



# ROTARY-5

5 Channel Rotary Encoder to  
Output Pulse Converter

## User Manual



Thank you for purchasing the ROTARY-5 Module.

## **HAGSTROM ELECTRONICS, INC.**

is pleased that you have selected this product for your application.

The ROTARY-5 unit is configurable in a variety of ways in order to meet your specific requirements. Please take a few minutes to read this manual before using your ROTARY-5.

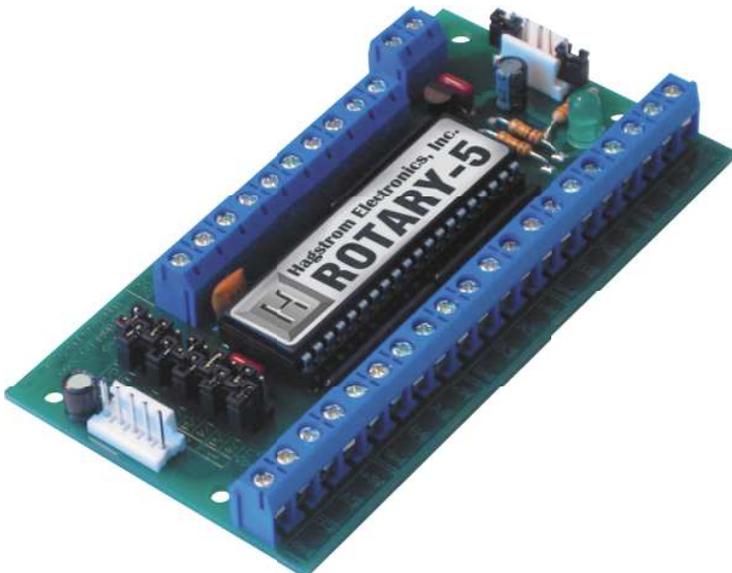
If you have any questions about the use of the ROTARY-5 not covered in this manual, please contact us directly. We offer toll free technical product support from 8:00am to 5:00pm M-F Eastern Time **888-690-9080**. You may also send an email to

***sales@hagstromelectronics.com***

We respond to all email requests within one business day.

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## Introduction to the ROTARY-5

The ROTARY-5 module is a product designed to convert quadrature signals from mechanical and/or optical rotary encoder switches to logic level output pulses. These pulses are suitable for driving keyboard encoder inputs and can be used with all Hagstrom Electronics, Inc. keyboard encoder products.

The ROTARY-5 allows for up to five rotary switches to be connected at one time. The signals from each rotary switch are converted into two outputs which activate independently based on the direction of rotation of the switch. Multiple ROTARY-5 units may be "Daisy Chained" to expand the number of rotary channels. Use our MTA100-5-36-FF connecting cable for connecting multiple ROTARY-5 units together.

### Power Requirements

The ROTARY-5 requires a regulated supply of 5V DC. This voltage can be taken from the keyboard encoder or from an external supply. Use our KE-PWR5/2A power supply (5V / 2A regulated DC). The KE-PWR5/2A is for USA/Canada use only. If the ROTARY-5 will be connected to a KE-USB108 an external supply must be used for the ROTARY-5. The 5V DC from the KE-USB108 should not be used to provide power to the ROTARY-5.

*Note: If the ROTARY-5 is powered by an external power supply,*

- *the logic ground on the ROTARY-5 must be tied to the logic ground of the keyboard encoder,*
- *do not tie the +5V DC on the ROTARY-5 to the +5V DC on the keyboard encoder.*

### Supported Keyboard Encoders

The ROTARY-5 is suitable for use with all standard Hagstrom Electronics, Inc. keyboard encoders.

## ROTARY-5 Connections

**Power Header 1 and Power Header 2:** The power header connections provide power and/or option signals for the unit. These connectors are electrically connected, identical in pinout, and either header can be used for power, options, or daisy chaining to another Rotary-5 module.

