

Classic Organ Works
Classic 'AGO' MIDI
Pedalboard (MPD)
User Manual
Version 1.03.00

A Division of:
ARTISAN CLASSIC ORGAN INC.

Classic Organ Works
CLASSIC 'AGO' MIDI PEDALBOARD
MPD

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DISCLAIMER

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CLASSIC 'AGO' MIDI PEDALBOARD MPD

INTRODUCTION

Congratulations on your purchase of the Classic 'AGO' MIDI Pedalboard! This beautiful, deluxe, wood-veneer pedalboard uses a combination of heel and toe springs to produce an authentic organ pedalboard feel while conforming to the exacting specifications of the American Guild of Organists. .

Constructed using the classical methods of organ-builders, the Classic 'AGO' MIDI pedalboard is also a technologically-advanced musical device. The pedalboard magnetic reed switches connect to the built-in Classic MIDI Keyboard Scan Computer (MKSC-4A). The electronics on this board perform MIDI-merge, velocity (volume level), transpose, and selectable MIDI-channel output functions. Other MIDI devices may be chained with this pedalboard to produce a single MIDI output stream.

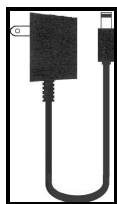
The pedalboard can output notes at different velocity (volume) levels. The transpose function allows organists to select their preference for the starting pitch associated with the first pedalboard key. A selectable MIDI channel output allows transmission of MIDI information on any one of sixteen standard MIDI channels.

The Classic 'AGO' MIDI pedalboard is shipped fully assembled and requires only MIDI and power connections. MIDI devices are connected to the 'MIDI IN' and 'MIDI OUT' connectors using standard MIDI cables.

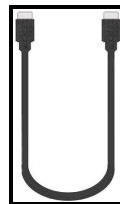
The Classic 'AGO' MIDI pedalboard conforms to the MIDI Manufacturers Association (MMA) specification. For more information, please visit: <http://www.midi.org>



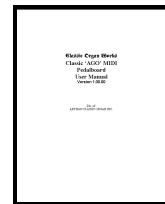
Pedal Board with MKSC-4A



DC adaptor



MIDI cable



User Manual

Figure 1: Parts list for the Classic 'AGO' MIDI Pedalboard

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INSTALLATION

The Classic 'AGO' MIDI Pedalboard is shipped fully assembled and requires only MIDI and power connections to operate. The heart of the pedalboard is the MKSC-4A MIDI Keyboard Scan computer which performs key-scanning, transposition, volume adjustment, and MIDI channel output select. It has a 2.1mm co-axial DC power connector and two connectors for MIDI input and MIDI output. A picture of the connectors is shown below.

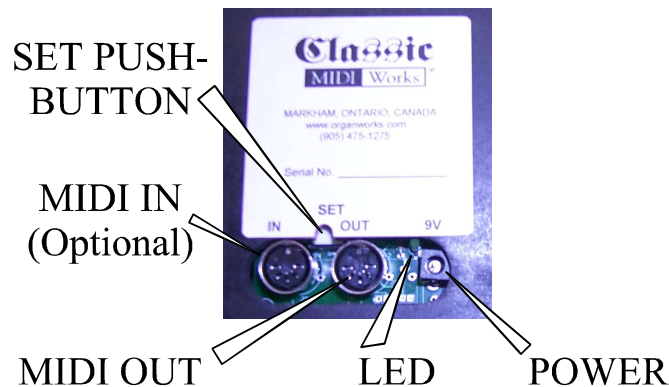


Figure 2: Required Connections

POWER: Plug the 9-Volt DC power supply (included) into the 2.1mm co-axial power connector.

MIDI OUT: Plug the included 6-foot MIDI cable into the MIDI-OUT connector and to the MIDI device that is to be controlled. MIDI data is output from the pedalboard to other MIDI devices via this connector.

