

## GENERAL PURPOSE INPUT/OUTPUT (GPI/O)

### DESCRIPTION

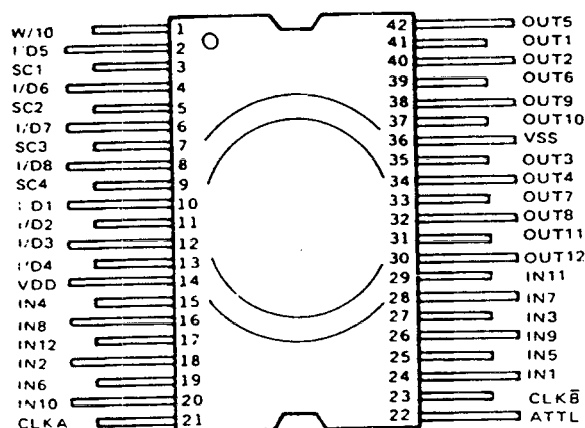
The General Purpose Input/Output device P/N 10696, provides 12 discrete inputs and 12 discrete static outputs. This device is used for direct data exchange or status and control function exchange with an external peripheral device. The GPI/O lines directly interface with TTL circuitry. Direct addressing for up to sixteen of these circuits is possible by the use of four chip address straps that can be terminated, by the user, to create each chip address. The I/O is accessed with an I/O enable signal from the CPU and a simultaneous 8-bit instruction from ROM. Four bits of the instruction are used to address the particular I/O chip; the other four bits define the I/O operation.

The 4-bit operation code is interpreted by the GPI/O to either copy the contents of the accumulator into one of the three 4-bit parallel output registers (A, B or C) or transfer data from one of the 4-bit parallel input receivers (A, B or C) into the accumulator of the CPU. The input lines are static and are sampled at instruction execution time. The output drivers are latched and data remains in the output registers until altered. Bits 1 through 4 of the instruction word are commands to the I/O while bits 5 through 8 are used to address one of 16 possible I/O chips. The four I/O chip select strap inputs terminated by the user, create the addresses for each I/O circuit.

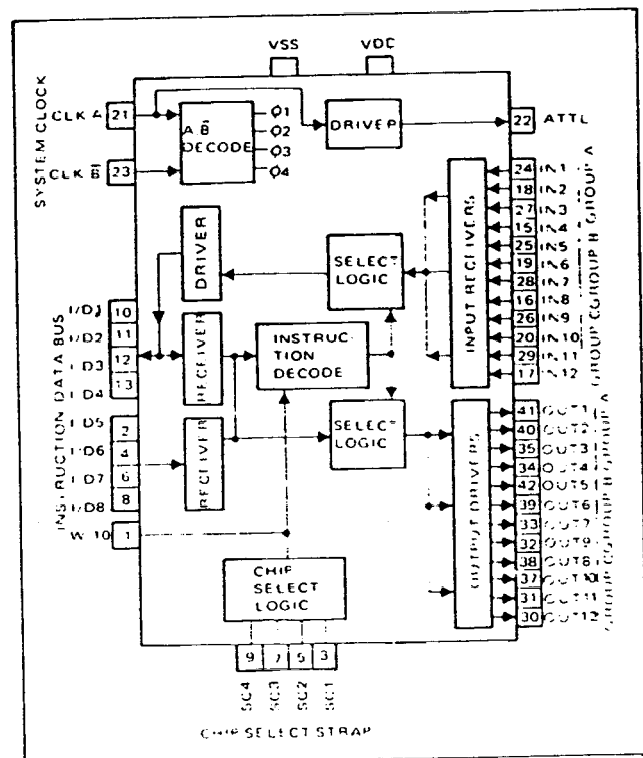
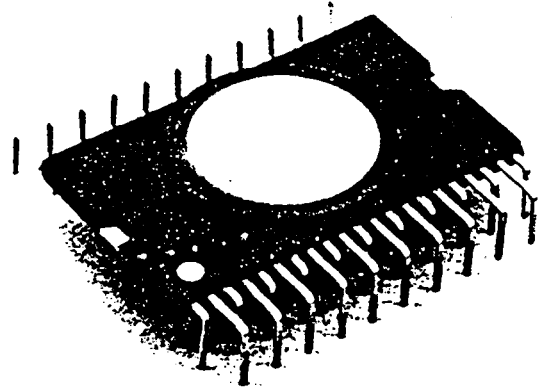
Data is transferred through the GPI/O from input groups A, B, or C to I/D 1 through 4 and from I/D 5 through 8 to output groups A, B or C, to most significant to most significant and least significant to least significant. A TTL level A clock (ATTL) is provided for external system use.