*Note: In the case of daisy chaining, power supplied at one module will be propagated to the others in the same daisy chain. Observe proper wire size based on power consumption for connecting multiple units.*

**Rotary Switch Inputs:** The ROTARY-5 unit features 5 independent quadrature signal rotary switch inputs. Input from mechanical and/or optical rotary encoders that provide a quadrature signal is acceptable.

**Rotary Switch Outputs:** The ROTARY-5 has 5 output pairs of normally high logic level signals which pulse low for activity detected at the corresponding rotary input. CW outputs activate for clockwise movement. CC outputs activate for counterclockwise movement.

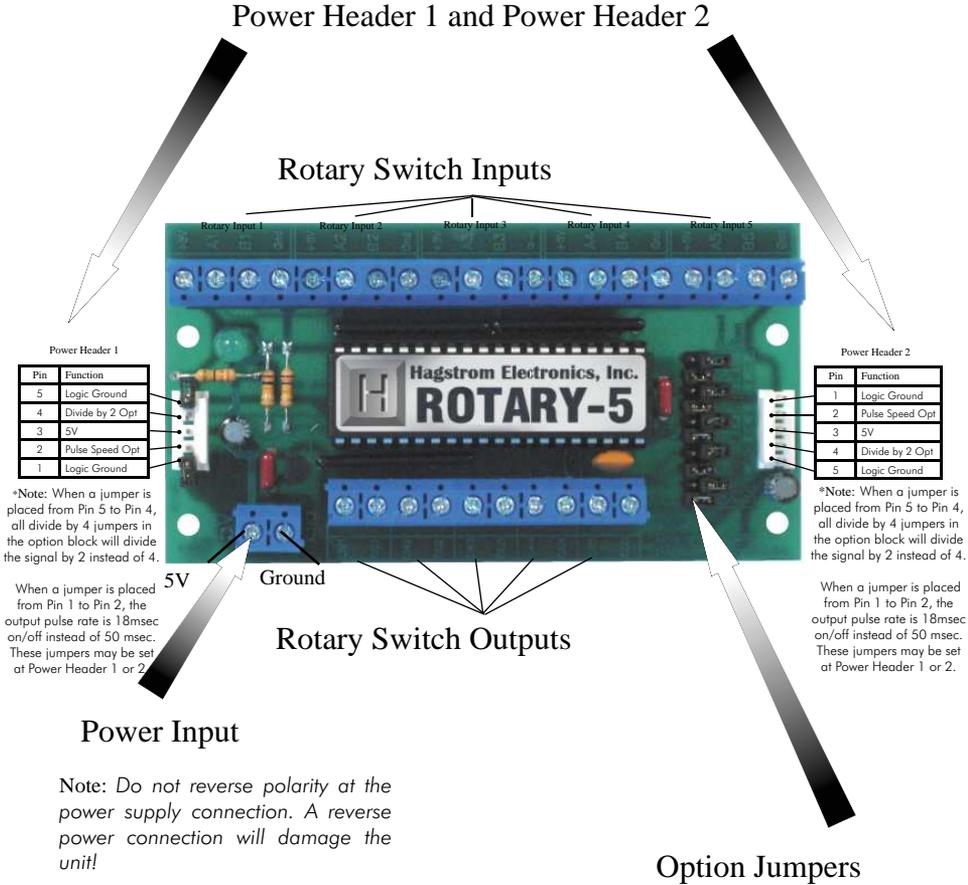
**Option Jumpers:** Each Rotary Switch Input has two configuration jumpers which modify the manner for how that rotary switch is serviced. The "1/4" setting allows for a divide by 4 function from the rotary switch. The "C/M" selection controls the buffering technique of the output pulses. See "Option Jumper Settings" on page 6. The divide by 4 function may be changed to divide by 2 by using the appropriate Power Header Jumper (see page 5 diagram for this jumper location).

*Note: The Option Jumpers for each Rotary Switch Input may be adjusted independently. This feature allows for customizing the response sent by each rotary input based on the type of switch and the desired output action.*

**Power Input:** When power is not being supplied at the 5 pin Power Headers, it may be attached on this 2 position terminal block.

