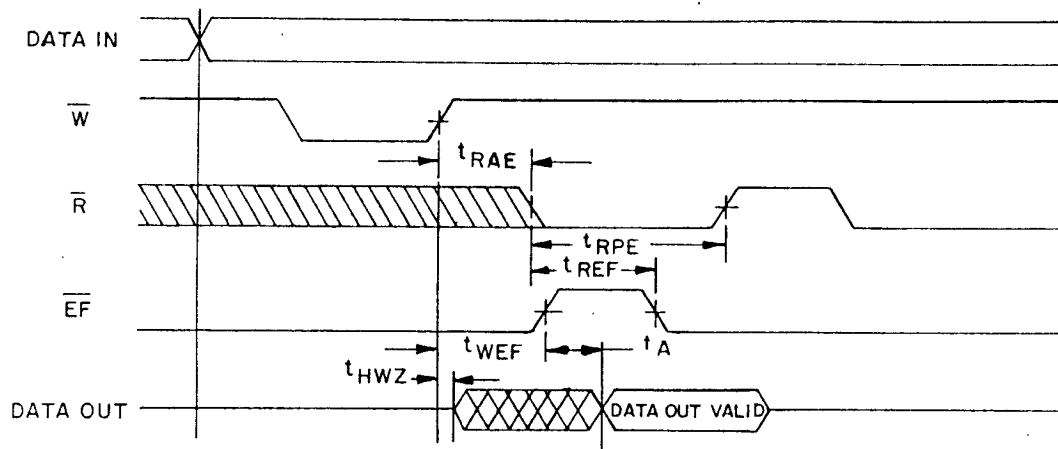
NOTES:

1.  $t_{RTC} = t_{PRT} + t_{RTR}$
2.  $\overline{EF}$ ,  $\overline{HF}$ , and  $\overline{FF}$  may change state during retransmit as a result of the offset of the read and write pointer, but flags will be valid at  $t_{RTC}$ .

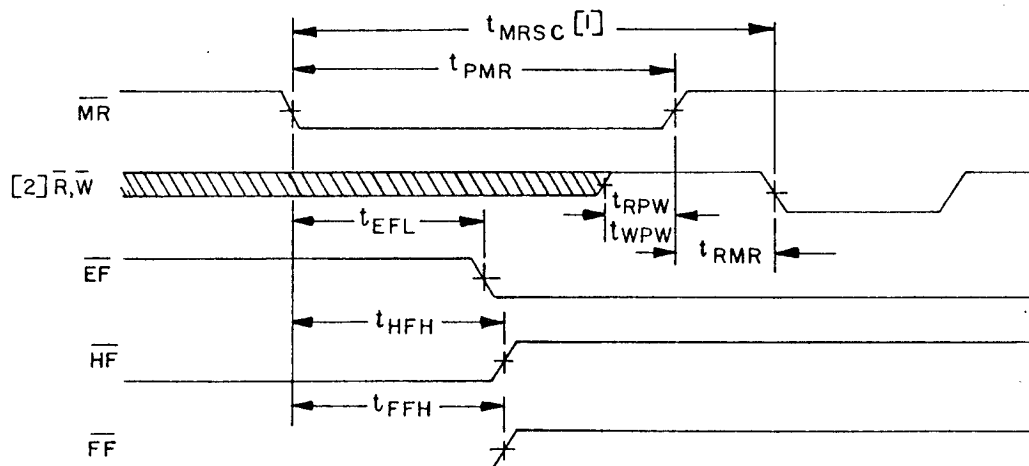
FIGURE 3. Timing waveforms - Continued.

|                                                                                                     |                  |                |             |
|-----------------------------------------------------------------------------------------------------|------------------|----------------|-------------|
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Empty flag and read bubble-through mode timing diagram.



Master reset timing diagram.



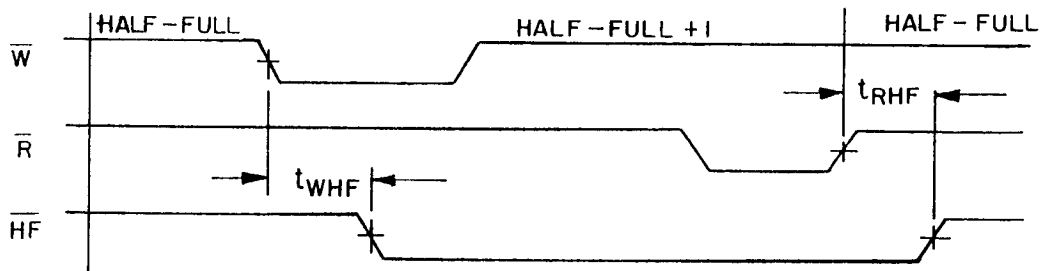
NOTES:

1.  $t_{MRSC} = t_{PMR} + t_{RMR}$ .
2.  $\overline{W}$  and  $\overline{R} = V_{IH}$  around the rising edge of  $\overline{MR}$ .

