



## SYSTEMS S3000

## INDUSTRIAL CONTROLLER

### S3068: DIGITAL DC I/O BOARD 8-IN 8-OUT 10-30VDC SOURCING

#### FEATURES:

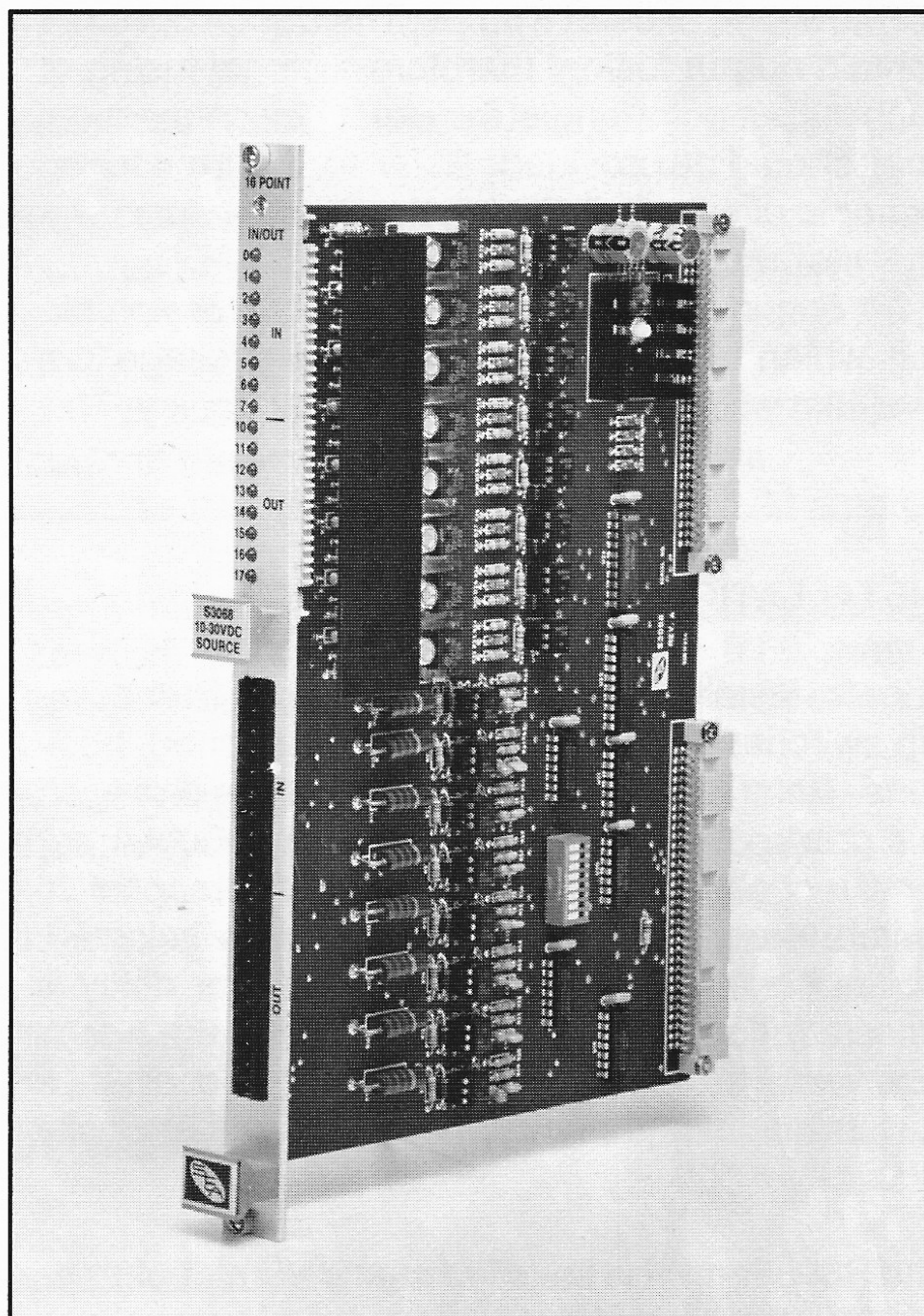
- 8 DIGITAL INPUT POINTS AND 8 DIGITAL OUTPUT POINTS
- INPUT SECTION ISOLATED FROM OUTPUT SECTION
- 16 INDIVIDUAL STATUS LEDES (1 LED PER I/O POINT)
- 1 AMP DRIVE CAPABILITY PER OUTPUT POINT
- OUTPUT TRANSIENT PROTECTION
- REMOVABLE FIELD WIRING CONNECTOR
- INDIVIDUALLY SELECTABLE INPUT FILTER DELAY ON INPUTS
- OPTICAL ISOLATION ALL I/O POINTS
- STANDARD DOUBLE HEIGHT EUROCARD