MIDI IN (optional): Plug a standard MIDI cable from the 'MIDI OUT' port of another MIDI device into the 'MIDI-IN' connector. This connector receives MIDI data from other MIDI devices and re-transmits it through the 'MIDI OUT' port as described above.

SET PUSH-BUTTON: No installation is necessary. The push-button switch is used to configure the pedalboard. Along with the pedalboard keys, it sets the output MIDI channel, velocity level and transposes the entire pedalboard up one octave and back to default.

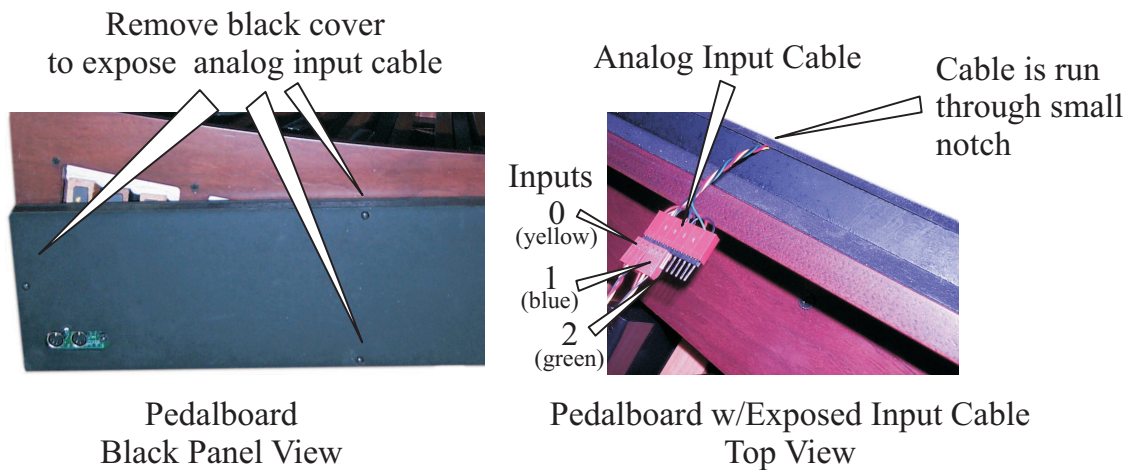


Figure 3: Analog Inputs

ANALOG INPUTS (Optional): An analog input cable is hidden inside the pedalboard behind the black cover. Remove the black cover and pull the cable out. Run the cable through the small notch (pictured), leaving the 12 pin connector on the outside, and restore the black cover. Plug in analog organ shoes, such as Expression, Swell and Crescendo as illustrated in schematic on page 18.

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CLASSIC 'AGO' MIDI PEDALBOARD MPD

CONFIGURING

The Classic 'AGO' MIDI Pedalboard provides the ability to configure a variety of parameters for its key and analog inputs. These inputs are configured using the programming push-button (illustrated on page 5) along with the pedalboard keys.

In general:

1. A pedalboard setting is configured by pressing and releasing the programming push-button, followed by a press-and-release sequence of pedalboard keys, as defined in the list below
2. Only one setting can be configured per press of the programming push-button

