

## 54F/74F432

### Multi-Mode Buffered Latch With 3-State Outputs

#### Description

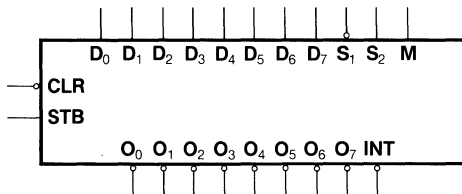
The 'F432 is an 8-bit latch with 3-state output buffers and control and device selection logic. Also included is a status flip-flop for providing device-busy or request-interrupt commands. Separate Mode and Select inputs allow data to be stored with the outputs enabled or disabled. The device can also operate in a fully transparent mode.

The 'F432 is the functional equivalent of the Intel 8212, but with inverting outputs.

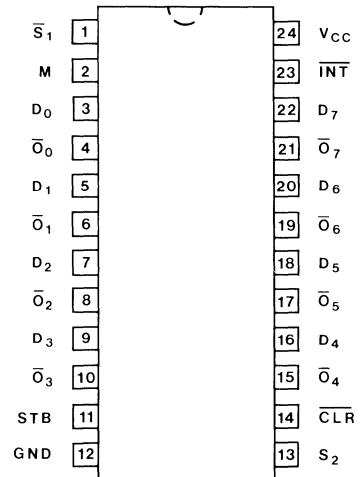
- 3-State Inverting Outputs
- Status Flip-Flop for Interrupt Commands
- Asynchronous or Latched Receiver Modes
- Data to Output Propagation Delay Typically 8.5 ns
- Supply Current 43 mA Typ
- 24-Pin Slim Package

**Ordering Code:** See Section 5

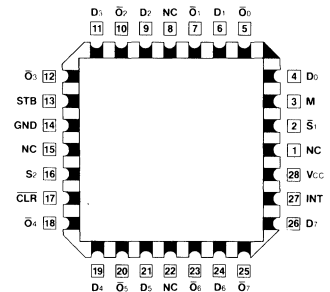
#### Logic Symbol



#### Connection Diagrams



#### Pin Assignment for DIP and SOIC



#### Pin Assignment for LCC and PCC

**Input Loading/Fan-Out:** See Section 3 for U.L. definitions

| Pin Names                       | Description        | 54F/74F(U.L.)<br>HIGH/LOW |
|---------------------------------|--------------------|---------------------------|
| D <sub>0</sub> -D <sub>7</sub>  | Data Inputs        | 0.5/0.375                 |
| O <sub>0</sub> -O <sub>7</sub>  | Latch Outputs      | 75/15 (12.5)              |
| S <sub>1</sub> , S <sub>2</sub> | Select Inputs      | 0.5/0.375                 |
| M                               | Mode Control Input | 0.5/0.375                 |
| STB                             | Strobe             | 0.5/0.375                 |
| INT                             | Interrupt          | 25/12.5                   |
| CLR                             | Clear              | 0.5/0.375                 |

## Functional Description

This high-performance eight-bit parallel expandable buffer register incorporates package and mode selection inputs and an edge-triggered status flip-flop designed specifically for implementing bus-organized input/output ports. The 3-state data outputs can be connected to a common data bus and controlled from the appropriate select inputs to receive or transmit data. An integral status flip-flop provides busy or request interrupt commands.

The eight data latches are fully transparent when the internal gate enable, G, input is HIGH and the outputs are enabled. Latch transparency is selected by the mode control (M), select ( $\bar{S}_1$  and  $S_2$ ), and the strobe (STB) inputs and during transparency each data output ( $\bar{O}_n$ ) follows its respective data input ( $D_n$ ). This mode of operation can be terminated by clearing, de-selecting, or

holding the data latches. See Data Latches Function Table.

An input mode or an output mode is selectable from this single input line. In the input mode,  $M = L$ , the eight data latch inputs are enabled when the strobe is HIGH regardless of device selection. If selected during an input mode, the outputs will follow the data inputs. When the strobe input is taken LOW the latches will store the most recently setup data.

In the output mode,  $M = H$ , the output buffers are enabled regardless of any other control input. During the output mode the content of the register is under control of the select ( $\bar{S}_1$  and  $S_2$ ) inputs. See Data Latches Function Table.

