



## DM7136 6-Bit Unified Bus Comparator with Open-Collector Outputs

### General Description

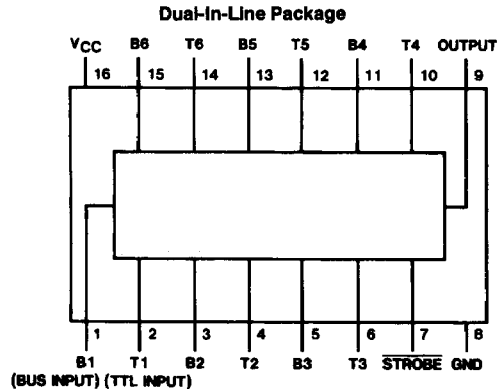
The DM7136 compares two binary words of two-to-six bits in length and indicates matching (bit-for-bit) of the two words. Inputs for one word are 54/74 series-compatible TTL inputs, whereas those of the second word are high-impedance receivers driven by a terminated data bus. These bus inputs include 0.65V typical hysteresis which provides 1.4V noise immunity. The DM7136 has open-collector outputs which go to the high state upon equality and is expandable to n bits by collector-ORing. The device has an output latch which is strobe controlled.

The transfer of information to the output occurs when the STROBE input goes from a logic "1" to a logic "0" state. Inputs may be changed while the STROBE is at the logic "1" level, without affecting the state of the output. These devices are useful as address comparators in computer systems utilizing unified data bus organization.

### Features

- Low bus input current 15  $\mu$ A typ
- High bus input noise immunity 1.4V typ
- Bus inputs comply with IEEE 488-1975
- TTL-compatible output
- Output latch provision

### Connection Diagram



TL/F/6577-1

Order Number DM7136J or DM7136W  
See NS Package Number J16A or W16A

### Function Table

| Condition         | STROBE | Output      |
|-------------------|--------|-------------|
|                   |        | DM71/8136   |
| T = B, T $\neq$ B | H      | $Q_{N-1}^*$ |
| T = B             | L      | H           |
| T $\neq$ B        | L      | L           |

\*Latched in previous state.

H = High Logic Level

L = Low Logic Level

## Absolute Maximum Ratings (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

|                                      |                 |
|--------------------------------------|-----------------|
| Supply Voltage                       | 7V              |
| Input Voltage                        | 5.5V            |
| Operating Free Air Temperature Range |                 |
| DM71                                 | -55°C to +125°C |
| Storage Temperature Range            | -65°C to +150°C |

Note: The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

## Recommended Operating Conditions

| Symbol          | Parameter  | DM7136 |      |      | Units |
|-----------------|--|--------|------|------|-------|
|                 |  | Min    | Nom  | Max  |       |
| V <sub>CC</sub> | Supply Voltage   | 4.5    | 5    | 5.5  | V     |
| V <sub>T+</sub> | Positive-Going Input Threshold Voltage for Bus Inputs (Note 1) | 1.4    | 1.75 | 2    | V     |
| V <sub>T-</sub> | Negative-Going Input Threshold Voltage for Bus Inputs (Note 1) | 0.9    | 1.1  | 1.35 | V     |
| V <sub>IH</sub> | High Level Input Voltage for TTL and Strobe Inputs             | 2      |      |      | V     |
| V <sub>IL</sub> | Low Level Input Voltage for TTL and Strobe Inputs              |        |      | 0.8  | V     |
| V <sub>OH</sub> | High Level Output Voltage                                      |        |      | 5.5  | V     |
| I <sub>OL</sub> | Low Level Output Current                                       |        |      | 16   | mA    |
| T <sub>A</sub>  | Free Air Operating Temperature                                 | -55    |      | 125  | °C    |