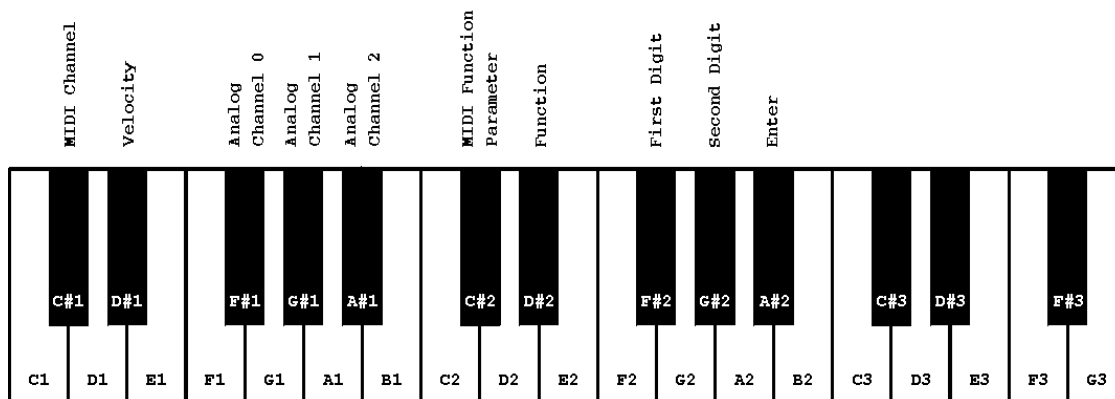


Figure 4: Pedalboard Key Map

Table 1: Functions Accessible with the Programming Push-Button

Setting	Parameter
<p>MIDI Function</p> <p><i>Defines the type of MIDI messages sent by the pedalboard.</i></p>	<ol style="list-style-type: none"> 1. Press & release programming push-button 2. Press & release Black key D#2 (Key-16) 3. To select <i>MIDI Note On/Off</i> function, press & release first white key (C1, Key-1) <li style="text-align: center;">- or - To select <i>MIDI Program Change</i> function, press & release second white key (D1, Key-3) <li style="text-align: center;">- or - To select <i>Ahlborn Stops Control</i> function, press & release third white key (E1, Key-5) 4. Press & release black "Enter" key (A#2, Key-23) <p style="text-align: center;">To enter default function (Note On/Off) – skip step 3</p>

Setting	Parameter
<p>MIDI Function Parameter</p> <p><i>Sets the base key (C1) value</i></p>	<p>The MIDI Function Parameter sets MIDI Key Number for C1 Key if <i>Note On/Off</i> function is selected, Program Change Number for C1 Key if <i>Program Change</i> function is selected and Ahlborn Stop Number for C1 Key if <i>Ahlborn Stops Control</i> function is selected.</p> <ol style="list-style-type: none"> 1. Press & release programming push-button 2. Press & release black C#2 (Key-14) 3. Press & release black F#2 (Key-19) and then one of first 13 white keys to enter ‘Tens’ of C1 Key Number (digits 0-12) example: For a value of 111, which has eleven tens, hit 12th. white key G2 (Key-20) For a value of 5, which has zero tens, hit key C1 (Key-1) 4. Press & release G#2 (Key-21) and then one of first 10 white keys to enter ‘Units’ of C1 Key Number (digits 0-9) example: For a value of 111, which has 1 unit, hit 2nd white key D1 (Key-2) For a value of 5, which has 5 units, hit key A1 (key10) 5. Press & release “Enter” key (A#2, Key-23) <p style="text-align: center;">To enter default value (36) – skip steps 3 and 4</p>
<p>MIDI Channel Select</p> <p><i>Sets the pedalboard MIDI output channel</i></p>	<ol style="list-style-type: none"> 1. Press & release programming push-button 2. Press & release black C#1 (Key-2) 3. For MIDI Channel 1-8 press & release black F#2 (Key-19) and then one of the first 8 white keys - or - For select MIDI Channel 9-16 press & release black G#2 (Key-21) and then one of the first 8 white keys 4. Press & release black “Enter” key (A#2, Key-23) <p style="text-align: center;">To enter default value (1) – skip 3</p>
<p>Velocity Value</p> <p><i>Sets the key velocity (which controls the volume)</i></p>	<ol style="list-style-type: none"> 1. Press & release programming push-button 2. Press & release black D#1 (Key-4) 3. Press & release black F#2 (Key-19) and then one of the first 13 white keys to enter ‘Tens’ of Velocity Value (digits 0-12) example: For a value of 111, which has eleven tens, hit key G2 (Key-20, 12th. white key) For a value of 5, which has zero tens, hit key C1 (Key-1, first white key) 4. Press & release black G#2 (Key-21) and then one of first 10 white keys to enter ‘Units’ of Velocity Value (digits 0-9) example: For a value of 111, which has 1 unit, hit key D1 (Key-3, second white key) For a value of 5, which has 5 units, hit key A1 (Key-10) 5. Press & release black “Enter” key (A#2, Key-23) <p style="text-align: center;">To enter default value (127) – skip steps 3 and 4</p>

