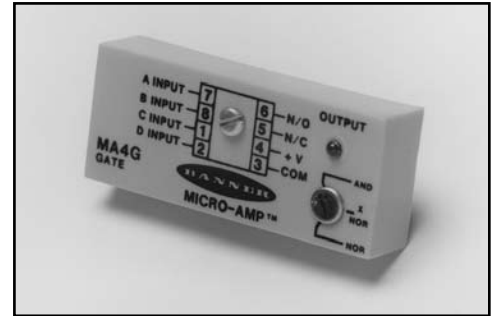


# MICRO-AMP® System

## MA4G 4-input Gate Logic Module



**MICRO-AMP® module MA4G** is a 10 to 30V dc, plug-in, 4-input logic gate module. It offers three selectable logic modes: "AND", "NOR", and "X-NOR" (exclusive "NOR"). In the AND gate mode, the output(s) will change state when all four inputs are low simultaneously. The NOR logic mode requires that all four inputs be high at the same time for the output(s) to change state. The output(s) will change state in the X-NOR mode when all four inputs are simultaneously *either high or low*. The MA4G may be used as a 2, 3 or 4-input gate. Unused inputs are simply tied low (to pin #3) or left unconnected (high), depending upon the logic mode in use.



The MA4G directly accepts the outputs of other MICRO-AMP modules plus the NPN (current sinking) output of self-contained dc sensors in the following Banner families: OMNI-BEAM, MULTI-BEAM, MAXI-BEAM, VALU-BEAM, MINI-BEAM, ECONO-BEAM, QØ8, Q19, Q25, S18, SM3Ø, C3Ø, and SM512 Series.

### MICRO-AMP MA4G Specifications

**SUPPLY VOLTAGE:** 10 to 30V dc at less than 20 milliamps (exclusive of load); 10% maximum ripple.

**INPUTS:** INPUT and INHIBIT both respond to a logic "low" signal (less than 2V dc). A logic "high" is at least 6V dc or an open circuit. Inputs must be capable of sinking at least 4 milliamps. Inputs may be derived from limit switches or from dc sensors with NPN (current sinking) output transistors.

**RESPONSE SPEED:** all INPUTS will respond to a low signal or high signal of 1 millisecond duration or longer.

**OUTPUT CONFIGURATION:** two open-collector NPN transistors with complementary outputs (one normally open, one normally closed). Maximum sinking current 150 milliamps, each output. Saturation

voltage less than 0.5V dc at 10 milliamps. Off-state leakage current less than 1 microamp.

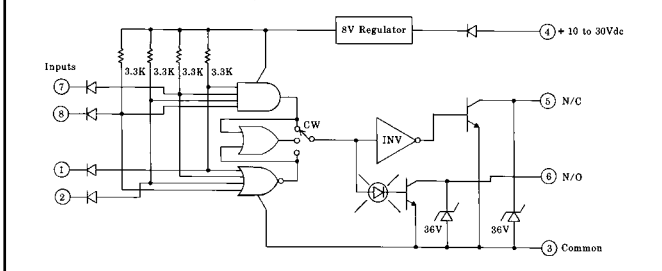
**SELECTOR SWITCH:** single-turn potentiometer selects logic mode. Fully clockwise = NOR mode; fully counterclockwise = AND mode; midpoint = X-NOR mode.

**INDICATOR:** red LED indicator on the top of the module lights whenever the N/O output is conducting.

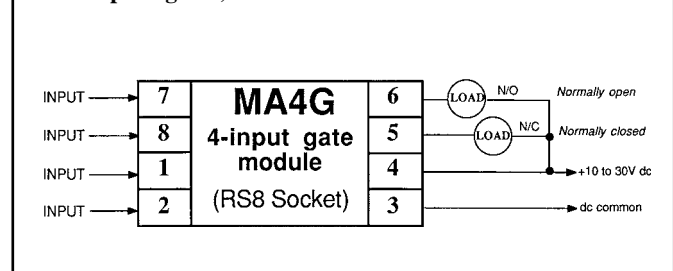
**CONSTRUCTION:** totally encapsulated plug-in package with molded VALOX® housing. Gold-flashed connection pins.

**OPERATING TEMPERATURE:** 0 to 70 degrees C (32 to 158 degrees F).

Functional Schematic, MA4G LOGIC Module



Hookup Diagram, MA4G LOGIC Module



### Truth Table

This table lists the various input states and their corresponding outputs available in each logic mode. The key to reading the table is given below. Logic statements in the table read down the columns. For example, in the first column, if the selector control is at "AND" and all four inputs are logic low, the MA4G's N/O output is low, the N/C output is high, and the LED indicator is "on".

#### Truth Table Key

H = logic HIGH  
L = logic LOW  
X = either HIGH or LOW (does not matter)

**"AND":** all inputs low energizes N/O output.  
Any input(s) high energizes N/C output.

**"NOR":** all inputs high energizes N/O output.  
Any input(s) low energizes N/C output.

**"X-NOR" ("exclusive NOR"):**  
All inputs the same energizes N/O output.  
All inputs not the same energizes N/C output.

