THE ARTISAN MICRO-MIDI CONTROL SYSTEM

Introducing the Artisan Micro-MIDI Control System

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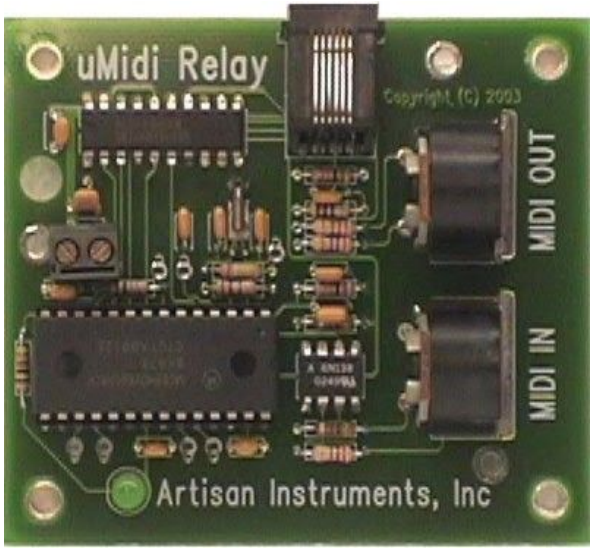
THE ARTISAN MICRO-MIDI CONTROL SYSTEM

1 Hardware

The Micro-MIDI control system is implemented using a number of modular components, which can be combined in various ways. Traditional organ hardware can be used to generate MIDI messages, or MIDI messages can be used to drive traditional organ hardware. In addition, lighted stop buttons are available which can be used to control an organ.

1 The Micro MIDI Board

The essence of the Micro-MIDI Control System centers on a single board. It is simplicity itself, containing relatively few components in order to carry out its functions.



It consists of a board with (2) DIN connectors for MIDI IN and MIDI OUT, plus an RJ-11 connector for interfacing to other Artisan hardware.

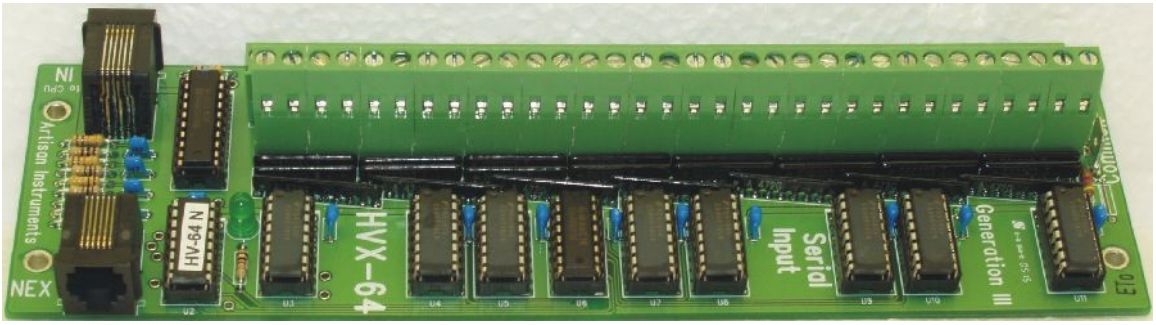
The processor used has many software resources to carry out the operations required by the system. The main feature of this board is that it is placed at various places in an overall modular system to route a variety of signal paths. The end function is to be able to drive a MIDI Sound engine to reproduce the sampled voices of a pipe organ. Examples of its application are described later.

2 Input Boards

There are two types of Serial Input Boards that can be used with the Micro-MIDI Control System. Both are used where discrete cabling connections are required. They differ only in terms of the voltage levels required at their input points. These are boards that also have use with the Artisan Pipe Organ Control System.

The boards have 64 screw-down input points. Each input is connected to a signal which is to be monitored.

The boards have two RJ-11 connectors which carry signals as well as power for operation of the electronics. Of the two RJ-11 connectors, one is connected to the Micro-MIDI control module, and the other can be connected to a second board in series with the first for additional inputs. Up to four boards can be connected to a single Micro-MIDI module, although having more boards causes greater latency, and in most cases it is wise to use a limit of two.