### FEATURES

- 12 Discrete Inputs
- 12 Discrete Outputs
- Direct TTL Compatibility
- Individual Strappable Addresses for Up to 16 GPI/Os
- Latched Output Drivers
- PPS-4 and PPS-8 Direct Compatibility



General Purpose Input/Output Pin Configuration



GPI/O Block Diagram

## OPERATING CHARACTERISTICS

### Supply Voltage:

VDD = -17 Volts ±5%  
(Logic "1" = most negative voltage V<sub>IL</sub> and V<sub>OL</sub>)

VSS = 0 Volts (Gnd.)  
(Logic "0" = most positive voltage V<sub>IH</sub> and V<sub>OH</sub>)

### System Operating Frequencies:

199 kHz or 256 kHz.

### Device Power Consumption:

330 mw

### Input Capacitance:

<5 pf

### Input Leakage:

<10 ua

### Operating Temperature (TA):

0°C to 70°C. (TA = 25°C unless otherwise specified.)

### Storage Temperature:

-55°C to 120°C.

## ABSOLUTE MAXIMUM RATINGS

### Supply Voltage

|VDD-VSS| = 27 volts maximum.

Input Voltage with respect to VSS  
-27 volts maximum.

Maximum positive voltage on any pin +0.3 volts.

| CHIP NO. | I/O BUS<br>CHIP SELECT<br>STRAPS | HEX | READ | GROUP |   |   | COMMAND   |
|----------|----------------------------------|-----|------|-------|---|---|---|
|          |                                  |     |      | C     | B | A |   |
| 0        | 0000                             | A   | 1010 | -     | - | X | Read Group A<br>Read Group B<br>Read Group C<br>If two or three groups are selected the accumulator will copy the logical "OR" value of the selected groups |
| 1        | 0001                             | 9   | 1001 | -     | X | - |   |
| 2        | 0010                             | 3   | 0011 | X     | - | - |   |
| 3        | 0011                             | 0   | 0000 | X     | X | X | If two or three groups are selected the accumulator will copy the logical "OR" value of the selected groups   |
| 4        | 0100                             | 1   | 0001 | X     | X | - |   |
| 5        | 0101                             | 2   | 0010 | X     | - | X |   |
| 6        | 0110                             | 8   | 1000 | -     | X | X | Set Group A<br>Set Group B<br>Set Group C<br>If two or three groups are selected the accumulator contents will be copied to each group selected             |
| 7        | 0111                             |     |      |       |   |   |   |
| 8        | 1000                             |     |      |       |   |   |   |
| 9        | 1001                             | E   | 1110 | -     | - | X | Set Group A<br>Set Group B<br>Set Group C<br>If two or three groups are selected the accumulator contents will be copied to each group selected             |
| 10       | 1010                             | D   | 1101 | -     | X | - |   |
| 11       | 1011                             | 7   | 0111 | X     | - | - |   |
| 12       | 1100                             | 4   | 0100 | X     | X | X | If two or three groups are selected the accumulator contents will be copied to each group selected  |
| 13       | 1101                             | 5   | 0101 | X     | X | - |   |
| 14       | 1110                             | 6   | 0110 | X     | - | X |   |
| 15       | 1111                             | C   | 1100 | -     | X | X |   |

NOTE: Any one of the I/O chips may be used to read or set any group (A, B, or C) or combination of groups.

