



**INSTRUCTIONS**

**For**

**Installing a Micro-MIDI**

**Control System**

# TABLE OF CONTENTS

## List of Hardware

The hardware discussion is focused on the three major items of hardware used in the Micro MIDI ( $\mu$ MIDI) Control System. There are other peripheral hardware items that are used for special functions. These can be reviewed on the web site [[www.artisanorgans.com](http://www.artisanorgans.com)] to determine their use and function.

## Block Diagram

The Block Diagram shown is simplified, primarily to show the concept of the  $\mu$ MIDI Control System.

## Wiring Instructions

This discussion is probably the most important aspect of the  $\mu$ MIDI Control System ---- or any control system. Proper wiring ensures long term reliability.

## Configuration File

This file is written with a text editor, using the syntax found in The Micro-MIDI Implementation Guide available on the web site.

## Software

The software supplied is an application program that compiles the text written definition (configuration file) to the form required by the  $\mu$ MIDI Board processor(s).

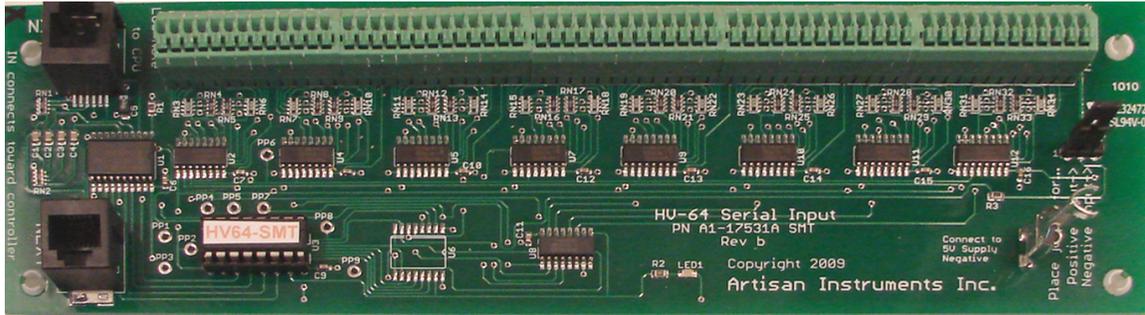
## Customer Support

When logic, reason or understanding fails, there is always the back-up of factory personnel to assist in solving problems.

# LIST OF HARDWARE

## HV64 input board

The Input Boards accept wiring from all organ elements such as keyboards, stop sense switches, pistons, or any other control that has a contact closure type of switch. There are 64 inputs available on each board.



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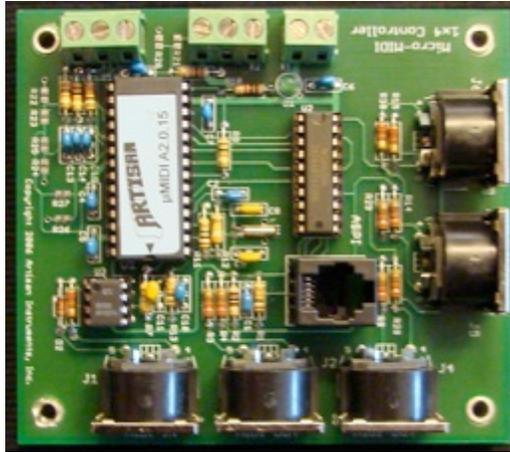
## μMIDI Board

The Micro ( $\mu$ )-MIDI Board(s), or Controller Board(s) are used in the Control System to retain the compiled and downloaded definition of the organ. The complete control of an organ is divided into several parts, so there are likely two, or more,  $\mu$ MIDI Boards connected in tandem for a given organ requirement.



## Micro MIDI Control Module with multiple MIDI outs

This board is identical to the  $\mu$ MIDI Board above, except for two things: one, it has 4 MIDI Output connectors, and two, the processor chip has less memory than the surface mount  $\mu$ MIDI Board.