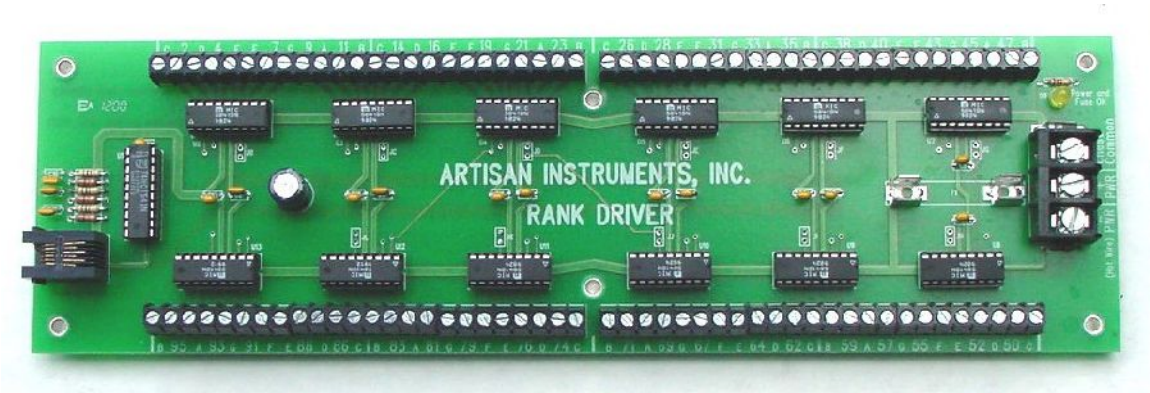


A microprocessor is added to give the board greater flexibility. The first major difference is that the inputs accept voltage levels, making it more suitable for organs that already have a voltage applied to their switch contacts. The HV-64P accepts voltages from 0V to 40V, and the HV-64N accepts voltages from -35V to +5V. The HV-64P can be used with switch closures to a common bus of +5V through 40V. The HV-64N can be used with switch closures to a common bus of 0v to -35V.

A useful feature is available on this board by virtue of the microprocessor. The last 8 inputs can be used for analog inputs (positions 57 through 64). Actually, 7 are available for a variable voltage input, while input 64 is used for a reference voltage (up to 40V). Thus, swell shoe potentiometers can be connected to these 7 inputs for expression control. Note that ultimately these analog inputs will be converted to Controller messages by the Micro-MIDI control system. Obviously, only 2 potentiometers can be connected if the Input Board is also being used for a 61-note keyboard input.

3 Output Board

Also drawn from the Artisan Pipe Organ Control System is a driver board that is used for magnet control of either chest magnets for pipework, or for stop action magnets in a combination action.



The signal and logic level voltage comes into the RJ-11 connector on this board, while the higher voltage/current voltage is applied to the 3-terminal connector. The middle and lower terminals (as shown in this picture) are, respectively, +V and –V. The +V voltage enters the board, and through a fuse, to provide the high current voltage to a POSITIVE COMMON bus associated with the magnet loads. At the same time, it provides a potential for the flyback diodes in the driver chips for protection from reverse magnetic field collapses in the magnets.

4 Stop Actions

An item of hardware that becomes involved in the Micro-MIDI Control System is the Stop Action. This may already exist on an organ that is being renovated, or may be added to an existing organ by means of an auxiliary Stop Box of some sort.

Stop Actions may take a variety of forms, but are generally of the “maintained action” type, or of the “momentary action” type where an associated lamp indicates whether they are ON, or OFF.

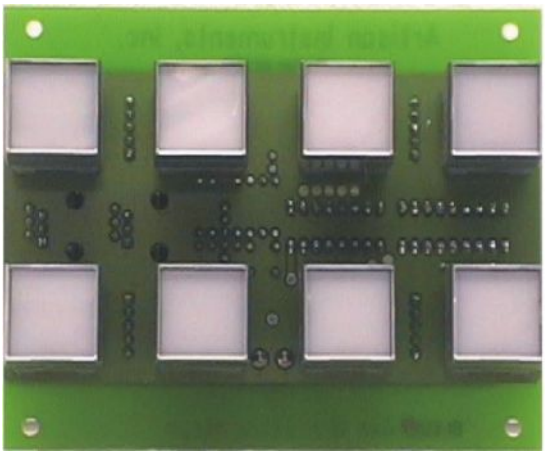
Both types can be interfaced to the Micro-MIDI Control System.

A new style of a “momentary action” stop developed by Artisan Instruments, Inc. is shown below.