#### GENERAL DESCRIPTION:

The S3068 10-30VDC I/O Board contains 8 digital inputs and 8 digital outputs. One-half of the board utilizes the circuitry of an S3063 10-30VDC input board and one-half the circuitry of an S3073 10-30VDC output board.

The Input section contains 8 identical solid state input circuits which accept the on/off status of user devices such as push-buttons, limit switches, and proximity sensors. The inputs sense the voltage levels of digital DC input signals, with the devices driving the inputs being defined as sourcing (positive current into the input). When the voltage at the input is high (approximately equal to the users supply voltage), the input is read as a "1". When the input is low (approximately zero), the input is read as a "0".

The on/off status of each input is indicated with in-



dividual LEDs located on the faceplate. The LEDs provide the status of the actual input points (field side) rather than the internal logic status.

The filter delay of each input can be independently set for either a long or short delay via dip switches mounted on the circuit board. The short filter delay is used when interfacing to proximity sensors or other solid state devices while the long filter delay is used when interfacing to mechanical contact switches such as push-buttons where it is necessary to eliminate contact bounce.

The output section contains 8 identical solid state circuits which convert the logic status of one output byte, written from the Main Processor Board, to the appropriate voltage in order to drive user devices such as relays, solenoids, and lamps. On any given output point, writing a "1" to that point turns the

output "on"; writing a "0" turns the output "off". When the output is "on", the voltage at the output is high (approximately equal to the users supply voltage). When the output is "off", the voltage at the output is low (approximately zero). An output will "source" current to the load when "on", thus the outputs are defined as "sourcing".

Each output is rated at 1 amp DC (continuous) with an inrush (pulsed) current drive capability of 5 amps for 100msec. The sum of all the outputs current cannot, however, exceed 6 amps. The S3068 does not contain output fusing, therefore external fusing at each output point and at the users Vcc connection point should be provided. Refer to Figure 4 for an example of externally fusing the S3068.

Each output contains a transient suppression circuit which clamps any transient overvoltage to a level that will not damage the output circuitry. This

allows solenoids and other inductive loads to be connected directly to an output point without connecting "fly-back" diodes or other surge suppression devices to the load itself. Outputs may be "collector or'd" such that applying 10-30 VDC to an "off" output will not damage the output.

The on/off status of each output is indicated with individual LEDs located on the faceplate. The LEDs provide the status of the actual output points (field side) rather than the internal logic status. A given LED also shows the correct status of its respective output point whether or not a load is connected to the output. No minimum load is required for proper output operation.

Input, output and user power wiring is implemented with a removable 20-pin field wiring connector which allows easy board replacement. Refer to Figure 4 for typical field wiring connections.

---

## **INSTALLATION:**

Prior to installing the S3068, the input filter delay dip switches should be set to the desired positions. Refer to Figure 2. The switches are arranged in a group of eight switches. The dip switches set the filter delay of inputs 0 thru 7. When a respective switch is open, the short filter delay is selected. When the switch is closed, the long filter delay is selected. To set a switch open, depress the switch down on the side that reads open. To close a switch, depress the switch down on the opposite side.