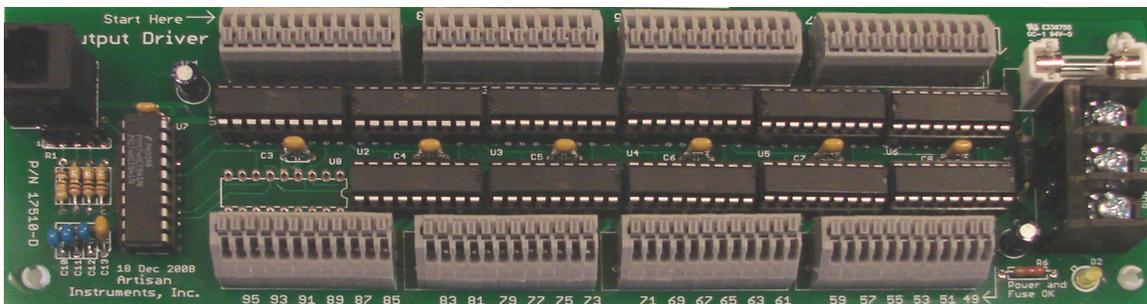


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## Driver Board

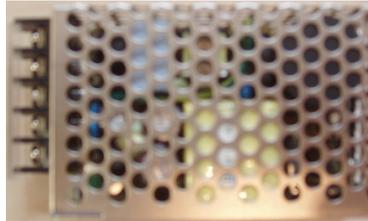
The Driver Board, when used in the organ console, is used to drive stop action magnets, lamps, or other devices that require a controlled voltage. In a pipe organ chamber they are used to drive chest magnets, tuned percussions, traps, or swell shades.

Each Driver Board requires an associated  $\mu$ MIDI Board to control the outputs.



## 5V Switching Power Supply

These small, but efficient, power supplies have a current rating of 5A, which is more than enough to supply the logic circuitry of several  $\mu$ MIDI Boards & the peripheral boards such as the Input Boards and the Driver Boards.



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## Data Cables

There are three types of data cables used in the Artisan Control System.

There are the MIDI cables, most of which are just 1' in length. These are used to connect the  $\mu$ MIDI Controller Boards in a daisy chain fashion from one controller to the next when more than one controller is needed in a complete Control System.

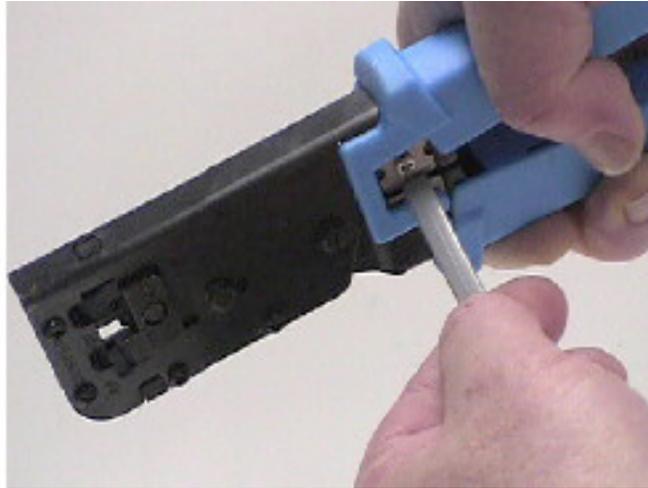


The second type is a 6-wire, flat phone cable used to connect Input Boards to a  $\mu$ MIDI Controller, or from a  $\mu$ MIDI Controller to a Driver Board. These cables can vary in length, depending upon the location of the Input Boards or Driver Boards with respect to their associated  $\mu$ MIDI Board.

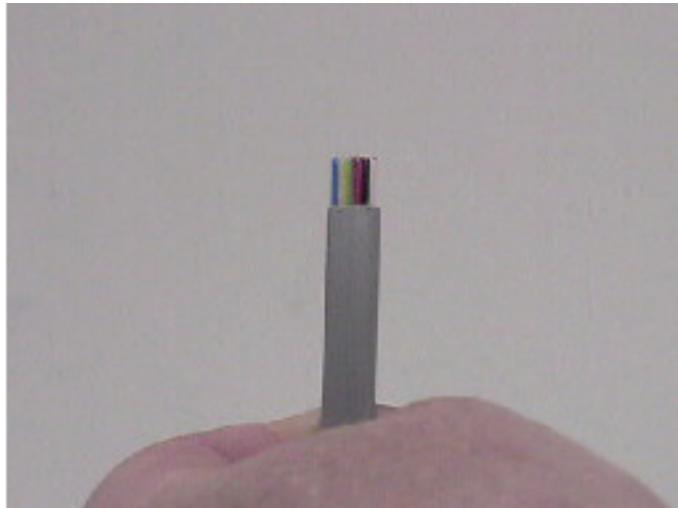


The termination of these 6-wire data cables is all important. [These are not cables that are readily available from the local electronic supplier].