*Note: Do not reverse polarity at the power supply connection. A reverse power connection will damage the unit.*

# ROTARY-5 Connections



## Using an External Power Supply

To power the ROTARY-5 unit from a stand-alone power supply (our Part# KE-PWR5/2A) connect the 5 position MTA connector from the power supply to either Power Header 1 or Power Header 2.

When the ROTARY-5 is powered by an external power supply be sure to tie the logic ground on the ROTARY-5 to the logic ground of the keyboard encoder. See appendix B of this manual for the location of logic ground on many of our keyboard encoders. When using the ROTARY-5 with the KE-USB108 refer to the KE-USB108 User Manual for a suitable logic ground location.

*Note: When using an external supply to power the ROTARY-5 do not tie the +5V DC on the ROTARY-5 to the +5V DC on the keyboard encoder. Doing so might damage the power source of the keyboard encoder and/or the external power supply.*

## Option Jumper Settings

The ROTARY-5 module features two option jumper settings for each of the five Rotary Switch Input locations. These jumpers affect how each rotary input is handled. The Option Jumpers for each Rotary Switch Input may be adjusted independently. This feature allows for customizing the response sent by each rotary input based on the type of switch and the desired output action.

**1/4 Option Jumper:** This option allows the number of outgoing pulses per each incoming pulse of the rotary input to be divided by 4.

### Open State:

Leaving the 1/4 jumper open for a particular rotary input will activate the divide by 4 function. Typically, most mechanical rotary switches provide four signals between each detent. Activating this option will allow for only one signal per detent position.

### Closed State:

By closing the 1/4 jumper, this option will be disabled. Optical rotary encoders will generally be used in this state in order to give one pulse for each rotary position of the switch.

**Note:** The divide by 4 function can be changed to divide by 2 when the divide by 2 option jumper is in place on one of the Power Headers. Refer to the diagram on page 5 for divide by 2 jumper location.

**C/M Option Jumper:** This option jumper controls the buffering of pulses for the rotary input. In cases where the rotary switch produces inputs faster than the pulses are sent out, the new input changes may be buffered or ignored based on this jumper setting.

### Open State:

Leaving the C/M jumper open will not buffer the incoming switch pulses. Once a change on a rotary input is detected, any new changes from that rotary input are ignored until the unit has completed the previous output pulse.

### Closed State:

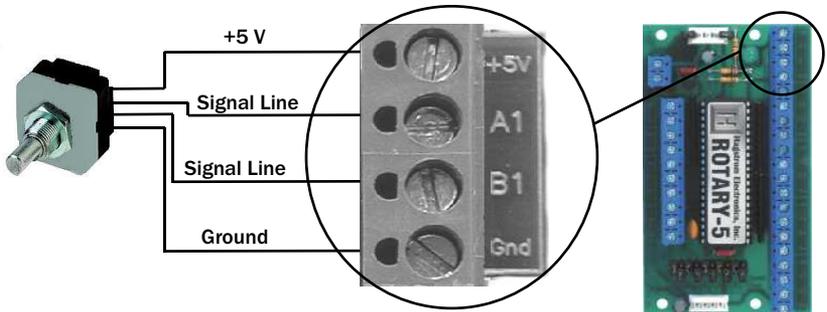
By closing the C/M (count/momentary) jumper, the incoming pulses will be buffered such that each input change will result in a corresponding output pulse.

**Note:** *Inputs are buffered up to 255 counts for each rotation direction.*

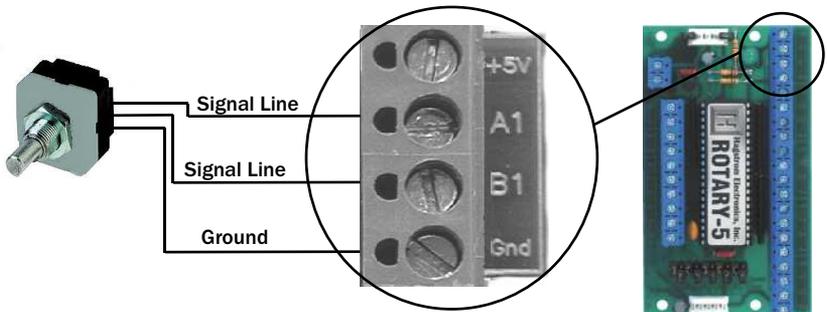
## Interfacing Rotary Encoders to the ROTARY-5