MA4G LOGIC TRUTH TABLE

SELECTOR	AND	AND	NOR	NOR	X-NOR	X-NOR	X-NOR
INPUT	L	H	H	L	L	H	H
INPUT	L	X	H	X	L	H	L
INPUT	L	X	H	X	L	H	X
INPUT	L	X	H	X	L	H	X
N/O OUTPUT	L	H	L	H	L	L	H
N/C OUTPUT	H	L	H	L	H	H	L
Indicator LED	ON	OFF	ON	OFF	ON	ON	OFF

# MICRO-AMP® Accessories

## Sockets

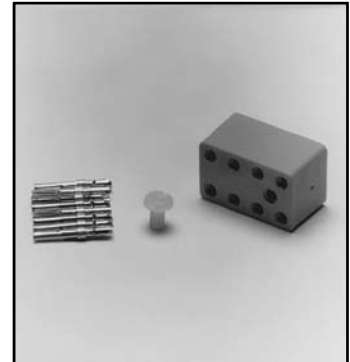
### RS8

The RS8 socket is the most frequently used means of mounting and wiring a MICRO-AMP module. It consists of a socket with two four-terminal connection strips, all wired together onto a PC board. The PC board assembly slides into a 1 inch (25mm) long PVC track which is used to mount the entire assembly. A hold-down screw keys the correct polarity of the module.

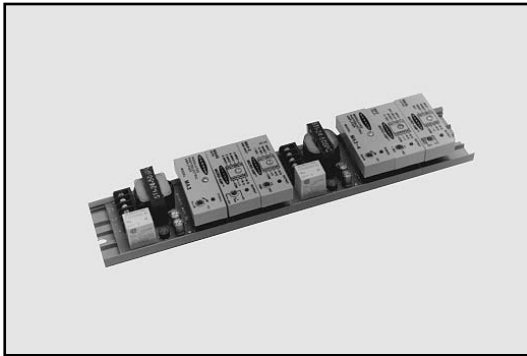


### RS8K

The RS8K is a kit of parts which comprise the socket portion of the RS8 assembly. It is used to provide a socket for MICRO-AMP modules that are installed onto printed circuit boards. The RS8K consists of a molded socket block and 8 individual socket pins. A nylon screw is included to affix the socket block to the PC board. The drill size for the pins is #50 (.070"; 1,8mm). Drill pattern dimensions are included with the RS8K.



## Mounting Track

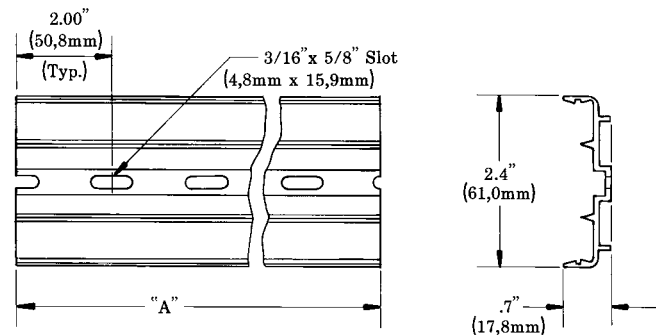


- TR100-1** 1 inch (25mm) long (supplied with RS8 socket)
- TR100-4** 4 inch (100mm) long (supplied with MPS-15 series power supply)
- TR100-6** 6 inch (150mm) long
- TR100-12** 12 inch (300mm) long

PVC mounting track for MICRO-AMP components is available in 6 and 12 inch lengths for systems which use multiple components. For example, a 6-inch length will accommodate one MPS-15 power supply plus two additional RS8 sockets with modules.

Longer lengths of mounting track may be supplied on a quote basis.

### Dimensions, TR-100 Mounting Track



Track Model	"A" Dimension	Minimum number of slots
TR100-1	1" (25mm)	1
TR100-4	4" (100mm)	2
TR100-6	6" (150mm)	3
TR100-12	12" (300mm)	8



**WARNING** MICRO-AMP® Systems do NOT include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A sensor or module failure or malfunction can result in *either* an energized or a de-energized sensor output condition.

Never use this product as a sensing device for personnel protection. Its use as a safety device may create an unsafe condition which could lead to serious injury or death.

Only MACHINE-GUARD and PERIMETER-GUARD Systems, and other systems so designated, are designed to meet OSHA and ANSI machine safety standards for point-of-operation guarding devices. No other Banner sensors or controls are designed to meet these standards, and they must NOT be used as sensing devices for personnel protection.

**WARRANTY:** Banner Engineering Corporation warrants its products to be free from defects for one year. Banner Engineering Corporation will repair or replace, free of charge, any product of its manufacture found to be defective at the time it is returned to the factory during the warranty period. This warranty does not cover damage or liability for the improper application of Banner products. This warranty is in lieu of any other warranty either expressed or implied.