Setting	Parameter
<p>Add Analog Input to MIDI Channel</p> <p><i>Sets the MIDI channel on which a given analog input will operate. Each analog input can operate on more than one channel.</i></p>	<ol style="list-style-type: none"> 1. Press & release programming push-button 2. Press & release black F#1 (Analog Input 0, Key-7) or black G#1 (Analog Input 1, Key-9), or black A#1 (Analog Input 2, Key-11) 3. To add MIDI Channel 1-8 press & release black F#2 and then one of the first 8 white keys - or - To add MIDI Channel 9-16 press & release black G#2 and then one of the first 8 white keys 4. Press & release black “Enter” key (A#2) To enter default value (MIDI Channels Off) – skip step 3
<p>Select Analog Input Function</p> <p><i>Defines the function of a given analog input</i></p>	<ol style="list-style-type: none"> 1. Press & release programming push-button 2. Press & release black F#1 (Analog Input 0, Key-7), black G#1 (Analog Input 1, Key-9), or black A#1 (Analog Input 2, Key-11) 3. Press & release black D#2 (Key-16) 4. Select desired function by pressing one the following white keys: <ul style="list-style-type: none"> C1 (Key-1) Low Level calibration of an Analog Input** D1 (Key-3) High Level calibration of an Analog Input** E1 (Key-5) MIDI Volume Control F1 (Key-6) MIDI Expression Control G1 (Key-8) MIDI Tuning Control A1 (Key-10) Ahlborn Crescendo B1 (Key-12) MIDI Realtime SysEx Master Volume Control C2 (Key-13) MIDI Realtime SysEx Master Coarse Tuning D2 (Key-15) MIDI Realtime SysEx Master Fine Tuning C3 (Key-25) Disable Analog Input 5. Press & release black “Enter” key (A#2, Key-23) To enter default Analog Input Function (14) – skip step 4 <p>** if Low Level > High Level, Analog Input action is inverted. The analog control should be at the desired position before setting the function.</p>
<p>Cancel</p> <p><i>Follow this procedure to cancel just-entered data before pressing “Enter” key (#A2)</i></p>	<ol style="list-style-type: none"> 1. Press and hold the first white key (C1, Key-1) 2. Press & release black “Enter” key (A#2, Key-23) 3. Release first the white key (C1, Key-1)

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CLASSIC 'AGO' MIDI PEDALBOARD MPD

MKSC-4A

(MIDI Keyboard Scan Computer for Matrix-wired keyboards and pedalboards)

Description

The 'brain' of the Classic 'AGO' MIDI Pedalboard is the MKSC-4A (MIDI Keyboard Scan Computer). This circuit board translates key-switch action from keyboards and pedalboards into MIDI NOTE 'ON' or 'OFF' commands. It is a stand-alone unit that adds MIDI capability to keyboards and pedalboards. In particular, the MKSC-4A is ideal for a new keyboard with high-quality gold or silver low-current contacts (or reed switches) wired in an 8x8 matrix (with diodes). Matrix wiring uses only sixteen wires to simplify the connections to a keyboard. The Classic MIDI pedalboard includes a MKSC-4A board installed.

Principal Features

- Allows a new keyboard to operate MIDI equipment.
- High-quality, low-current contacts are arranged in an 8x8 matrix array for 61-note keyboards.
- Switch de-bouncing to prevent switching errors in keyboards with older switch contacts.
- MIDI Channel set by a programming switch and pedal keys
- Non-volatile memory allows the unit to store MIDI channel and other functions when power is removed.
- MIDI input (merge function) allows other MIDI sources to simultaneously operate the same MIDI equipment.
- An on-board push-button provides user-selectable functions such as transpose, output velocity (volume) level, and output MIDI channel.
- If the MKSC-4A is purchased with the Classic MIDI Pedalboard, it will be shipped fully installed.