The ROTARY-5 unit can accept input from either mechanical and/or optical rotary encoders that produce a quadrature signal output. Each of the Rotary Switch Input channels has four connections: Power, Ground, and the two quadrature input signals. The type of rotary device being used will determine how the connections are made. The examples provided below demonstrate the connection to the rotary encoder.

**Optical Rotary Encoder Hookup:** To connect an optical rotary encoder to the ROTARY-5, use the arrangement shown below. The 5V from the ROTARY-5 is used to power the optical encoder.



**Mechanical Rotary Encoder Hookup:** To connect a mechanical rotary encoder to the ROTARY-5, use the arrangement shown below. Mechanical devices only require the Ground connection and two signal connections. No power connection is needed for the mechanical rotary encoder.



## Unit Setup

This section lists the series of steps necessary for the proper setup and connections of the ROTARY-5 unit to any corresponding Hagstrom Electronics, Inc. keyboard encoder product.

**Step 1:** Set the Option Jumpers according to the manner each rotary switch input is to be decoded. Refer to page 6 for a description on these jumper settings.

**Step 2:** Connect the rotary switches to the each of the Rotary Switch Inputs using the screw terminal strip provided on the ROTARY-5 board. Be sure to remove the insulation from the wire before making the connection in the screw terminal block. Examples of proper wiring are shown on page 7.

**Step 3:** Connect the Rotary Switch Outputs to inputs of any Hagstrom Electronics, Inc. keyboard encoder product. Attach the ROTARY-5 switch outputs to the input pins on the keyboard encoder. The keyboard encoder input pins should be programmed with the keystrokes that are to be sent by the rotary switch.

**Step 4:** The ROTARY-5 requires a regulated supply of 5V DC. This voltage can be taken from an external supply or from most Hagstrom Electronics, Inc. keyboard encoders. If the ROTARY-5 will be connected to a KE-USB108 an external supply must be used. See Appendix B on pages 11-12 for the keyboard encoder power locations.

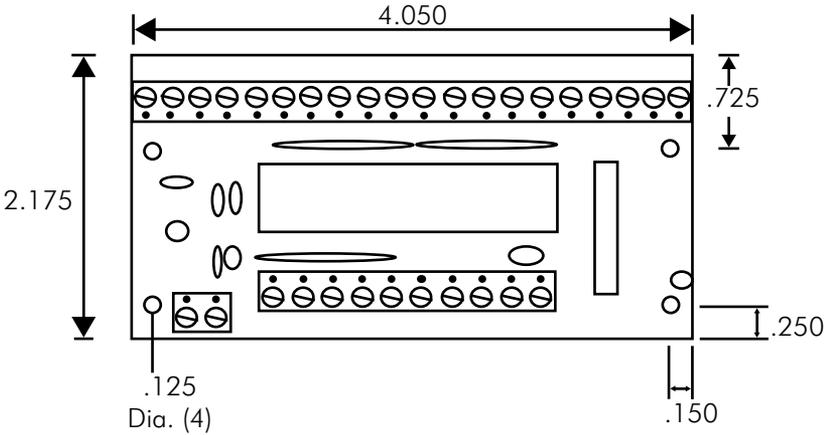
*Note: If power is supplied from an external power source, be sure that the logic ground of the ROTARY-5 is connected to the logic ground of the keyboard encoder.*

With power on the 5V supply off, connect the power supply positive and ground to the corresponding ROTARY-5 connections.