5 Lighted-Stop Module

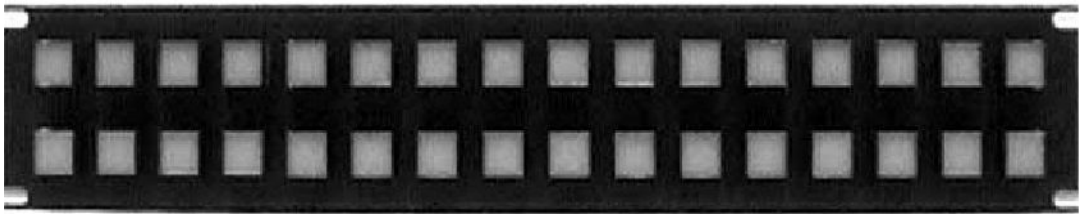
A Lighted Stop Module consists of either 4 or 8 stops mounted on a printed circuit board. Each module assembly contains circuitry similar to that of a Serial Input Board. It also controls the lamp circuitry to indicate the ON or OFF

condition of the momentary push-button stop actions.



Further, as many as 8 Lighted Stop Modules may be connected in series to form a panel of lighted stop actions. The series group may be connected to a single Micro-Midi interface board.

In the picture below, 4 modules are connected in series to produce a 32-swtich panel. The same panel could consist of 16 switches if each module only contained the upper 4 switches. The panel is the rack mount width of 19” for use in a Stop Box with other components.



Lighted Stop Panel with 4 Lighted Stop Modules

While each Lighted Stop Assembly has up to 8 stops, they can be connected in series to form a group as large as 64 stops prior to sending out a serial signal to the Micro-MIDI module.

The purpose of an individual module or complete panel of Lighted Stops is to provide control and selectivity of voices, couplers and controls for use with a sound engine.

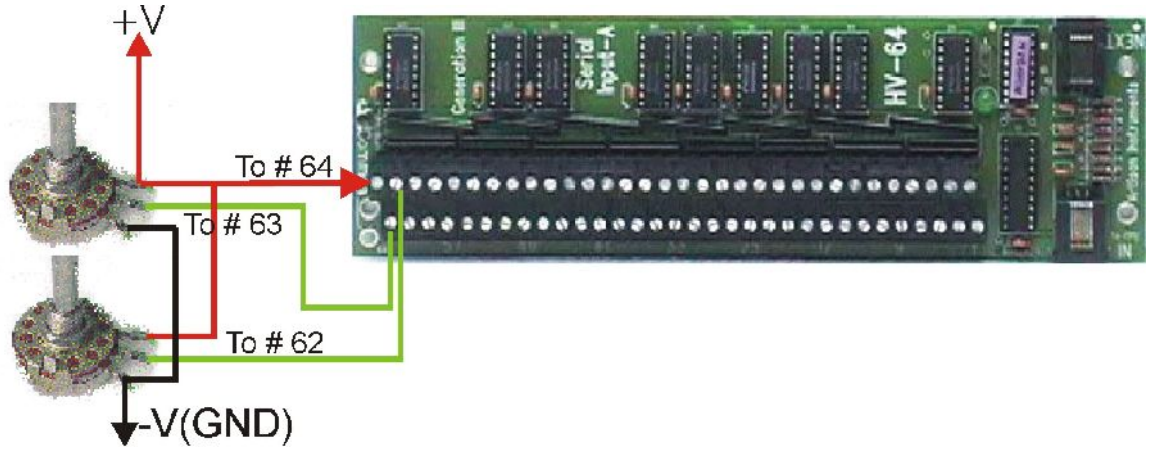
6 Potentiometers for Swell Shoe/Crescendo Control

Potentiometers can be either of the slide type as illustrated below, or of the

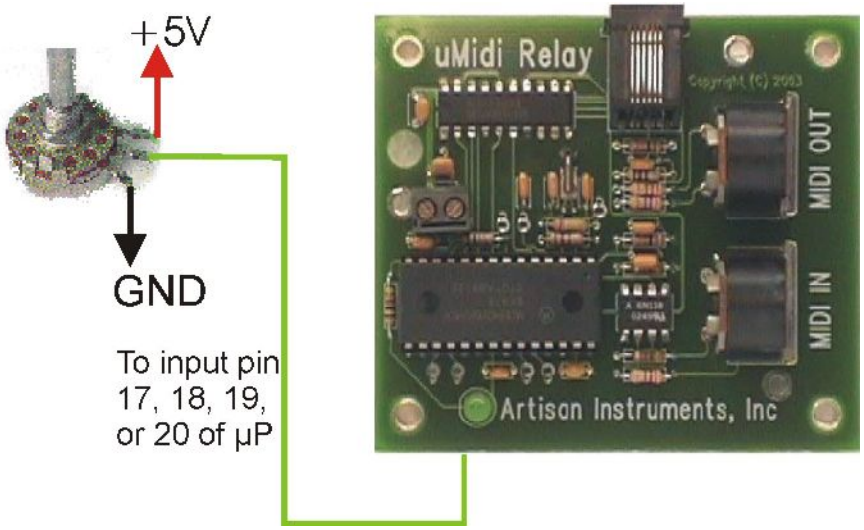
rotational type. Since they are mounted on the Swell or Crescendo shoes, the choice of potentiometer is the type that is easiest to mechanically mount.