## Electrical Characteristics over recommended operating free air temperature range (unless otherwise noted)

| Symbol           | Parameter                         | Conditions   | Min                   | Typ (Note 2) | Max  | Units |
|------------------|-----------------------------------|--|-----------------------|--------------|------|-------|
| V <sub>I</sub>   | Input Clamp Voltage               | V <sub>CC</sub> = Min, I <sub>I</sub> = -12 mA   |                       |              | -1.5 | V     |
| I <sub>CEX</sub> | High Level Output Current         | V <sub>CC</sub> = Min, V <sub>O</sub> = 5.5V<br>V <sub>IL</sub> = Max, V <sub>IH</sub> = Min |                       |              | 250  | μA    |
| V <sub>OL</sub>  | Low Level Output Voltage          | V <sub>CC</sub> = Min, I <sub>OL</sub> = Max<br>V <sub>IH</sub> = Min, V <sub>IL</sub> = Max |                       |              | 0.4  | V     |
| I <sub>I</sub>   | Input Current @ Max Input Voltage | V <sub>CC</sub> = Max<br>V <sub>I</sub> = 5.5V   | TTL                   |              | 1    | mA    |
|                  |                                   |  | Strobe                |              | 2    |       |
| I <sub>IH</sub>  | High Level Input Current          | V <sub>CC</sub> = Max<br>V <sub>I</sub> = 2.4V   | TTL                   |              | 40   | μA    |
|                  |                                   |  | Strobe                |              | 80   |       |
| I <sub>IL</sub>  | Low Level Input Current           | V <sub>CC</sub> = Max<br>V <sub>I</sub> = 0.4V   | TTL                   |              | -1.6 | mA    |
|                  |                                   |  | Strobe                |              | -2.4 |       |
| I <sub>IN</sub>  | Bus Input Current                 | V <sub>I</sub> = 4V  | V <sub>CC</sub> = Max | 15           | 50   | μA    |
|                  |                                   |  | V <sub>CC</sub> = 0V  | 1            | 50   |       |
| I <sub>CC</sub>  | Supply Current                    | V <sub>CC</sub> = Max (Note 3)   |                       | 50           | 74   | mA    |

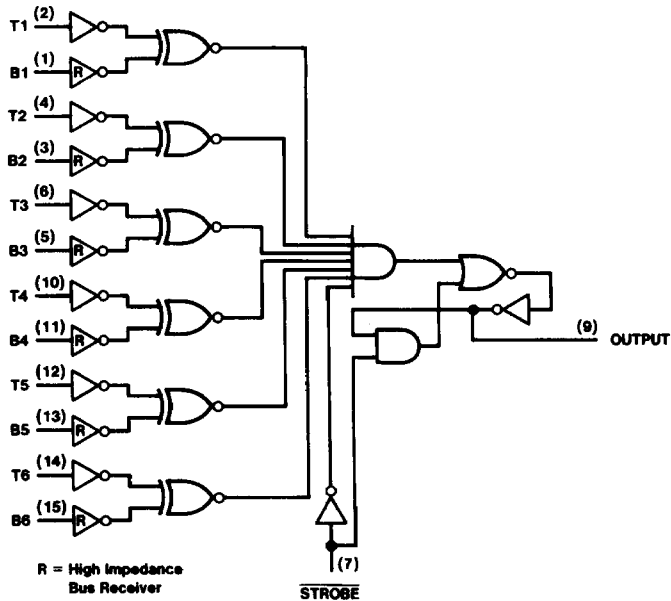
Note 1: V<sub>CC</sub> = 5V.

Note 2: All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

Note 3: I<sub>CC</sub> is measured with all inputs grounded and all outputs open.

**Switching Characteristics** at  $V_{CC} = 5V$  and  $T_A = 25^\circ C$  (See Section 1 for Test Waveforms and Output Load)

| Symbol    | Parameter  | From (Input)<br>To (Output) | $R_L = 400\Omega$<br>$C_L = 15\text{ pF}$ |     | Units |
|-----------|--|-----------------------------|---|-----|-------|
|           |  |                             | Min                                       | Max |       |
| $t_{PLH}$ | Propagation Delay Time<br>Low to High Level Output | TTL to<br>Output            |   | 30  | ns    |
| $t_{PHL}$ | Propagation Delay Time<br>High to Low Level Output | TTL to<br>Output            |   | 30  | ns    |
| $t_{PLH}$ | Propagation Delay Time<br>Low to High Level Output | Bus to<br>Output            |   | 45  | ns    |
| $t_{PHL}$ | Propagation Delay Time<br>High to Low Level Output | Bus to<br>Output            |   | 45  | ns    |
| $t_{PLH}$ | Propagation Delay Time<br>Low to High Level Output | Strobe to<br>Output         |   | 30  | ns    |
| $t_{PHL}$ | Propagation Delay Time<br>High to Low Level Output | Strobe to<br>Output         |   | 30  | ns    |

**Logic Diagram**


TL/F/6577-2