**Note:** Do not reverse polarity at the power supply connection. A reverse power connection will damage the unit.

**Step 5:** Apply power to the ROTARY-5 module.

Appendix A:  
 ROTARY-5 Specifications

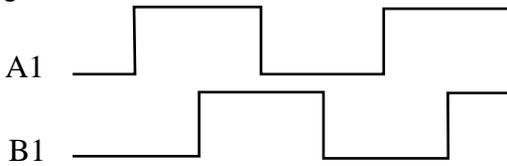


Note: Dimensions are in inches.

Operating Voltage	5 Volts DC +/- 5%
Operating Current	30 ma Typical at 5.00 V
Operating Temp.	0 to 70 Degrees C
Output Type	Logic Level Active Low Pulse
Input Type	2 Channel Quadrature (90 degree phase)

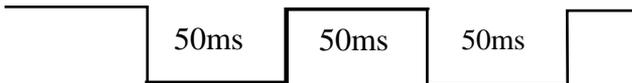
## Appendix A: ROTARY-5 Specifications

**Rotary Switch Inputs:** The ROTARY-5 unit accepts input from mechanical and/or optical rotary encoders that produce a quadrature signal.

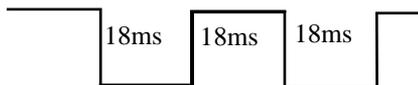


Typical Quadrature Signals from a  
Rotary Switch

**Rotary Switch Outputs:** The ROTARY-5 outputs are high logic level when idle, pulsed low for detected movement.



The ROTARY-5 outputs use 50msec on/off when the pulse speed option jumper on the power header is open.



The ROTARY-5 outputs use 18msec on/off when the pulse speed option jumper on the power header is On . See the diagram on page 5 for pulse speed jumper location.

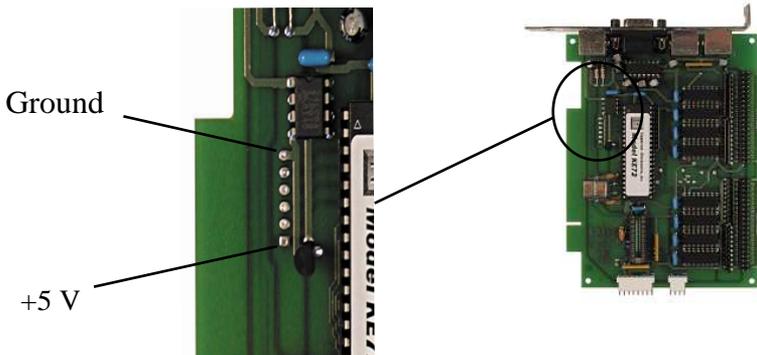
## Appendix B: Hagstrom Electronics, Inc. Keyboard Encoder Power Locations

Although the ROTARY-5 unit can be powered from a separate stand-alone power supply (our Part# KE-PWR5/2A), it may also be powered directly from most Hagstrom Electronics, Inc. Keyboard Encoders. The following pages illustrate the appropriate locations to obtain the +5v and Ground from the keyboard encoders.

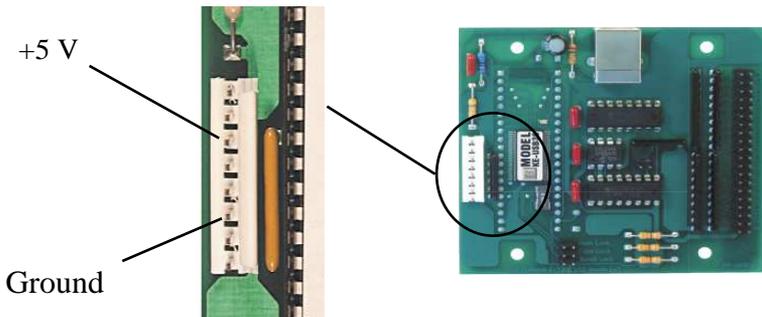
*Note: The ROTARY-5 must be externally powered when used with keyboard encoder model KE-USB108.*

*Note: Only connect the ROTARY-5 to these locations if a stand-alone power supply is not in use. Damage may occur if an external power source and the keyboard encoder power are connected at the same time.*