4

### Data Latches Function Table

| Function  | $\bar{CLR}$ | M | $\bar{S}_1$ | $S_2$ | STB | Data In | Data Out    |
|-----------|-------------|---|-------------|-------|-----|---------|-------------|
| Clear     | L           | H | H           | X     | X   | X       | H           |
|           | L           | L | L           | H     | L   | X       | H           |
| De-select | X           | L | X           | L     | X   | X       | Z           |
|           | X           | L | H           | X     | X   | X       | Z           |
| Hold      | H           | H | H           | L     | X   | X       | $\bar{Q}_0$ |
|           | H           | L | L           | H     | L   | X       | $\bar{Q}_0$ |
| Data Bus  | H           | H | L           | H     | X   | L       | H           |
|           | H           | H | L           | H     | X   | H       | L           |
| Data Bus  | H           | L | L           | H     | H   | L       | H           |
|           | H           | L | L           | H     | H   | H       | L           |

H = HIGH Voltage Level

L = LOW Voltage Level

X = Immaterial

Z = High Impedance

### Status Flip-Flop Function Table

| $\bar{CLR}$ | $\bar{S}_1$ | $S_2$ | STB | $\bar{INT}$ |
|-------------|-------------|-------|-----|-------------|
| L           | H           | X     | X   | H           |
| L           | X           | L     | X   | H           |
| H           | X           | X     | ↑   | L           |
| H           | L           | H     | X   | L           |

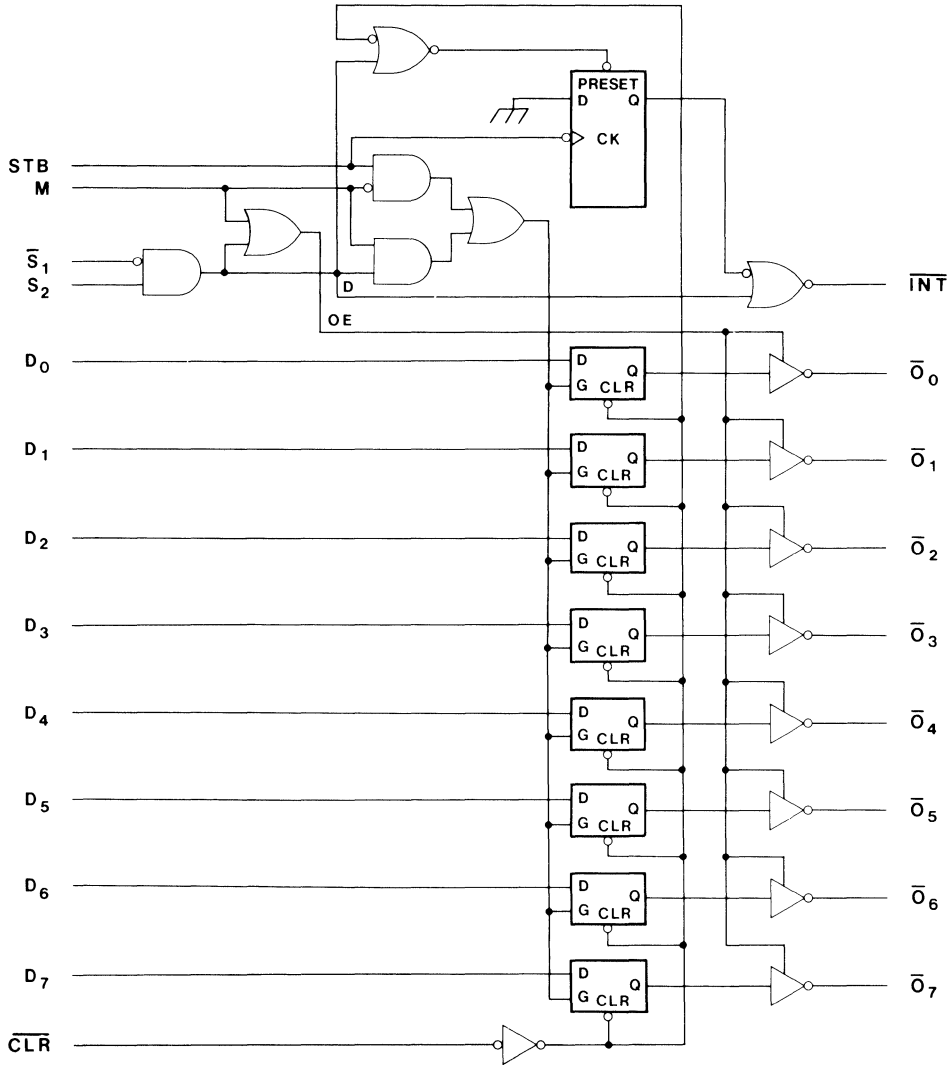
H = HIGH Voltage Level

L = LOW Voltage Level

X = Immaterial

↑ = LOW-to-HIGH Transition

Logic Diagram



Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

**DC Characteristics over Operating Temperature Range** (unless otherwise specified)

| Symbol                              | Parameter            | 54F/74F |                |                | Units | Conditions            |
|-------------------------------------|----------------------|---------|----------------|----------------|-------|-----------------------|
|                                     |                      | Min     | Typ            | Max            |       |                       |
| $I_{CCH}$<br>$I_{CCL}$<br>$I_{CCZ}$ | Power Supply Current |         | 43<br>29<br>29 | 65<br>43<br>43 | mA    | $V_{CC} = \text{Max}$ |