The S3068 may be installed in any I/O slot of the S3000 rack (provided the main program is

configured to address that slot as an S3068). Install the S3068 by aligning the board with the card guides and sliding in until firmly seated. The board is held in the rack via captive screws located on the S3068 faceplate. To remove the S3068, loosen the captive screws and gently pull the board out of the rack using the handles located on the S3068 faceplate.

NOTE: When installing or removing an S3068, the System should be in power-down mode (PS3007 power supply "off").

---

## **PROGRAM INTERFACE:**

The S3068 contains one input byte and one output byte which are accessed by specifying the slot (00-15) and the byte (0 for input bits 00-07 and 1 for output bits 10-17). When specified in the system configuration of the main processor board, the S3068 is automatically read and written to as part of the I/O update. The input is mapped to an input variable (X) and the output is written to from an output variable (Y). The format of these variables are:

input byte: Xaa0  
input bit: Xaa0.c  
output byte: Yaa1  
output bit: Yaa1.c

Where: X = input variable type (X)  
Y = output variable type (Y)  
aa = two digit slot address (00-15)  
c = bit address (0-7)

The input variable represents the status of the S3068 input as of the last I/O update while the output variable contains the value that is written to the S3068 output (as set in the main program).

## SPECIFICATIONS:

**Number Of I/O Slots Required:** 1

### **Board Size:**

Length: 9.15"  
Height: 6.30"  
Width: 0.80"

**Number Of I/O Points:** 16

**Number Of Isolated Sections:** 2

### **INPUT SECTION:**

#### **Input Voltage:**

Voltage Range: 10 to 30 volts  
Vin(on) -minimum guaranteed turn on: 10.0 volts  
Vin(off)-maximum guaranteed turn off: 3.5 volts  
Vin(max)-maximum continuous on voltage  
30.0 volts  
Vin(pul)-maximum pulsed (10msec): 150.0 volts

#### **Input Current:**

Iin(max)-maximum input current  
(Vin=10v) 6.5 milliamps  
Iin(max)-maximum input current  
(Vin=30v) 24.0 milliamps

**Input Impedance (approximate):** 1.2K ohms

#### **Input Filter Delay:**

Tplhs(min)-minimum short delay (off-on):  
0.5 millisecc  
Tplhs(max)-maximum short delay (off-on):  
1.5 millisecc  
Tphls(min)-minimum short delay (on-off):  
0.6 millisecc  
Tphls(max)-maximum short delay (on-off):  
2.0 millisecc  
Tplhl(min)-minimum long delay (off-on):  
5.0 millisecc  
Tplhl(max)-maximum long delay (off-on):  
12.0 millisecc  
Tphll(min)-minimum long delay (on-off):  
6.5 millisecc  
Tphll(max)-maximum long delay (on-off):  
16.0 millisecc

**Optical Isolation (input to bus):** 2500 Vrms

### **OUTPUT SECTION:**

#### **Output Voltage:**

Voltage Range: 10 to 30 volts  
Vout(on-min) -minimum on voltage  
(Iout=1.0 amps): Vcc-2.00 volts  
Vout(on-max) -maximum on voltage  
(no load): Vcc-0.75 volts  
Vout(off-max)-maximum off voltage  
(no load): 1.5 volts

[Note: Vcc = users supply voltage]

#### **Output Current:**

Iout(max)-maximum continuous output current  
(Vout=24v): 1.00 amp DC  
Iout(min)-off state leakage current  
[Vout=Vout(off-max)]: 100 microamps  
Iout(pul)-maximum pulsed output current  
(t=100msec): 5.00 amps

#### **Output Impedance (approximate):**

Zout(on) -output on impedance: 0.50 ohms  
Zout(off)-output off impedance: 2.2k ohms

#### **Output Response Time:**

Tplh(min)-minimum turn on time (max load):  
10 microsec  
Tplh(max)-maximum turn on time (min load):  
25 microsec  
Tphl(min)-minimum turn off time (max load):  
75 microsec  
Tphl(max)-maximum turn off time (min load):  
200 microsec