How it works

As shown on the schematic included at the end of this document (Figure 4), the PIC16F876 microprocessor forms the heart of this system. It is a serial micro-processor containing RAM and EEPROM as well as the operating program all in one device. It operates at a frequency of 20 MHz and has three ports. One port, JP4, is used only for matrixed inputs from the keys. The other two ports are used for group outputs to the keys as well as input and outputs for MIDI In and Out and miscellaneous devices.

The microprocessor scans each keyswitch separately. Keyboard wiring is minimized by wiring the keyswitches in an 8x8 matrix. The key switches must, therefore, be wired in groups of eight. However, to avoid two or more keys being read as being 'On' together through back-circuits and causing 'phantom' notes, each key switch MUST have a series diode, type 1N4148 or similar. These diodes (which may be fitted either side of the switches,

as convenient) must be wired so that the cathodes (the end with the band) go to the 'JP1' connector side of the matrix (the board inputs).

The scanning system is such that when a high output (+5V) is present on JP4-1, the first 8 keys are read in as a group on JP1 1-8. A key-down causes a high signal at a JP1 pin only while JP4-1 is high. The scan then progresses to JP4-2 and JP1 1-8 are read again, and so on up to JP4-8, after which the sequence is repeated continuously (the last three switch inputs are not used on a 61-note keyboard but could be). Bottom-C is Key-1 corresponding to JP1-1/JP4-1. Thus, all the keys are read sequentially from bottom to top.

Every eighth (cathode) switch is joined to JP1-1 (for keys 1, 9, 17, 25, 33, 41, 49, 57). Similarly, every eighth one (2, 10, 18...) is joined to JP1-2, and so on, up to JP1-8. The JP1 connector will always be fully wired, no matter what size the keyboard. JP3 is in parallel with JP1 for convenience in external wiring.

The first eight keys (C-G) have all their anode sides joined together to JP4-1. The next eight (G#-D#) all go to JP4-2, etc., up to JP4-8 (which has only the top five keys of a 61-note keyboard). On a 32-note pedalboard, only the first 32 switches are present, so JP4 5-8 will not be used.

All the input pins of JP1 are voltage-protected by internal diodes. These clamp any incoming spikes or static after the input series resistors to the 5-volt range of the supply. Outputs have series resistors to limit the current in the event of a short.

Power for the on-board electronics is regulated down to +5V by a voltage regulator (U2). A bridge rectifier (D5) corrects the polarity of voltage thereby allowing a co-axial power jack of either positive or negative inner polarity to be used. When the supply is present, the processor will indicate that all is well by flashing the 'Heartbeat' LED D1.

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MIDI APPLICATIONS

The Classic 'AGO' MIDI Pedalboard can be connected to MIDI devices such as sequencers, MIDI sound modules, and computer-based synthesizer software. The convenient MIDI-merge feature re-transmits MIDI messages received on the 'MIDI IN' connector. A chart showing support of various MIDI parameters is shown below.

Table 2: MIDI Parameters supported

FUNCTION	TRANSMITTED	RECOGNIZED	COMMENTS
Channel 1-16	Yes (Note 2)	Yes (Note 1)	Key On/Off, Program Change, or Ahlborn Stops Control Data
Mode	Mode 3	Mode 3	OMNI OFF, POLY
Note Number	24-108	0-127	Middle C = 60
Velocity	No (Note 3)	Yes (Note 1)	Default Velocity = 100
After Touch	No	Yes (Note 1)	
Pitch Bender	No	Yes (Note 1)	
Controllers 7 11 64	Yes (Note 4) Yes (Note 4) Yes (Note 5)	Yes (Note 1)	Volume Expression Sustain
Program Change	Yes (Note 6)	Yes (Note 1)	
System Exclusive	Yes	Yes	<i>Note 7</i>
System Common	Yes (Note 1)	Yes (Note 1)	
System Real Time Clock Start Stop System Reset	Yes (Note 1)	Yes (Note 1) No No Yes (Note 1)	
All notes off	Yes (Note 1)	Yes (Note 1)	