There are two ways that a potentiometer can be connected to the Micro-MIDI Control System to control volume, or expression.

The first way is to connect a potentiometer (1K value) to one of the last three input positions of an HV-64 Serial Input Board. The microprocessor on this board will convert the pot input to a MIDI Controller signal that will be sent on to the Micro-MIDI Board to become part of the MIDI signal stream.

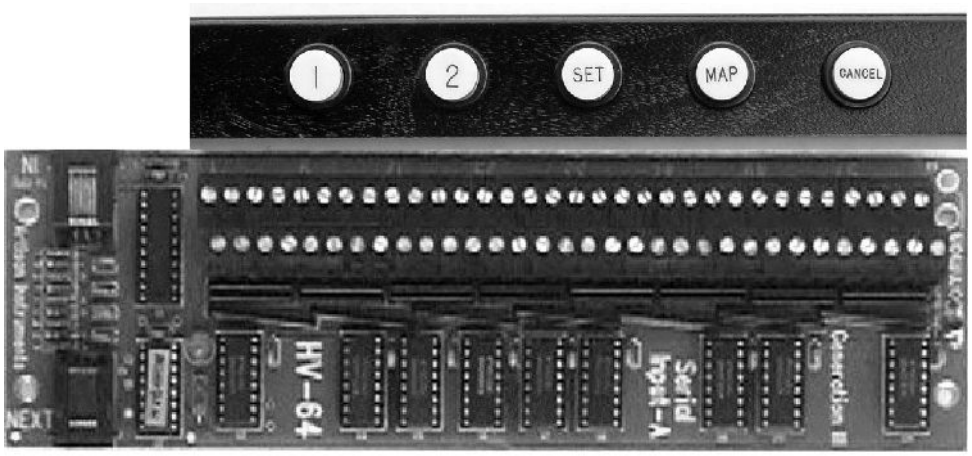


The second way in which a potentiometer can be added to provide volume, or expression, control is to connect the potentiometer wiper to the A to D input of the microprocessor on the Micro-MIDI Board. Up to four potentiometers can be connected to one Micro-MIDI board. (Earlier Micro-MIDI boards did not allow the connection of potentiometers.)



7 Piston Inputs

Pistons are another item of hardware that is essential to an organ that will have a combination action. They are of the momentary action type of switch, so their ON and OFF function is controlled by software.



Thumb Pistons to HV-64 Input Board

2 Applications

Here are a few of the applications where the Micro-MIDI Board can be used. There are undoubtedly many others.

The Artisan Micro-Midi system is a modular, flexible system for making use of MIDI in an organ system. The Micro-Midi system allows you to:

- Merge MIDI messages with another MIDI stream
- Convert a musical keyboard with discrete switches into a MIDI keyboard.
- Convert stop tabs into MIDI messages
- Connect a potentiometer which will generate controller messages
- Add a Stop Box with lighted stop buttons, or Lighted Stop Assembly
- Implement a combination action for dual magnet stop tabs or for the Stop Box, which has lighted stops.
- Add low-end pedal extensions to pipe organs.
- Use a MIDI messages to control traditional pipework.