FIGURE 3. Timing waveforms - Continued.

|                                                                                                     |                  |                |       |            |
|-----------------------------------------------------------------------------------------------------|------------------|----------------|-------|------------|
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Half-full flag timing diagram



Last write to first read full flag timing diagram

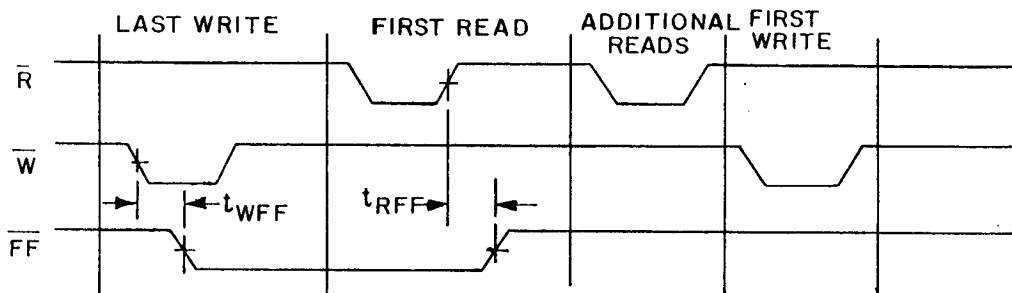


FIGURE 3. Timing waveforms - Continued.

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Full flag and write bubble-through mode timing diagram

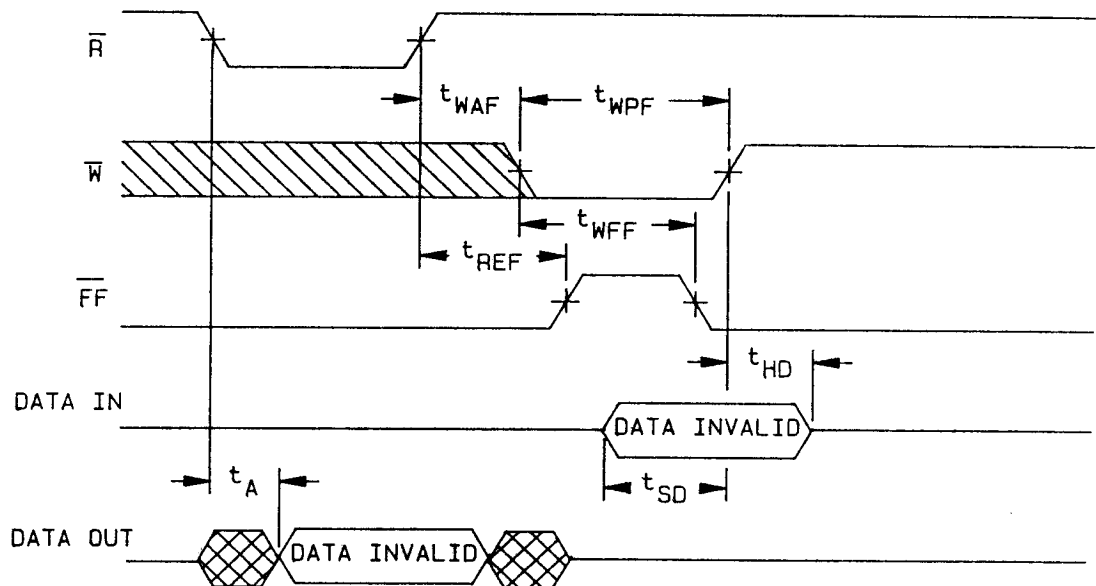
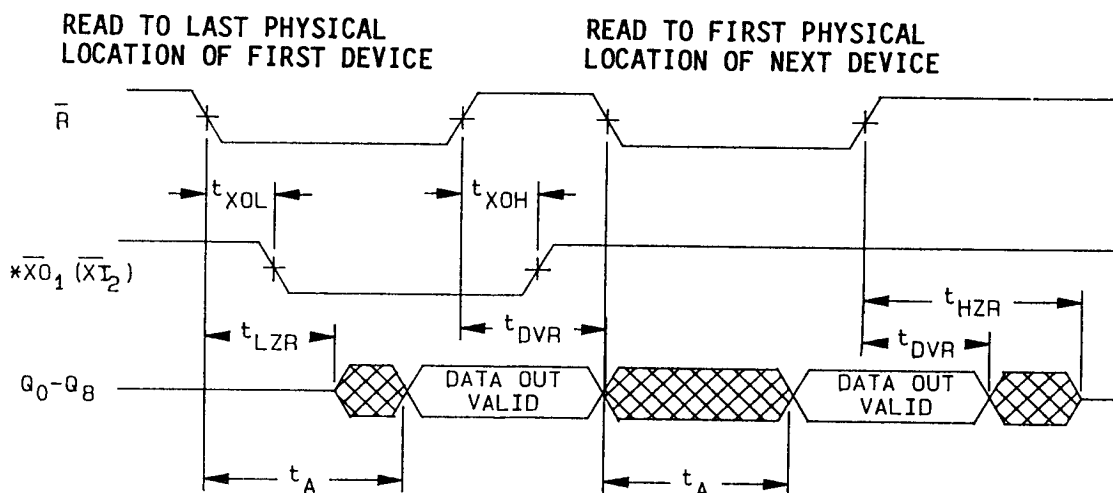
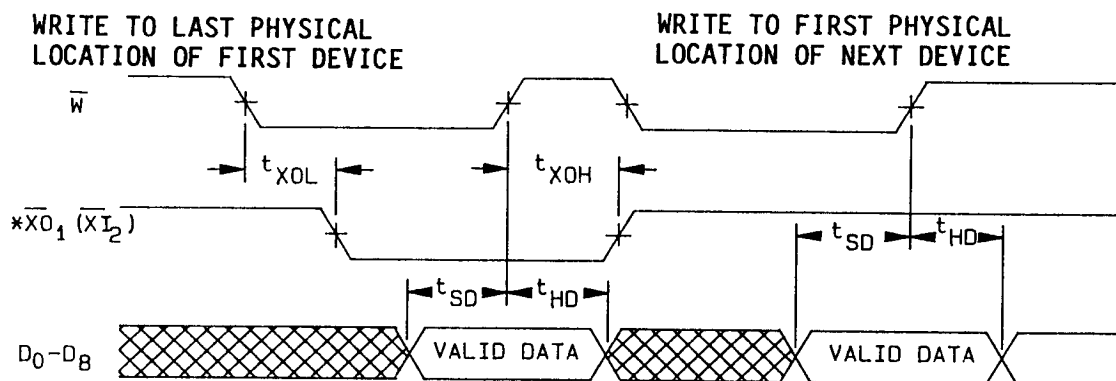


