

# KY-12M MATRIX KEYPAD

(with decoder card)

## TECHNICAL REFERENCE

ELECTRONIC ENERGY CONTROL, INC.  
14960 MAPLE RIDGE RD  
MILFORD CENTER OH 43045  
USA

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## SPECIFICATIONS

Size .....2.1875" by 3"

Weight.....4 ounces

Number of keys.....12

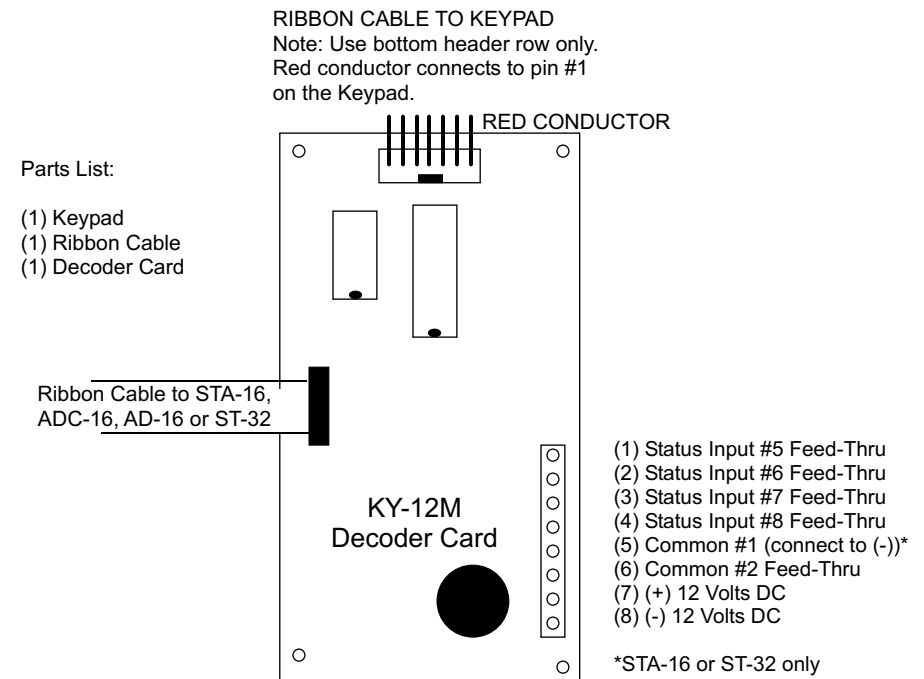
Coding.....Matrix

Power requirements.....12 Volt DC 50ma (may be powered from the STA-16 or ADC-16 power supply)

## TECHNICAL SUPPORT

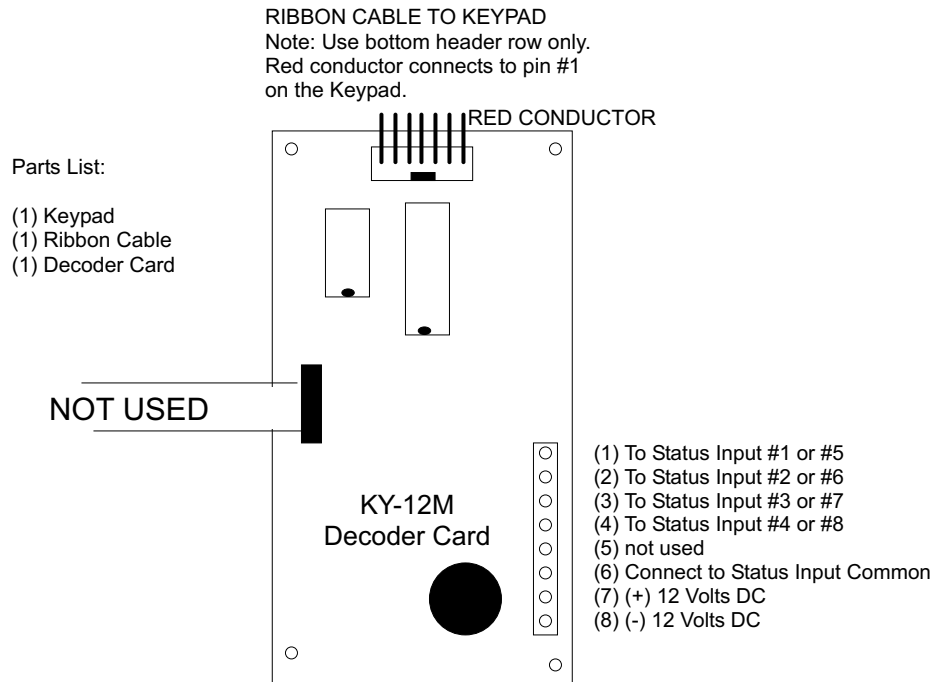
Technical support for our products is available by calling (614) 464-4470. If a technical adviser is not available, please leave your name, phone number and a time that you can be reached. Your call will be returned within 24 hours.

