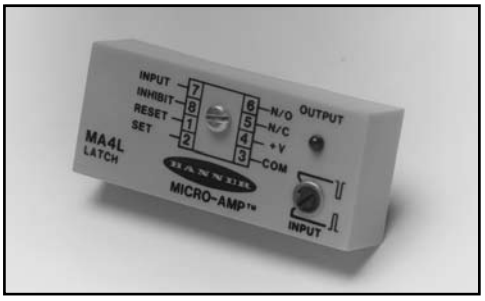
MICRO-AMP® System

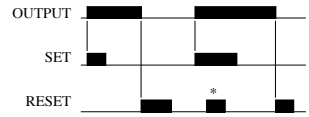
MA4L Latch Logic Module

MICRO-AMP® model MA4L offers two latching logic modes. It can be latched and unlatched with low-going signals to its SET and RESET inputs. It also will function as an edge-triggered "D" flip-flop latch when signals are presented to its INPUT pin. The edge-triggered latch may be interrogated with a second signal at the INHIBIT or the RESET pin. In this mode, the MA4L is very useful in inspection/rejection applications. The MA4L may also be wired for alternate-action divide-by-two logic (see logic diagram, below).

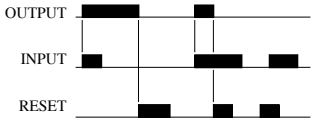
The MA4L directly accepts the outputs of other Banner MICRO-AMP modules plus the NPN (current sinking) output of self-contained dc sensors in the following Banner families: OMNI-BEAM, MULTI-BEAM, MAXI-BEAM, VALU-BEAM, MINI-BEAM, ECONO-BEAM, QØ8, Q19, Q25, S18, SM3Ø, C3Ø, and SM512 Series.



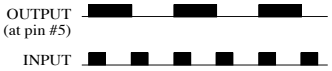
Set/reset latch mode, MA4L:



Edge-triggered latch mode, MA4L:



Flip-flop (÷2) logic, MA4L:



NOTE: Jumper pin #8 (INHIBIT) to pin #6 (N/O Output)

MICRO-AMP MA4L Specifications

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

INPUTS: INPUT, INHIBIT, RESET, and SET signals are buffered for 1-millisecond response. A logic "low" must be 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. INPUT signal polarity is selectable for either high-going or low-going transition.

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.

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

CIRCUIT PROTECTION: reverse voltage polarity protected. Latch comes up reset after power-up.

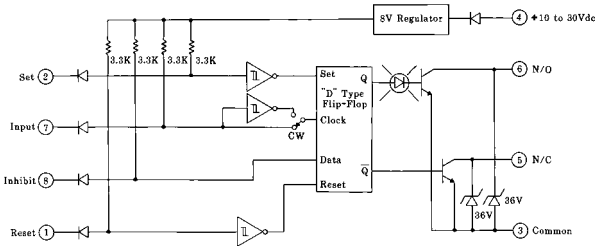
SELECTOR SWITCH: single-turn potentiometer selects response polarity of INPUT. Fully clockwise = high-going transition; fully counterclockwise = low-going transition.

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

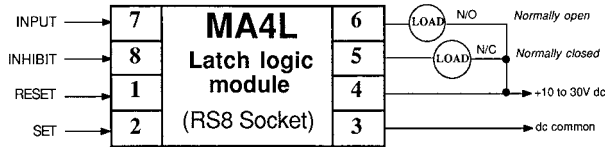
CONSTRUCTION: totally encapsulated plug-in package with molded VALOX® housing. Gold-flashed connection pins.

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

Functional Schematic MA4L LATCH Module



Hookup Diagram, MA4L LATCH Module



Logic Truth Tables

TRUTH TABLE KEY

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

↘ = HIGH to LOW transition

↗ = LOW to HIGH transition

NC = no change of state

**NOTE: both outputs conduct in this condition (*).*

SET-RESET LATCH MODE (no connections to INPUT or INHIBIT)			
SET (pin #2)	H	L	L
RESET (pin #1)	L	H	L
N/O OUTPUT (pin #6)	H	L	L*
N/C OUTPUT (pin #5)	L	H	L*
Indicator LED	Off	On	On

EDGE-TRIGGERED LATCH MODE (no connections to SET)						
Input Polarity:	⊓			⊔		
INPUT (pin #7)	↘	↘	↗	↗	↗	↘
INHIBIT (pin #8) or RESET (pin #1)	H	L	X	H	L	X
N/O OUTPUT (pin #6)	L	H	NC	L	H	NC
N/C OUTPUT (pin #5)	H	L	NC	H	L	NC
Indicator LED	On	Off	NC	On	Off	NC

MICRO-AMP® Accessories

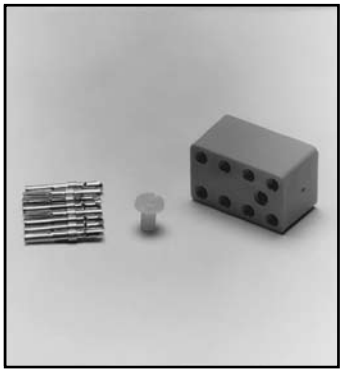
Sockets

RS8

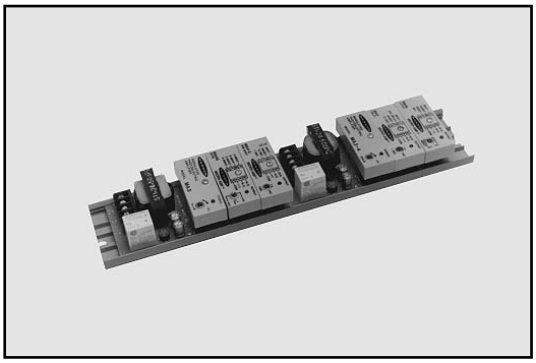
The RS8 socket is the most frequently used means of mounting and wiring a MICRO-AMP module. It consists of a socket with two four-terminal connection strips, all wired together onto a PC board. The PC board assembly slides into a 1 inch (25mm) long PVC track which is used to mount the entire assembly.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



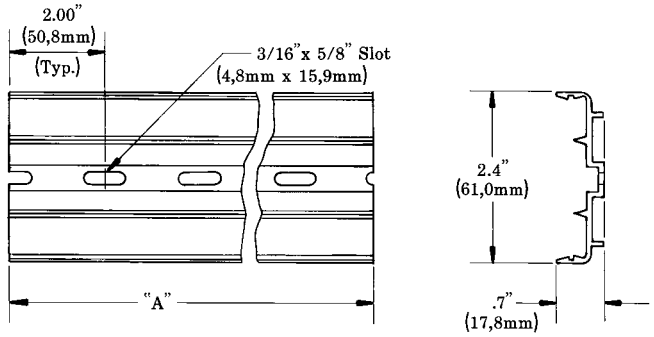
TR100-1 1 inch (25mm) long (supplied with RS8 socket)
TR100-4 4 inch (100mm) long (supplied with MPS-15 series power supply)
TR100-6 6 inch (150mm) long
TR100-12 12 inch (300mm) long

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 accomodate one MPS-15 power supply plus two additional RS8 sockets with modules.

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

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

Dimensions, TR-100 Mounting Track



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.

Banner Engineering Corp. 9714 10th Avenue No., Minneapolis, MN 55441 Telephone: (612) 544-3164 FAX (applications): (612) 544-3573