FIGURE 3. Timing waveforms - Continued.

|                                                                                                     |                   |                       |                    |
|-----------------------------------------------------------------------------------------------------|-------------------|-----------------------|--------------------|
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Expansion timing diagram



\*Expansion out of device type first ( $XO_1$ ) is connected to expansion in of device type next ( $XI_2$ ).

FIGURE 3. Timing waveforms - Continued.

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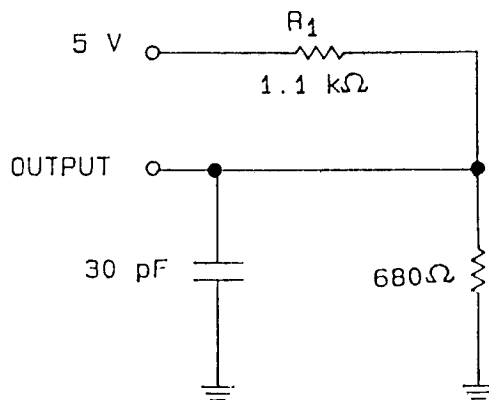
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Circuit A  
Output load

\*Including scope and jig (minimum values)

AC test conditions

|                               |              |
|-------------------------------|--------------|
| Input pulse levels            | GND to 3.0 V |
| Input rise and fall times     | 5 ns         |
| Input timing reference levels | 1.5 V        |
| Output reference levels       | 1.5 V        |

FIGURE 4. Output load circuit and test conditions.

|                                                                                                     |                  |                |             |
|-----------------------------------------------------------------------------------------------------|------------------|----------------|-------------|
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3.7 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.

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

3.9 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 D or E using the circuit submitted with the certificate of compliance (see 3.6 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 5 and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Subgroup 4 ( $C_{IN}$  and  $C_{OUT}$  measurements) shall be measured only for the initial test and after any process or design changes which may affect capacitance. Sample size is 15 devices with no failures, and all input and output terminals tested.

d. Subgroups 7 and 8 shall include verification of the truth tables.

##### 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 D or E using the circuit submitted with the certificate of compliance (see 3.6 herein).