## CONNECTION DIAGRAM



NOTE: Supply power to the KY-12M decoder by installing 2 jumper wires from the STA-16 or ADC-16 (+) and (-) to the KY-12M decoder. Install a jumper across terminals (5) and (8) to power the STA-16 or ST-32 opto isolators. The ribbon cable should be installed with the red conductor next to the #1 pin on the keypad as shown above. The ribbon cable should be connected to the keypad and decoder card using the bottom row of contacts on the ribbon connector. The top row of contacts on both ribbon connectors are not used.

**KY-12M KEYPAD FOR USE WITHOUT RIBBON CABLE**



NOTE: Supply power to the KY-12M decoder by installing 2 jumper wires from the STA-16 or ADC-16 (+) and (-) to the KY-12M decoder. Connect a wire from terminal 6 on the KY-12M to terminals 9 or 10 on the RCT-8 to power the STA-16 or ST-32 opto isolators.

**SET-UP AND TESTING**

- (1) Connect the STA-16 to the computer, power source and RCT-8 as shown in the STA-16 technical reference manual. The STA-16 should be set to 9600 baud. Test the STA-16 as shown in it's reference manual.
- (2) Connect the ribbon cable from the KY-12M decoder card to port #1 on the STA-1. Connect a jumper across terminals #5 and #8 to supply (-) power to inputs #1 thru #4.
- (3) Connect the decoder card power terminals (shown above) to the (-) and (+) terminals on the STA-16 or other 12 VDC power source. The power input must not exceed 14 volts DC. Use caution, reversed polarity will damage the decoder IC.
- (4) Connect the ribbon cable between the keypad and decoder card as described above if not already connected.
- (5) Insert the test disk supplied with your order into the computer disk drive and enter KY-12M to start the DOS test program. After the test program message appears on the screen, press each key on the keypad to verify correct operation. Press any key on your computer keyboard to exit the program.

**SOFTWARE**

Software examples are provided on your test disk. The keypad decoder card provides a binary number for input into the STA-16 status inputs when a key is pressed on the keypad. To read the keypad from the computer, the computer must continuously read status port #1 on the STA-16 (or the port the decoder card is connected to). The decoder card outputs a binary number as shown below (in decimal) for the corresponding keys. The numbers 0, 4, 8 and 12 are used in conjunction with a 16 key keypad and are not outputted by the decoder card since the KY-12M is a 12 key keypad. Any value or symbol may be assigned to a specific key by assigning the value or symbol to the associated binary number

0	1	2	3
4	5	6	7
8	9	10	11
12	13	14	15

KY-12M KEYPAD

**GENERATING INTERRUPTS**

In the event that your keypad application requires continuous monitoring of keypad activity, an interrupt may be generated to interrupt program execution when a key is pressed on the keypad. Pin (12) on the 74C922 IC on the decoder card will go high when a key on the keypad is pressed. Pin (13) on the 74C922 will go low on key pressed. Connect the desired pin to the unused RS-232 transmitter input on the Maxim IC (pin 7). The Maxim IC is located on the STA-16 next to the UART. Be sure to break the transmitter input connection on the Maxim IC before using. The RS-232 transmitter out (pin 4) is connected to the (S) terminal on the STA-16. Connect the (S) terminal to the desired RS-232 control line (CTS, DTR, DCD, ect.). Remember to enable the modem status interrupt bit located in the interrupt enable register (bit 3 of I/O address 3F9 COM1).

COMMON INTERRUPTS FOR COM PORTS COM1=IRQ4 COM2=IRQ3 COM3=IRQ4 COM4=IRQ3

**IMPORTANT WIRE ROUTING PRECAUTIONS**

The decoder IC on the decoder card is of the CMOS variety and is sensitive to static electricity and electrical storm/lightning discharge, and is subject to damage or failure as a result. If you are in an area that experiences frequent electrical storms, we recommend the following precautions when installing the wire which supplies power to the decoder card and when installing the wire from the decoder outputs to the status inputs on the STA-16.

- (1) Use shielded wire and ground both ends of the shield to an earth ground and the equipment enclosure or install the wire in metal conduit. PVC type conduit may be used (provided the conduit is buried in the ground).
- (2) Install the keypad and decoder card in an earth grounded metal enclosure.
- (3) Install a TransZorb across the power input terminals on the decoder card and across each power input terminal to the metal enclosure (a total of 3 TransZorbs). Install 3 TransZorbs on the STA-16 in this same manner.

## VOLTAGE TRANSIENT PROTECTION FOR KEYPADS