## GPI/O Instruction Format

| FUNCTION  | SYMBOL                     | LIMITS (VSS = 0V)        |        |        | LIMITS (VSS = +5V)       |        |      | UNIT | TEST CONDITIONS                                       |  |  |
|---|----------------------------|--------------------------|--------|--------|--------------------------|--------|------|------|---|--|--|
|   |                            | MIN                      | TYP    | MAX    | MIN                      | TYP    | MAX  |      |   |  |  |
| Supply Current (Average)  | I <sub>DD</sub>            |                          | 8.5    | 18.5   |                          | 8.5    | 18.5 | mA   | VDD = -17.85V<br>VSS = 0V<br>F = 256 kHz<br>TA = 25°C |  |  |
| Input and Output Characteristics -- System Bus                    |                            |                          |        |        |                          |        |      |      |   |  |  |
| I/D <sub>1-4</sub>  | I/D <sub>5-8</sub><br>W/IO | V <sub>IH</sub>          | -1.5   | +0.3   | +3.5                     | +5.3   | V    | OR   | VDD = -17V ±5%<br>VSS = 0V                            |  |  |
|   |                            | V <sub>IL</sub>          | -6.5   | -17.85 | -1.5                     | -12.85 | V    |      |   |  |  |
| V <sub>OH</sub>   | -1.0                       | +0.3                     | +4.0   | +5.3   | V                        |        |      |      |   |  |  |
|   | V <sub>OL</sub>            | -7.5                     | -17.85 | -2.5   | -12.85                   | V      |      |      |   |  |  |
| CLKA<br>CLKB  | V <sub>IH</sub>            | -0.5                     | +0.3   | +4.5   | +5.3                     | V      |      |      |   |  |  |
|   | V <sub>IL</sub>            | -10.0                    | -17.85 | -5.0   | -12.85                   | V      |      |      |   |  |  |
| Input and Output Characteristics -- External Interface and Straps |                            |                          |        |        |                          |        |      |      |   |  |  |
| SC <sub>1-4</sub>   | V <sub>IH</sub>            | -1.5                     | +0.3   | +3.5   | +5.3                     | V      |      |      |   |  |  |
|   | V <sub>IL</sub>            | -13.0                    | -17.85 | -8.0   | -12.85                   | V      |      |      |   |  |  |
| IN <sub>1-12</sub>  | V <sub>IH</sub>            | -1.5                     | +0.3   | +3.5   | +5.3                     | V      |      |      |   |  |  |
|   | V <sub>IL</sub>            | -4.2                     | -17.85 | +0.8   | -12.85                   | V      |      |      |   |  |  |
| OUT <sub>1-12</sub><br>A(TTL)                                     | V <sub>OH</sub>            | NOTE 1<br>floating (≥5M) |        |        | NOTE 1<br>floating (≥5M) |        |      | Ω    | VDD = -12V ±5%<br>VSS = +5V ±5%                       |  |  |
|   | V <sub>OL</sub>            | NOTE 1<br>floating (≥5M) |        |        | NOTE 1<br>floating (≥5M) |        |      |      |   |  |  |

NOTE: 1. Output driven to VSS with maximum "ON" resistance (RON) of 1.0K ohms and maximum output current of 2.7 milliamps.

## REGIONAL SALES OFFICES

### EASTERN REGIONAL MANAGER

JIM PIERCE  
Rt. 2, Box 825  
Riverhead, N.Y. 11901  
Phone: 516/979-0183

### JAPAN SALES MANAGER

SHIGE MURASE  
Rockwell International Overseas Corp.  
Ichiban-cho Central Bldg.  
22-1 Ichiban-cho, Chiyoda-ku  
Tokyo 102, Japan  
Phone: 265-8808



Rockwell  
International

Microelectronic Device Division

### EUROPEAN SALES MANAGER

ANDRE KOBEL  
Rockwell International GmbH  
Microelectronic Device Division  
Frauenhoferstrasse 11  
D-8033 Munchen-Martinsried  
Germany  
Phone: 8599575

### S. EASTERN REGIONAL MANAGER

RON JANSSEN  
350C McCall Place  
Atlanta, Ga. 30340  
Phone: 404/458-2263

### CENTRAL REGIONAL MANAGER

JIM SMITH  
2855 Coolidge Road, Suite 101  
Troy, Mich. 48064  
Phone: 313/435-1638

### MIDWEST REGIONAL MANAGER

ALLAN CAREY  
2620 E. Higgins Road, Suite 200-13  
Elk Grove Village, IL 60007  
Phone: 312/439-1713

### WESTERN REGIONAL MANAGER

BILL TRELEAVEN  
Box 3669  
Anaheim, Ca 92803  
Phone: 714/632-3698

For assistance, call or write the office nearest you.