**AC Characteristics:** See Section 3 for waveforms and load configurations

| Symbol                 | Parameter   | 54F/74F   |              |              | 54F   |     | 74F   |              | Units | Fig. No.            |
|------------------------|---|---|--------------|--------------|---|-----|---|--------------|-------|---------------------|
|                        |   | $T_A = +25^\circ\text{C}$<br>$V_{CC} = +5.0\text{V}$<br>$C_L = 50\text{pF}$ |              |              | $T_A, V_{CC} = \text{Mil}$<br>$C_L = 50\text{pF}$ |     | $T_A, V_{CC} = \text{Com}$<br>$C_L = 50\text{pF}$ |              |       |                     |
|                        |   | Min   | Typ          | Max          | Min   | Max | Min   | Max          |       |                     |
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay<br>$D_n$ to $O_n$                         | 3.5<br>2.5  | 8.5<br>5.5   | 10.5<br>7.0  |   |     | 3.0<br>3.0  | 12.0<br>12.0 | ns    | 3-1<br>3-3          |
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay<br>$\bar{S}_1, S_2$ or STB to $\bar{O}_n$ | 8.5<br>6.5  | 16.0<br>12.5 | 21.0<br>16.0 |   |     | 7.5<br>5.5  | 23.0<br>18.0 | ns    | 3-1<br>3-7          |
| $t_{PHL}$              | Propagation Delay<br>$\bar{CLR}$ to $\bar{O}_n$             | 7.0   | 15.0         | 18.5         |   |     | 6.0   | 20.5         | ns    | 3-1<br>3-9          |
| $t_{PHL}$              | Propagation Delay<br>STB to INT                             | 6.0   | 11.5         | 14.5         |   |     | 5.0   | 16.0         | ns    | 3-1<br>3-10         |
| $t_{PLH}$              | Propagation Delay<br>$\bar{S}_1$ or $S_2$ to $\bar{INT}$    | 4.0   | 7.5          | 9.5          |   |     | 3.5   | 10.5         | ns    | 3-1<br>3-10         |
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay<br>M to $\bar{O}_n$                       | 9.0<br>6.5  | 15.0<br>11.0 | 19.0<br>14.0 |   |     | 9.0<br>6.5  | 20.0<br>15.0 | ns    | 3-1<br>3-3          |
| $t_{PZH}$<br>$t_{PZL}$ | Enable Time<br>$\bar{S}_1, S_2$ to $\bar{O}_n$              | 4.5<br>5.0  | 13.0<br>11.0 | 18.0<br>15.0 |   |     | 4.0<br>4.0  | 20.0<br>17.0 | ns    | 3-1<br>3-12<br>3-13 |
| $t_{PHZ}$<br>$t_{PLZ}$ | Disable Time<br>$\bar{S}_1, S_2$ to $\bar{O}_n$             | 4.0<br>5.0  | 8.0<br>11.0  | 11.0<br>15.5 |   |     | 3.5<br>4.0  | 12.5<br>17.5 |       |                     |

**AC Operating Requirements:** See Section 3 for waveforms

| Symbol                             | Parameter   | 54F/74F   | 54F                    | 74F                    | Units | Fig. No. |
|------------------------------------|---|---|------------------------|------------------------|-------|----------|
|                                    |   | $T_A = +25^\circ\text{C}$<br>$V_{CC} = +5.0\text{ V}$ | $T_A, V_{CC} =$<br>Mil | $T_A, V_{CC} =$<br>Com |       |          |
|                                    |   | Min Typ Max   | Min Max                | Min Max                |       |          |
| $t_s(\text{H})$<br>$t_s(\text{L})$ | Setup Time, HIGH or LOW<br>$D_n$ to $\overline{S}_1, S_2, \text{STB}$ | 0<br>0  |                        | 0<br>0                 | ns    | 3-15     |
| $t_h(\text{H})$<br>$t_h(\text{L})$ | Hold Time, HIGH or LOW<br>$D_n$ to $\overline{S}_1, S_2, \text{STB}$  | 11.0<br>8.5   |                        | 12.5<br>9.5            |       |          |
| $t_w(\text{H})$<br>$t_w(\text{L})$ | STB, $\overline{S}_1, S_2$ Pulse Width<br>HIGH or LOW                 | 8.0<br>8.0  |                        | 9.0<br>9.0             | ns    | 3-9      |
| $t_w(\text{L})$                    | $\overline{\text{CLR}}$ Pulse Width, LOW                              | 8.0   |                        | 9.0                    | ns    | 3-9      |