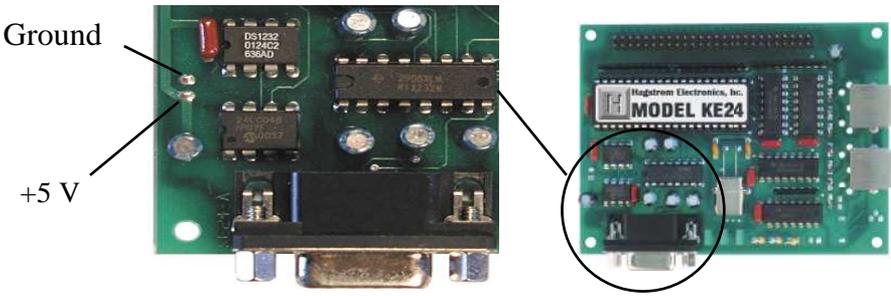
### KE72 and KE72-T Connection Points:



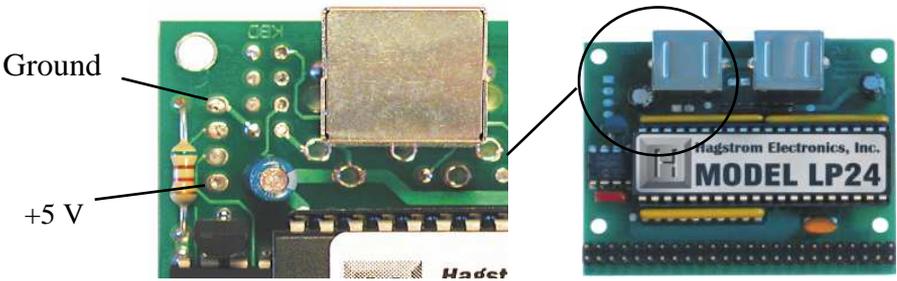
### KE-USB36 Connection Points:



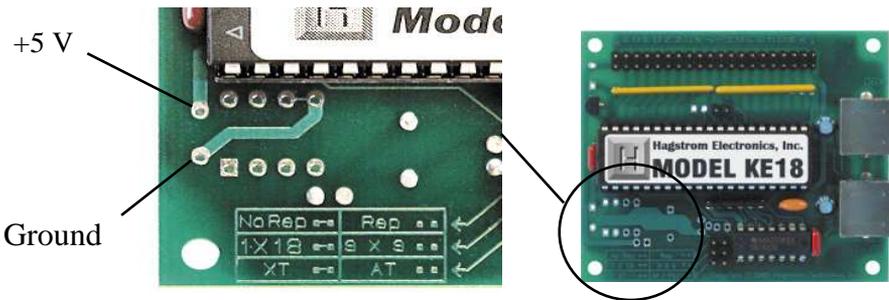
KE24 Connection Points:



LP24 Connection Points:



KE18 Connection Points:



## Accessories

### KE-PWR5/2A Power Supply (USA/Canada orders only)

5V/2A regulated DC. Use to supply power to the ROTARY-5.



### MTA100-5-36-FF Cable Set

36 inches long. MTA style headers. May be used to "daisy-chain" multiple ROTARY-5 units.



### KE-232-IF Interface Cable (for custom Rotary-5 units only)

4 feet. Use to connect the ROTARY-5 logic level to the PC RS-232 port.



## Warranty

**HAGSTROM ELECTRONICS, INC.** warrants this product against defects in material or workmanship for a period of ONE YEAR from the original purchase date. We will repair or replace (at our option) the returned defective unit at no charge during this warranty period.

No responsibility is assumed for any special, incidental, or consequential damage resulting from the use of or inability to use this product. In no case is **HAGSTROM ELECTRONICS, INC.** to be liable for any amount which exceeds the purchase price of the unit, regardless of the claim.

No other warranty, written or verbal, is authorized. This warranty is applicable only to units sold in the United States. Units sold outside the United States are covered by a similar warranty.

Depending on the state in which you live, you may have additional rights.