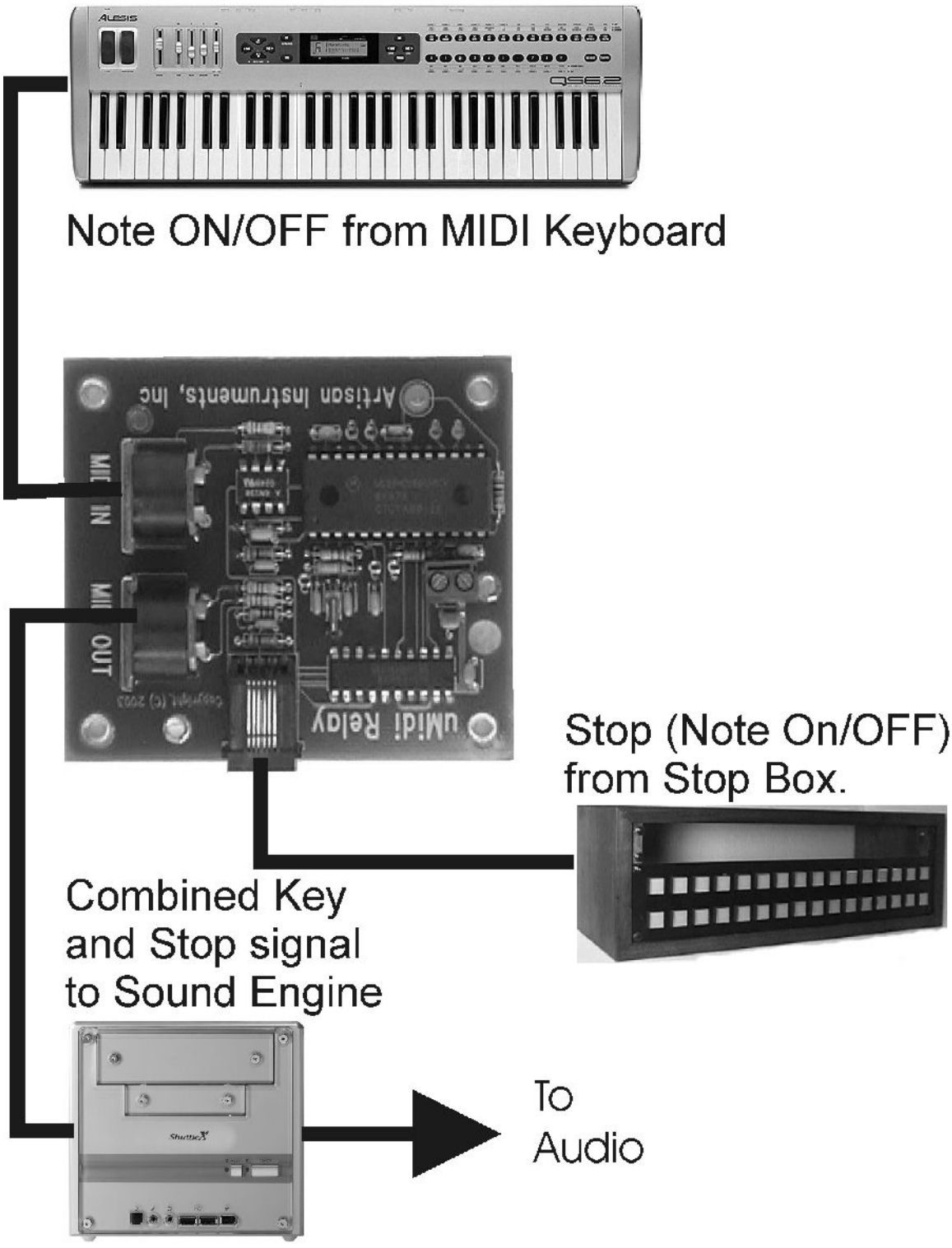
1 Merging MIDI from MIDI Keyboards

The Artisan Micro-MIDI Control System can be used with either MIDI Keyboards, or with keyboards that have discrete switch closures (sometimes called “naked switches”).

The first question to answer is, “Why is a Micro-MIDI Control System required if you already have MIDI Out from a keyboard? Won’t the keyboard send Note ON/OFF messages to the Sound Engine directly?

Yes, that’s correct. However, the objective is to have stop and coupler control over the Sound Engine. Thus, the Micro-MIDI Board can be used as a “merging” device to combine the output from a MIDI Keyboard and the output from a Stop Box to obtain complete “organ” control over the Sound Engine.