1) Cut the cable to the required length, and strip both ends with a special cutting and crimping tool designed for this type of termination. These tools can be found in stores that sell telephone cable or telephone installation supplies. The stripped length must be long enough so that the wire can reach the end of the connector, but must be short enough so that the outer jacket fits inside the connector and acts as a strain relief.



2) Make sure the stripping tool has not cut into any of the conductors. Then, hold the cable as shown so that the White wire is on the right. (The Blue wire will be on the left). Verify that the six conductors are in the same order on the two ends of the cable.



3) Place the stripped end of the cable into the RJ-11 phone plug. Note that the locking tab is on the underside. A good "Rule-of-Thumb" is to establish the cable and connector position so that "WHITE IS ON THE RIGHT".



4) Crimp the connector tightly with the crimping tool. This method provides the proper orientation for the cables when plugged into the receptacles on the Micro-MIDI board(s) and the various other boards. In effect, it provides the 180 degree twist in the cable ---- which is correct.

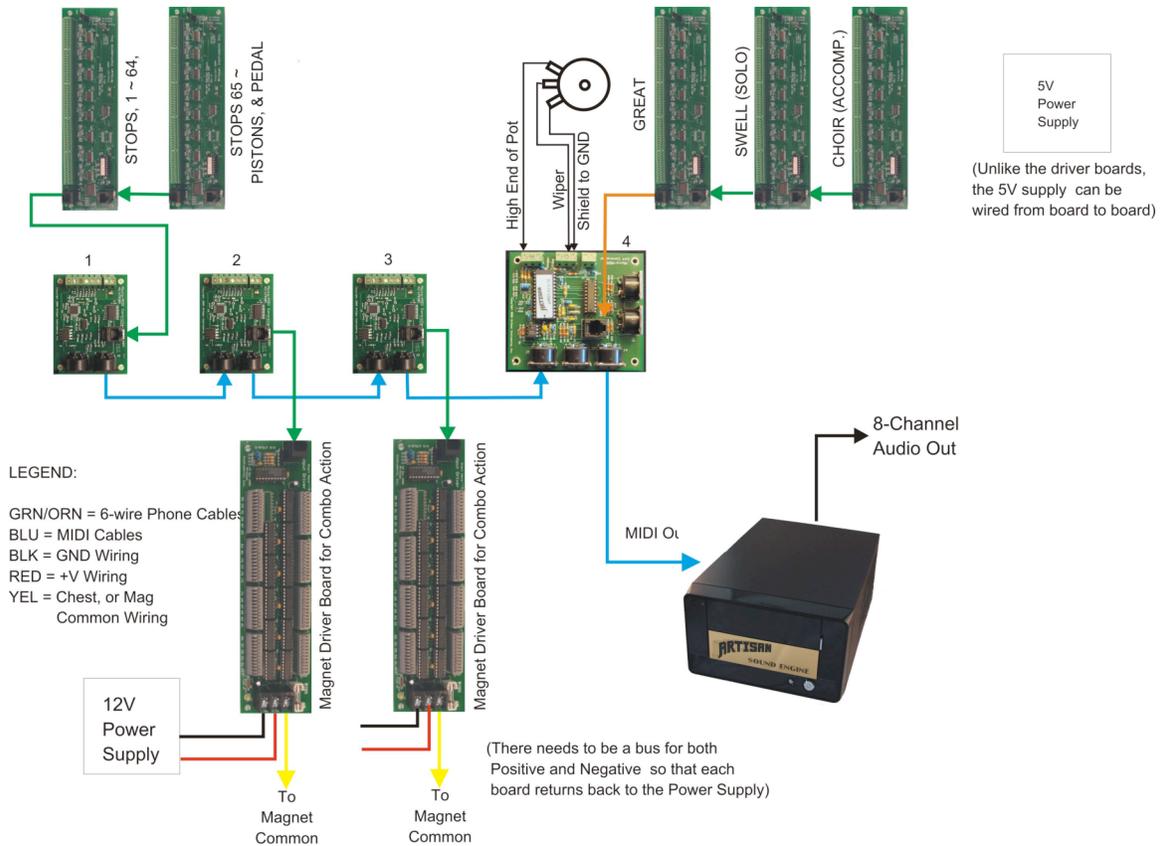


The third cable is a USB MIDI Interface cable used to connect between a computer and the system  $\mu$ MIDI Board(s). This will be shown pictorially later.