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

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

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TABLE II. Electrical test requirements.

| MIL-STD-883 test requirements                                      | Subgroups<br>(per method<br>5005, table I) |
|--------------------------------------------------------------------|--------------------------------------------|
| Interim electrical parameters<br>(method 5004)                     | ---                                        |
| Final electrical test parameters<br>(method 5004)                  | 1*,2,3,7*,8A,8B<br>9,10,11                 |
| Group A test requirements<br>(method 5005)                         | 1,2,3,4**,7***,<br>8***,9,10,11            |
| Groups C and D end-point<br>electrical parameters<br>(method 5005) | 2,3,7,8A,8B                                |

\* PDA applies to subgroup 1 and 7.

\*\* For subgroup 4, see 4.3.1c.

\*\*\* For subgroups 7 and 8, see 4.3.1d.

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

6.3 Configuration control of SMDs. All proposed changes to existing SMDs will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-481 using DD Form 1693, Engineering Change Proposal (Short Form).

6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronics devices (FSC 5962) should contact DESC-ECS, telephone (513) 296-6022.

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

|                                                                                                     |                  |                |             |
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6.6 Approved sources of supply. Approved sources of supply are listed in MIL-BUL-103. The vendors listed in MIL-BUL-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DESC-ECS.

| Military drawing<br>PIN | Vendor<br>CAGE<br>number | Vendor similar<br>PIN 1/        |
|-------------------------|--------------------------|---------------------------------|
| 5962-8986301UX          | 61772                    | IDT7201SA80XEB                  |
| 5962-8986301XX          | 61772                    | IDT7201SA80DB                   |
| 5962-8986301YX          | 61772                    | IDT7201SA80TCB                  |
| 5962-8986301ZX          | 61772                    | IDT7201SA80LB                   |
| 5962-8986302UX          | 65786<br>61772           | CY7C421-65KMB<br>IDT7201SA65XEB |
| 5962-8986302XX          | 65786<br>61772           | CY7C420-65DMB<br>IDT7201SA65DB  |
| 5962-8986302YX          | 65786<br>61772           | CY7C421-65DMB<br>IDT7201SA65TCB |
| 5962-8986302ZX          | 65786<br>61772           | CY7C421-65LMB<br>IDT7201SA65LB  |
| 5962-8986303UX          | 65786<br>61772           | CY7C421-50KMB<br>IDT7201SA50XEB |
| 5962-8986303XX          | 65786<br>61772           | CY7C420-50DMB<br>IDT7201SA50DB  |
| 5962-8986303YX          | 65786<br>61772           | CY7C421-50DMB<br>IDT7201SA50TCB |
| 5962-8986303ZX          | 65786<br>61772           | CY7C421-50LMB<br>IDT7201SA50LB  |
| 5962-8986304UX          | 65786<br>61772           | CY7C421-40KMB<br>IDT7201SA40XEB |
| 5962-8986304XX          | 65786<br>61772           | CY7C420-40DMB<br>IDT7201SA40DB  |

|                                                                                                     |                  |                |             |
|-----------------------------------------------------------------------------------------------------|------------------|----------------|-------------|
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| Military drawing<br>PIN | Vendor<br>CAGE<br>number | Vendor similar<br>PIN 1/        |
|-------------------------|--------------------------|---------------------------------|
| 5962-8986304YX          | 65786<br>61772           | CY7C421-40DMB<br>IDT7201SA40TCB |
| 5962-8986304ZX          | 65786<br>61772           | CY7C421-40LMB<br>IDT7201SA40LB  |
| 5962-8986305UX          | 65786<br>61772           | CY7C421-30KMB<br>IDT7201SA30XEB |
| 5962-8986305XX          | 65786<br>61772           | CY7C420-30DMB<br>IDT7201SA30DB  |
| 5962-8986305YX          | 65786<br>61772           | CY7C421-30DMB<br>IDT7201SA30TCB |
| 5962-8986305ZX          | 65786<br>61772           | CY7C421-30LMB<br>IDT7201SA30LB  |
| 5962-8986306UX          | 65786                    | CY7C421-25KMB                   |
| 5962-8986306XX          | 65786                    | CY7C420-25DMB                   |
| 5962-8986306YX          | 65786                    | CY7C421-25DMB                   |
| 5962-8986306ZX          | 65786                    | CY7C421-25LMB                   |

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE  
number

65786

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|                                                                                                     |                  |                |             |
|-----------------------------------------------------------------------------------------------------|------------------|----------------|-------------|
| <b>STANDARDIZED<br/>MILITARY DRAWING</b><br>DEFENSE ELECTRONICS SUPPLY CENTER<br>DAYTON, OHIO 45444 | SIZE<br><b>A</b> | 5962-89863     |             |
|                                                                                                     |                  | REVISION LEVEL | SHEET<br>22 |

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