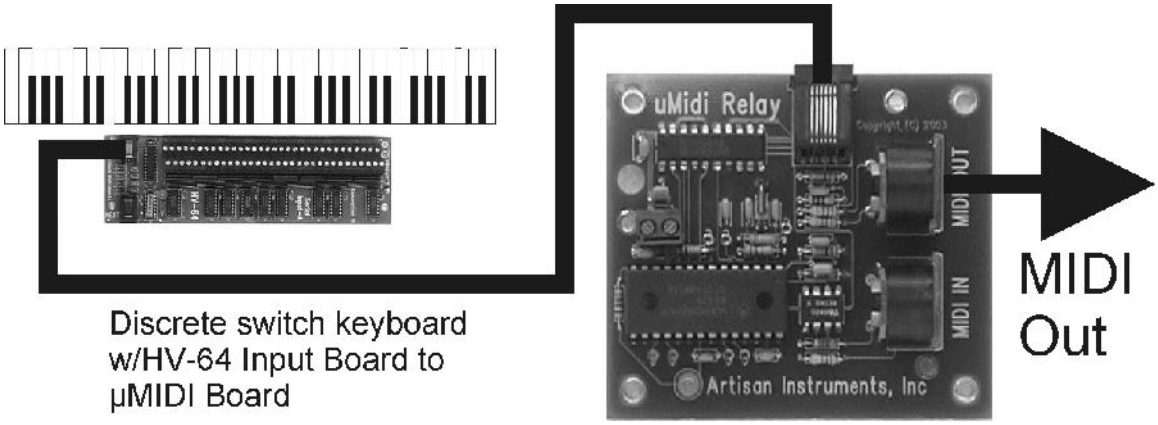
In this case, the Keyboard is connected to the MIDI IN of the Micro-MIDI Board and the Stop Box is connected to the RJ-11 input. The MIDI Out is then connected to the Sound Engine.



NOTE: If the MIDI information is originating from an organ that also sends out Note ON/OFF messages from its stops, then the Micro-MIDI Board is not needed for merging purposes.

2 Creating MIDI from Discrete Switch Keyboards

The Artisan Micro-Midi system may be connected to keyboards that have discrete switch contacts. Either sense voltage of an existing system by use of an HV-64 Input Board (input voltages from 5V to 30V), or connect to naked switches using the standard 5V Input Board.



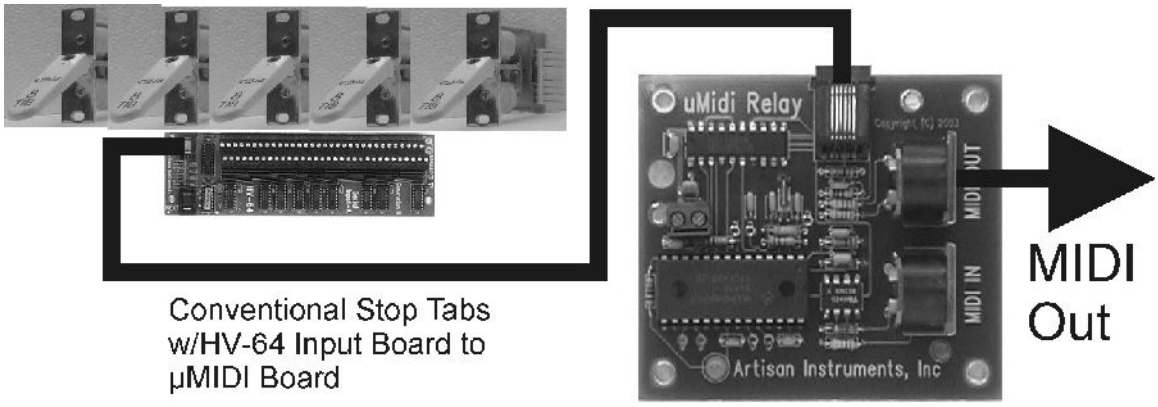
Up to 256 bits of input may be connected to one Micro-Midi interface board.

3 Converting Stop Actions to MIDI

To incorporate stop tab messages into the Micro-Midi system, there are two choices: Either traditional stop tabs, or the Artisan Lighted-Stop modules can be used.

The use of either of these two types of stop actions is necessary when the desired stops and couplers are not part of the organ console, but available via an auxiliary unit such as a Stop Box.

4 Traditional stop tabs



In the same manner as sensing keyboard input, traditional stop tabs may be

connected to input boards. Stop tabs and keyboards may be freely combined on input boards. Thus, up to 256 stop tab switches and/or keyboard notes may be connected to one Micro-Midi interface board.

This completes the discussion of the Micro MIDI System hardware and applications. For information on installation and definition writing, refer to the document entitled *Implementing the Micro-MIDI Control System*.