USB MIDI Interface cable



## BASIC BLOCK DIAGRAM



Console Hardware for 3-Manual Organ

Notice carefully the orientation of the input boards and the data cable path. 6-wire phone cables (shown in Green) interconnect boards via their RJ-12 connectors. MIDI connections are shown in Blue from the first board's MIDI Out to the next board's MIDI In, etc.

Normally you would make the last input board (farthest from controller) the Pedal division. However, in this pictorial the Pedal division is shown along with the Stops and Pistons, primarily because its Input Board has 32 available inputs that are conveniently utilized for pistons.

The closest one to the controller should be the primary division. In a classical organ this would be the Great. On a theater organ it would be the Solo on a 2 manuals or the Great on a 3 manual.

Be sure that the data cable going to the controller is in the jack marked TO CPU on the input board.

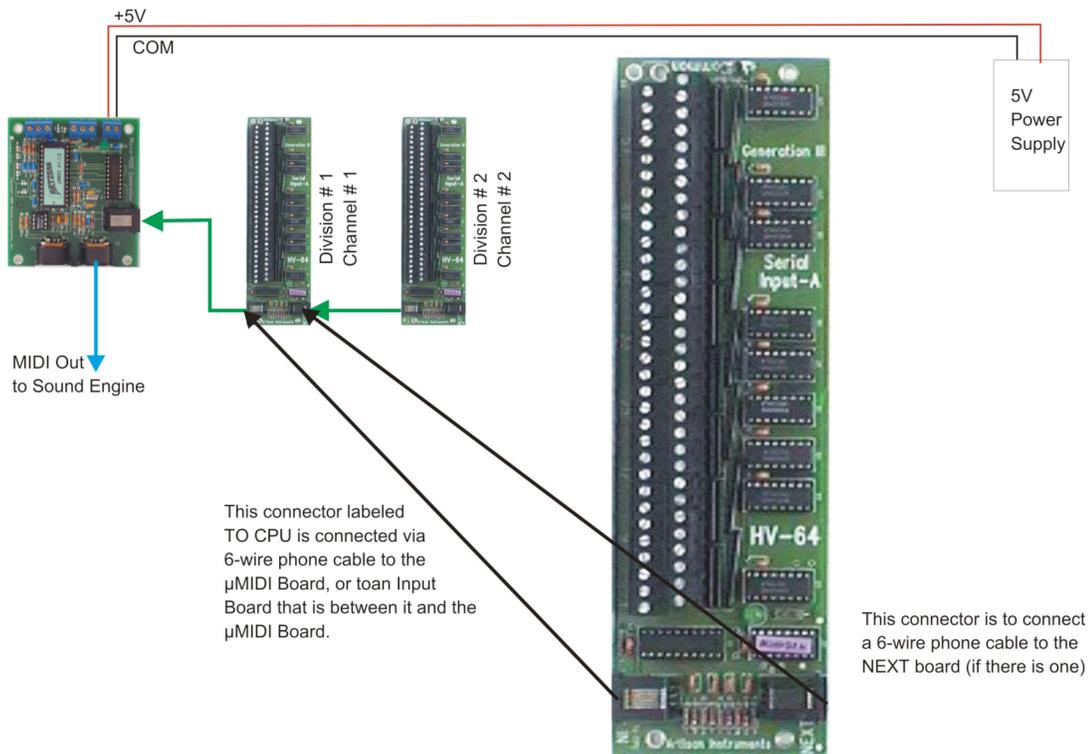
Wiring is shown for one expression pedal. Up to three expressions Pedals and one Crescendo pedal can be accommodated in this system.

## Wiring Instructions for Keyboards

Keyboards are mostly of two forms: either having discrete switch contacts for each key or pedal, or else a matrix that can be converted to MIDI. The following instructions are for keyboards with discrete switch contact.