#### **Optical Isolation (bus interface to output):**

1500 Vrms

#### **Power Requirements (all outputs on):**

IccEXT(max)-maximum users supply current  
(Vcc=24v) 6.0 amps  
IccEXT(max)-maximum users supply current  
(all outputs off): 20 milliamps  
IccBUS(max)-maximum S3000 bus current:  
200 milliamps

#### **Temperature Ranges:**

Storage: 0 to 85° C  
Operating: 0 to 60° C

**Relative Humidity:** 5 to 95%

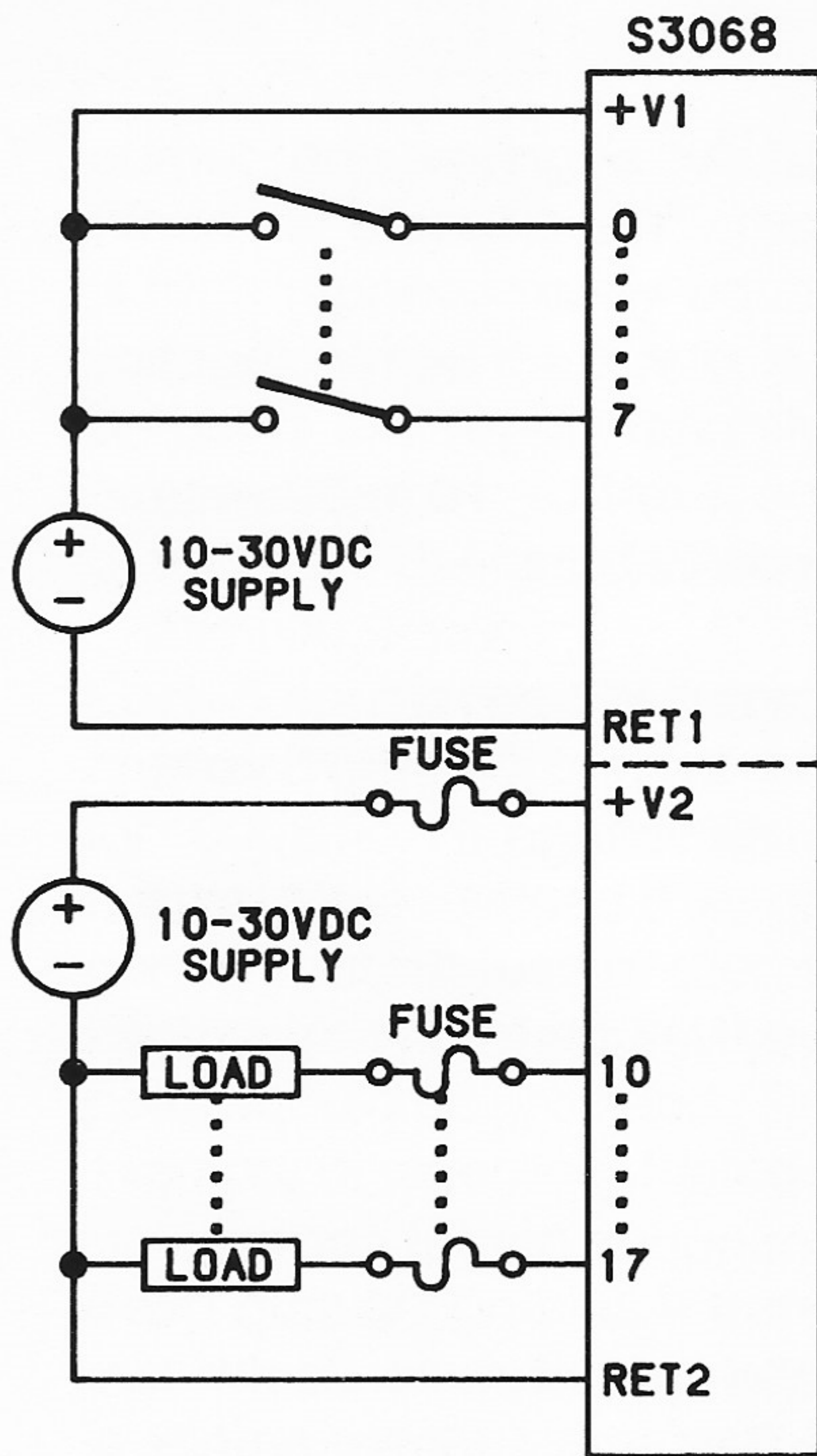