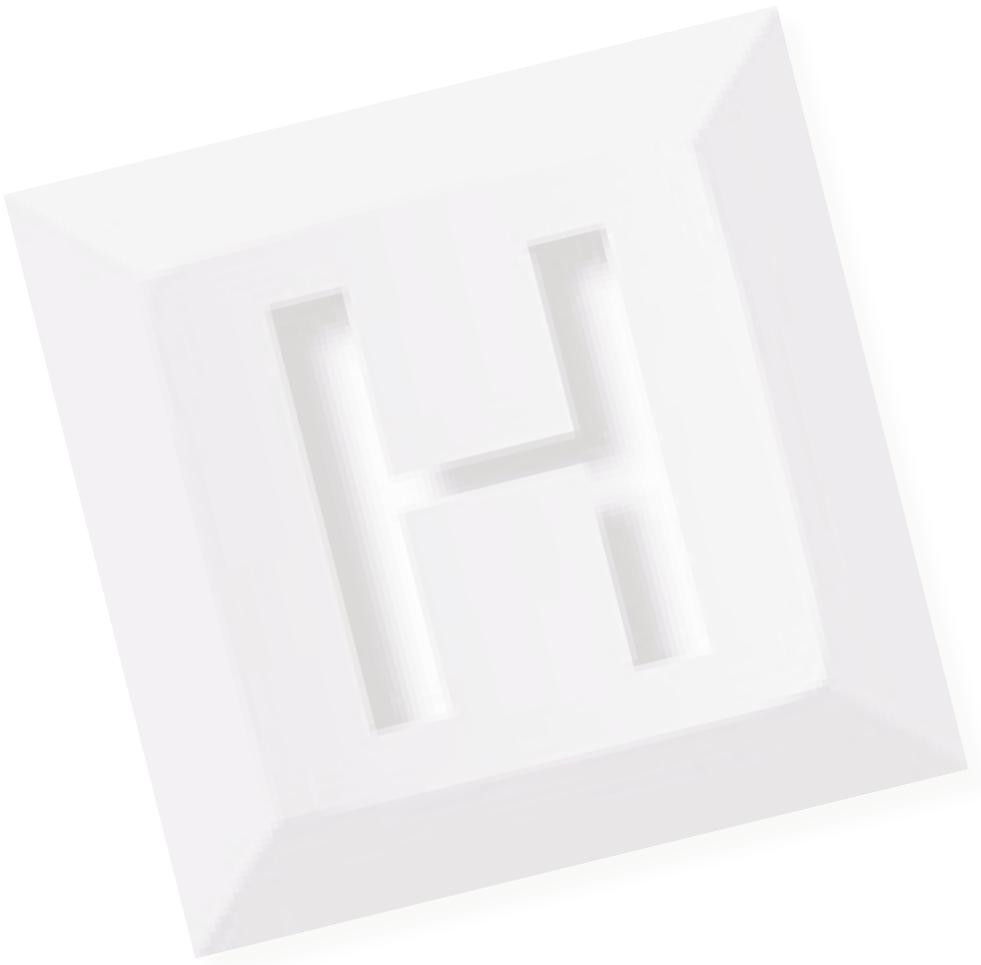
Great care has been taken during the assembly, testing, and burn-in of your ROTARY-5 to ensure its performance. If you have any questions, please send us an email or give us a call. Support is available Monday through Friday, 8:00 am to 5:00 pm (EST).

customer service email: *[sales@hagstromelectronics.com](mailto:sales@hagstromelectronics.com)*

Call Toll Free **888-690-9080**, or **(540) 465-4677**

**NOTICE** The ROTARY-5 product is designed to be used by technically oriented computer users. When the ROTARY-5 is in use, electronic signals and voltages are present on the unit. Prudent handling and packaging is necessary to prevent damage to the unit.

The ROTARY-5 is designed for OEM use, and is not FCC part 15 approved. Because the packaging and use of the product will directly affect the characteristics of the unit, it is the responsibility of the purchaser to obtain final approval of their application, if required.



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