1. Identify the key contacts and pedal contacts as well as the common bus that makes the contact closure when the key or pedal is pressed. Each key contact will have a wire that will be connected to the Input Board for that keyboard. Make certain that you start wiring from the lowest C on the keyboard or pedal. Run that wire from low C to input terminal 1. Continue wiring the division, one key at a time, making certain to keep the keys in order, continuing up the keyboard to terminal 61 (for manuals) or 32 (for pedals.) When you have finished wiring a keyboard or pedalboard then connect the common from that division to the spade lug at the end of the input board.
2. After wiring each input board they are then connected together using the flat, 6-wire gray data cables. The shorter flat gray cables connect from input board to input board and the longer one connects the first input board to the controller board. If you look carefully on each input board you will see that the two jacks are marked "TO CPU" and "NEXT." Start your data chain at the controller board. That is your CPU. Make the connection from the jack on the controller board to the CPU jack of your first input board. Again, the CPU jack is the one on the same side of the input board as the wired terminals. From the NEXT jack on your first input board, connect a gray data cable to the CPU jack of the next input board. Continue with all other input boards. The NEXT jack of the last input board will have NO connection.

BLUE = MIDI Cables  
GREEN = 6-wire Phone Cable



**Pictorial of a 2-manual Organ Console converted to MIDI Out**

## Wiring Stops and Pistons

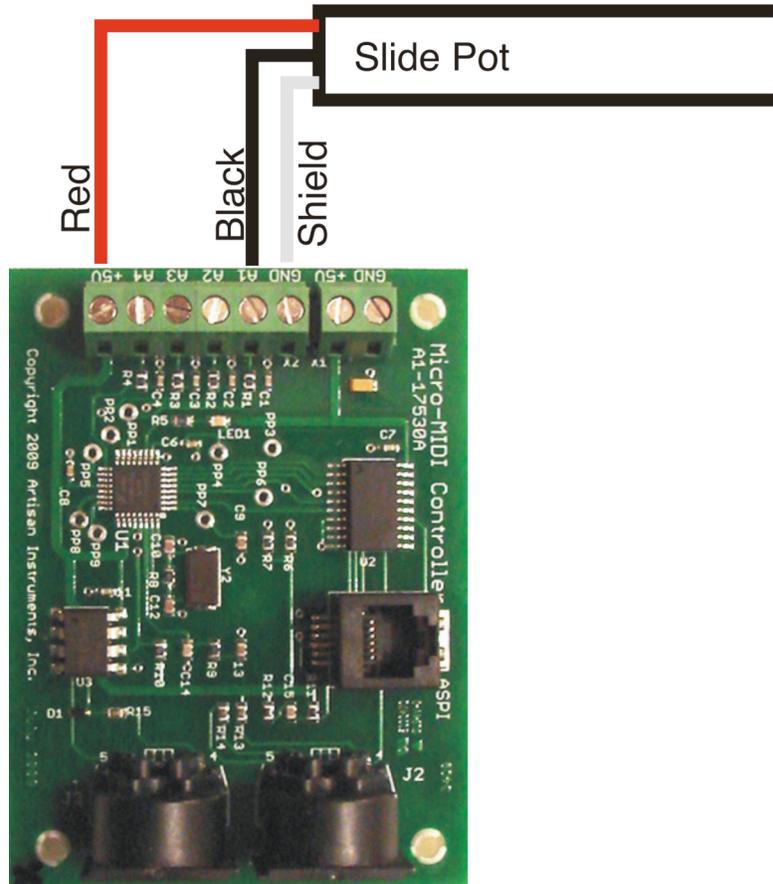
Much like the keyboards, the stop sense switches of the Stop Actions and the pistons are wired to the inputs of an Input Board. The major difference is, that they do not have to be wired in a precise and consecutive order as the keyboards require. [They can be identified later during the diagnostic process to determine their actual MIDI Note #.] However, it is probably just as easy at the outset to wire them in a consecutive order, if for no other reason, to make the cabling easier to trace.

Like the keyboards there will be a Common connecting one terminal of a group of Stop Sense switches or Piston switches. This Common is normally connected to the Negative terminal of the 5V Logic Supply.

[In cases where the Common of the Stop Sense switches and the Common of the Pistons is already connected to a Positive voltage, all that has to be done is to change the jumper on the Input Board to accept a Positive Common]

## Wiring a Potentiometer

Connect the expression pedal potentiometer (or any other variable voltage device) to the analog inputs on the controller board. This will produce a MIDI Controller signal for the control of audio volume, or for other requirements such as manual tuning of the Sound Engine to conform to the tuning of organ pipes.