FIGURE 4  
TYPICAL USER WIRING

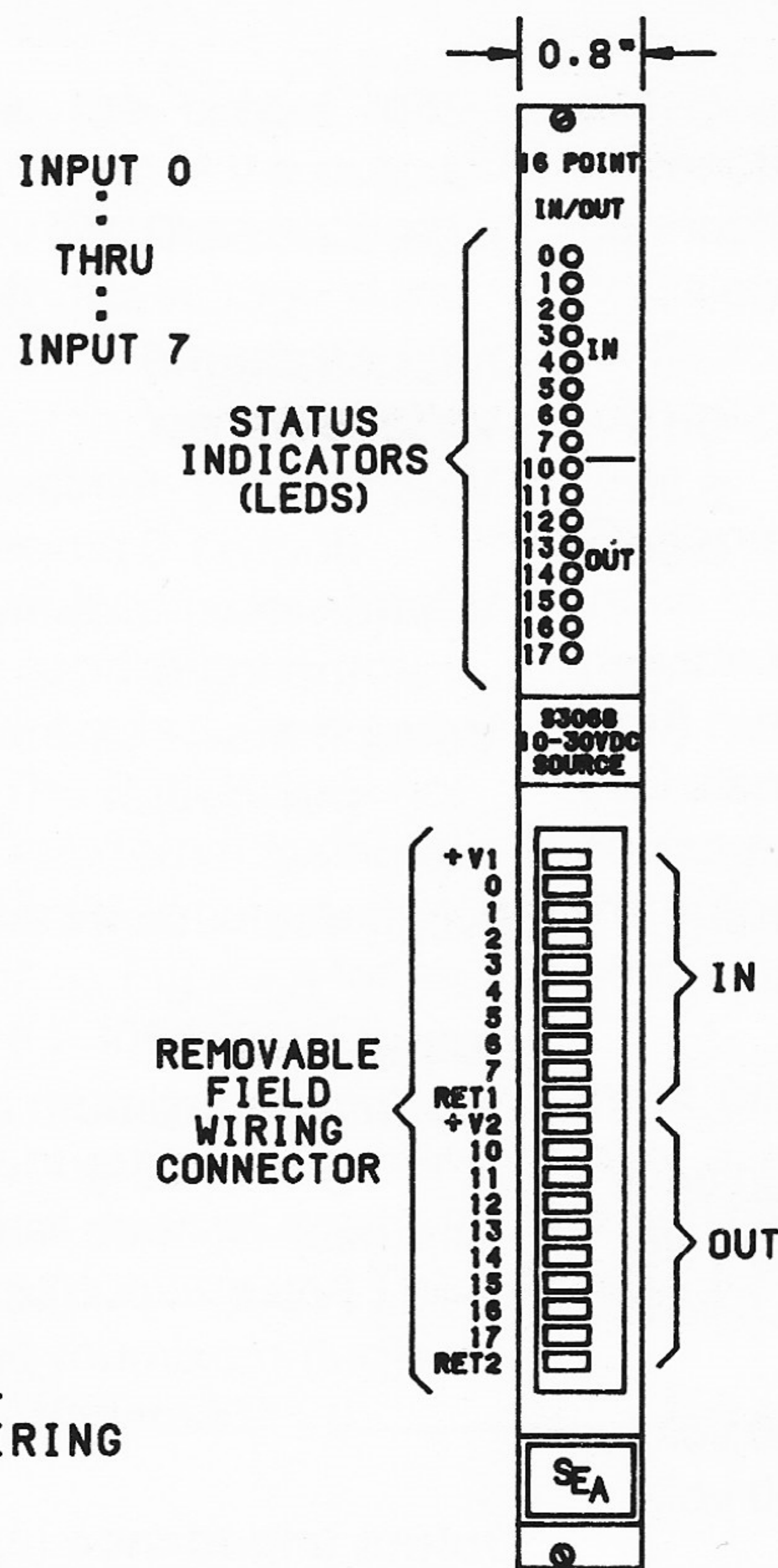


FIGURE 2  
BOARD OUTLINE

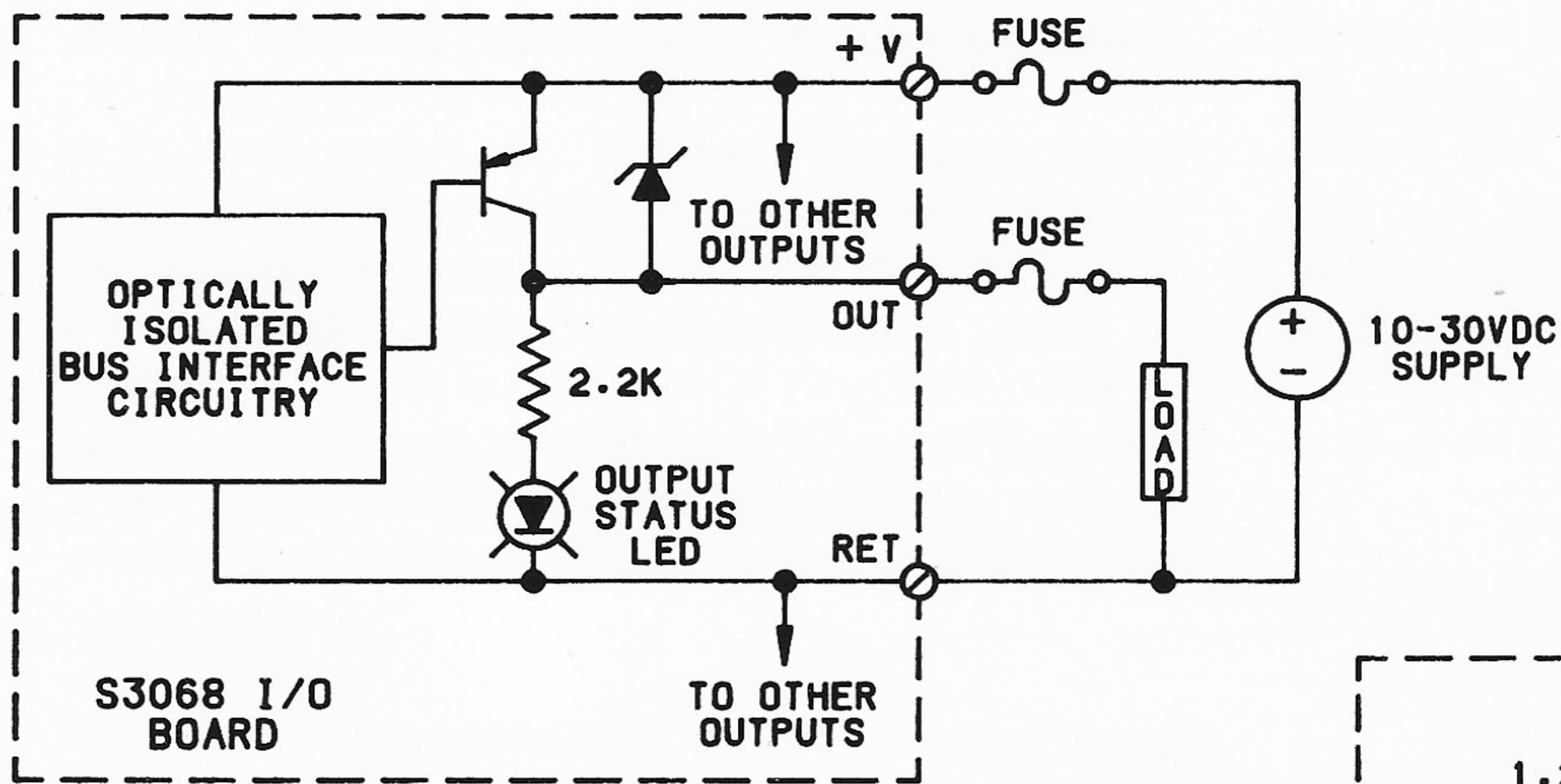


FIGURE 3  
TYPICAL OUTPUT CIRCUIT

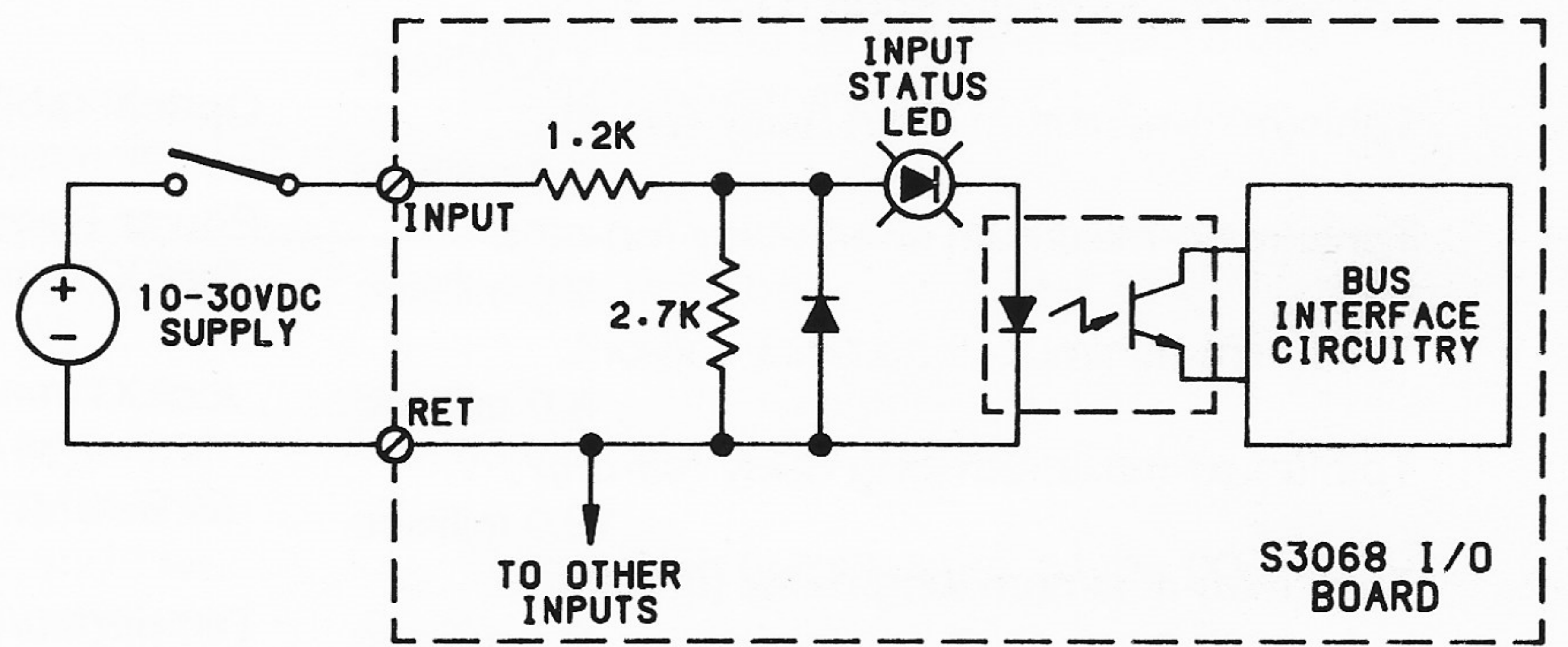


FIGURE 1  
TYPICAL INPUT CIRCUIT



# SYSTEMS ELECTRONICS GROUP

DIVISION OF SYSTEMS ENGINEERING ASSOCIATES, INC.  
14989 W. 69TH AVE, ARVADA, COLORADO, P.O. BOX 750 80001  
(303) 421-0233 FAX (303) 421-8108