## Wiring the 5V Logic Power Supply

Next, wire the power supply to the controller board(s). Identify the two terminal screws on the controller board marked "+5" and "Gnd." Connect the black wire from the negative terminal of the 5 volt power supply to the terminal marked Gnd. Connect the red wire from the positive terminal of the 5 volt power supply to the terminal marked +5V.

At this point you are ready to power up the system. Plug in the AC power cord and watch for a blinking pattern on the controller board(s) as well as each input board. The pattern will be random at first but will quickly settle into a steady blinking pattern. This is the Micro MIDI system booting up and communicating within itself.

## WARNING!!

If the green LEDs on the  $\mu$ MIDI Boards and/or Input Boards do not light up at all when power is applied, immediately power down and prepare to troubleshoot!

The first thing that should be done is to break the system down to its “lowest common denominator” [You undoubtedly recall that terminology from your school days]. That is, reduce the system to a single  $\mu$ MIDI Board to determine if applied power will indicate a blinking Green LED. If so, begin to build the system back up again board by board to determine where the failure might have occurred.

With regard to the Input Boards and Driver Boards, remove the 6-wire data cables, since these boards derive their power through the 6-wire cable from the  $\mu$ MIDI Controller Boards.

## SOFTWARE

On this disk we have provided software to load onto a laptop or desktop computer running Windows 98, Windows XP, Windows 2000, Windows Vista, or Windows 7.

Look for the file  [\$\mu\$ MIDI-A.3.0.4a.EXE](#) and copy that file from this disk to the Windows desktop. Then double click the file to install the Artisan Configuration program on the computer.

Also look for the file [Artisan\\_2\\_3\\_Manual.ucf](#) and copy that file to the desktop.

## CONFIGURATION FILE

The text file that makes the system run is called a configuration file. In this case that file is named [Artisan\\_2\\_3\\_Manual.ucf](#)

This file can be edited for additions or changes should you want to change the Channel number of a given division or the range of the expression pot or, anything else for that matter. There is a designated syntax to be used for this file. Refer to the  $\mu$ MIDI Manual on this disk for further information.

It is highly important that you do NOT use a Word Processor such as Wordpad, Notepad, or MS Word to edit this file. Those programs insert hidden codes into the file that will corrupt the system information.

We have included a program named PFE (Programmers File Editor) for the express purpose of editing these configuration files. Install PFE on your computer and only use PFE when editing a config file.

Here is an example of the configuration file with noted explanations:

```
;Artisan_2_3_Manual.ucf
;3-Manual Micro MIDI System

* $\mu$ MIDI_MODULE
  *control=div1vol *midi_channel=7 *bit=1 *midi_controller=7 *range=1,127
  *control=div2vol *midi_channel=6 *bit=2 *midi_controller=7 *range=1,127
  *control=cresc *midi_channel=10 *bit=3 *midi_controller=80 *range=1,20

*HV64
*DIVISION=ONE *BITS=1,61 *MIDI_CHANNEL=1 *MIDI_NOTE=36

*DIVISION=TWO *BITS=1,61 *MIDI_CHANNEL=2 *MIDI_NOTE=36

*DIVISION=THREE *BITS=1,61 *MIDI_CHANNEL=3 *MIDI_NOTE=36

*DIVISION=PEDAL *BITS=1,32 *MIDI_CHANNEL=4 *MIDI_NOTE=36

*END
```

Open the START menu and look for the item listed as Artisan Instrument. Under that folder in your start menu you will find a program named UCONFIG. Double click to start UCONFIG. You will be presented with a screen which will ask you to identify your USB device.

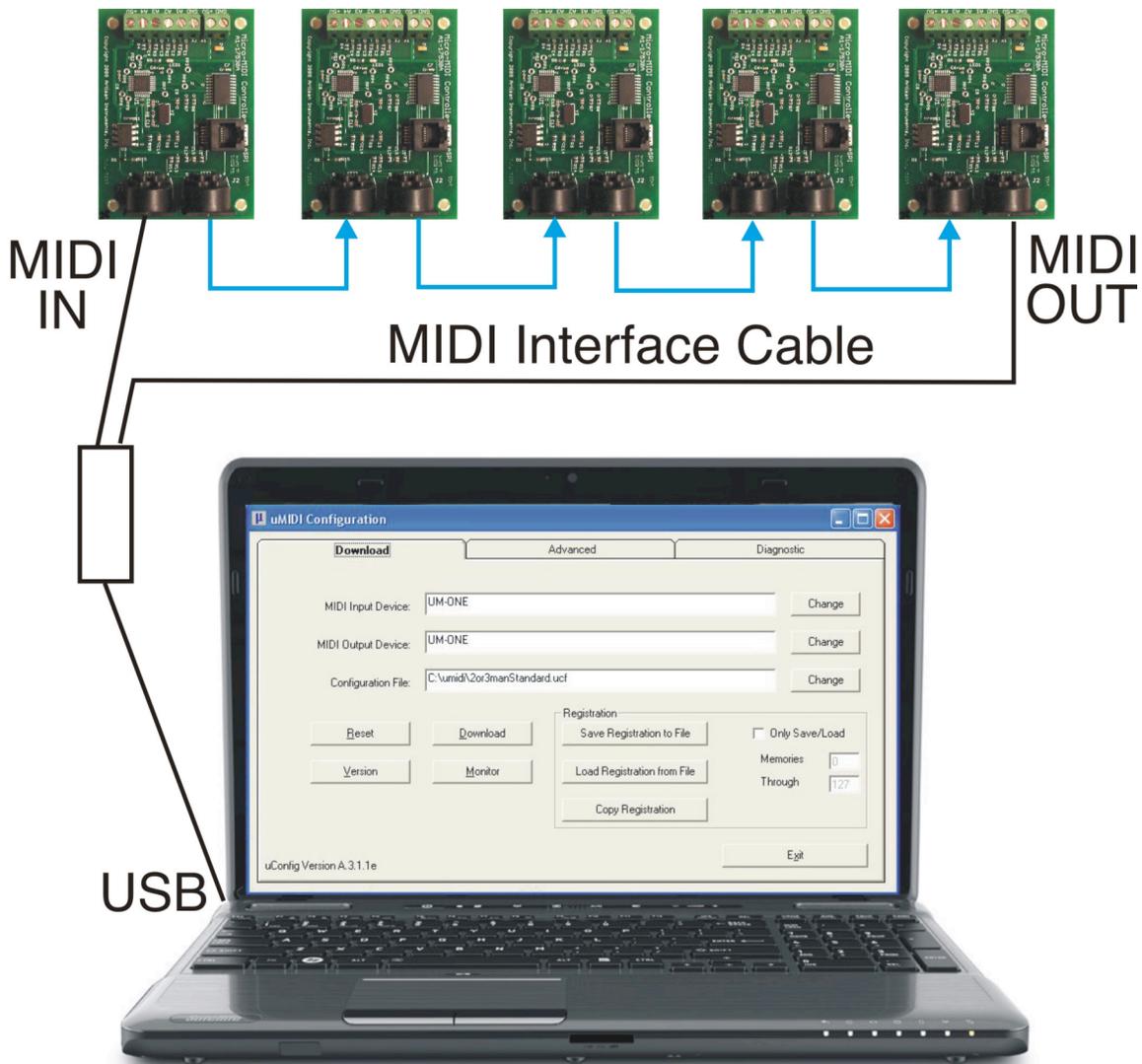
Select the [USB Audio device](#) choice.

The program will now ask you to direct it to a file to load. Navigate to the [Artisan\\_2\\_3\\_Manual.ucf](#) file on your desktop and select it.

The main screen of the configuration program will now open. Notice the clickable buttons for DOWNLOAD, MONITOR, VERSION. Those are the three buttons you will use most often.

Now plug in the USB connector of the Cakewalk interface to your computer as shown in the pictorial below.

**Make certain that the switches on the top of the Cakewalk device are both turned OFF.**



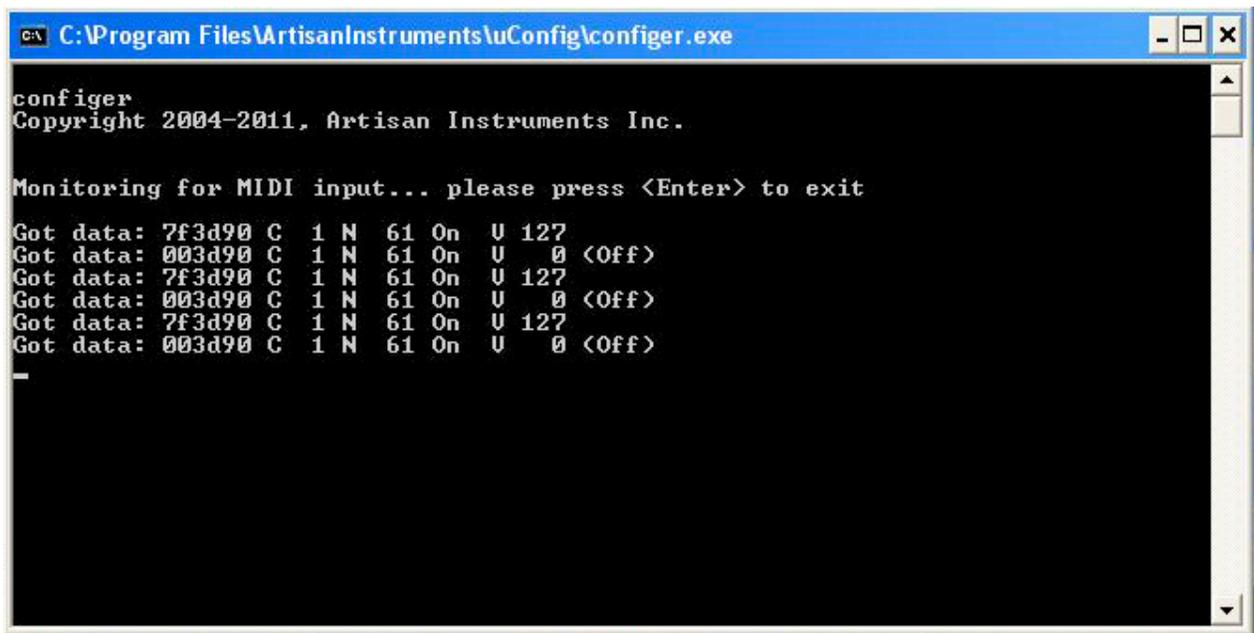
Connect the “CONNECT TO MIDI IN” plug of the Cakewalk interface to the MIDI IN plug of the first control module. Then connect the “CONNECT TO MIDI OUT” plug of the Cakewalk interface to MIDI OUT jacks of the last control module.

Click the DOWNLOAD button. A screen will open and you will see the download progress. It will end by telling you “DOWNLOAD SUCCESSFULLY COMPLETED”

The system should be operational at this point. If you do not see the [completed successfully](#) acknowledgement, look in the  $\mu$ MIDI manual for trouble shooting instructions or call Artisan Technical Support at (425) 485-6743.

You may use the MONITOR function to see the MIDI output of the system as a diagnostic tool.

For example, you need to verify that all of the keyboard contacts are working satisfactorily. Pressing each key from the lowest key on the keyboard to the top key will produce data for each key on the computer monitor screen. An example of what the screen will show is shown below. The major information is the MIDI Channel number and the note number [e.g., C 1 N 61 in this screen shot] ----- indicating its ON or OFF condition as the keys are enabled on the keyboard.



```
C:\Program Files\ArtisanInstruments\luConfig\configer.exe
configer
Copyright 2004-2011, Artisan Instruments Inc.

Monitoring for MIDI input... please press <Enter> to exit

Got data: 7f3d90 C 1 N 61 On U 127
Got data: 003d90 C 1 N 61 On U 0 <Off>
Got data: 7f3d90 C 1 N 61 On U 127
Got data: 003d90 C 1 N 61 On U 0 <Off>
Got data: 7f3d90 C 1 N 61 On U 127
Got data: 003d90 C 1 N 61 On U 0 <Off>
-
```

Or, you need to check to see that a swell shoe potentiometer is producing a range of Controller data. Moving the swell shoe from its closed position to its fully open position will show a range of data representing the range of volume control.

Each element on the console needs to be actuated to verify it's operation by seeing that it produces unique MIDI data in the same form as shown on the screen, above.

## **CUSTOMER SUPPORT**

If you encounter any problems with your installation please refer first to the  $\mu$ MIDI MANUAL. If you need further assistance, Artisan support is available during business hours 8AM to 5PM Monday through Friday Pacific Time Zone.

## **ARTISAN SUPPORT**

**(425) 485-6743**

**[www.artisanorgans.com](http://www.artisanorgans.com)**