NOTES:

1. All MIDI data received on MIDI-In is re-transmitted on MIDI-Out.
 2. Note data is transmitted on whichever channel is active.
 3. The key inputs are not velocity sensitive. The Velocity value* sent with notes may be changed from the default value (100) via pedalboard configuration
 4. Volume or Expression* may be sent on the currently-active channel via pedalboard configuration
 5. Sustain On/Off will be transmitted on the currently-active channel.
 6. Program Change messages may be sent on the currently-active channel or on Channel 16.
 7. SysEx messages received in MIDI-In will be re-transmitted on MIDI-Out. SysEx messages* to control stops on Ahlborn Archive modules may be generated by operating the programming switch and then pressing a key.
- * Not presently implemented.

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SPECIFICATIONS

Dimensions:

Pedalboard:

Front Width	53.5 inches, 135.9 cm
Back Width	37.5 inches, 95.25 cm
Height	5 inches, 12.7 cm (middle 'E' key)

MKSC-4A Circuit Board:

Width	4.875 inches, 12.38 cm
Height	2.25 inches, 5.72 cm
Depth	0.90 inches, 2.3 cm (plus cable connectors length)

Controls:

MIDI Channel Select, Transpose, Velocity, Analog Input, and MIDI Function	Accessible by pressing and releasing the programming push-button, followed by a press-and-release sequence of pedalboard keys documented in the configuration section of this manual
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Connections:

Inputs (Pedalboard):

Programming Switch	Active-low, 510 Ohm load via LED to +5V, 0V typical to operate.
MIDI	DIN 5-pin Socket Standard MIDI signals, optically isolated.
Power	5-12V DC, 50 mA typical. Co-axial Power Jack, 2.1mm ID, 6mm OD. Either polarity.

Inputs (MKSC-4A):

Key Switches JP1	Active-high, +5V typical, 10k-Ohm load to 0V, 1 Group of 8 Pins, 0.025" Square, 0.3" long, 0.1" pitch. (for 8-pin Molex or MAS-CON connector)
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Outputs (Pedalboard):

MIDI	DIN 5-pin Socket Standard MIDI signals
------	---

Outputs (MKSC-4A):

Key Switches JP4	Active-high, +5V typical, source 810 Ohms, 1 Group of 8 Pins, 0.025" Square, 0.3" long, 0.1" pitch.(for 8-pin Molex or MAS-CON connector)
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CLASSIC 'AGO' MIDI PEDALBOARD MPD

TROUBLESHOOTING

The Classic 'AGO' MIDI Pedalboard has been designed for years of worry-free use. It is a ready-to-use device that requires no assembly or programming with the exception of user-selectable functions like MIDI channel, transpose, and output-velocity level. It is extremely reliable and works with all MIDI devices conforming to the MIDI Manufacturers Association specification.

The pedalboard requires power and MIDI connections. Once these connections have been made, the pedalboard is ready for use. Each pedalboard is thoroughly tested at our factory before being shipped. However, if the pedalboard does not function correctly upon delivery, follow these guidelines:

1. There is no MIDI output and the green LED (located at the back of the pedalboard) is flashing.
 - Make sure you have the correct MIDI connections. 'MIDI OUT' should be connected to the 'MIDI IN' port on sound modules and MIDI equipment to send MIDI data to that equipment. The Pedalboard 'MIDI IN' port can be left unconnected. If you wish to have MIDI equipment output MIDI data to the pedalboard, then connect the 'MIDI OUT' port on MIDI equipment to the Pedalboard 'MIDI IN' port.
 - Check that the MIDI device connected to the Pedalboard is one that is approved by the MIDI Manufacturers Association (MMA). All MIDI devices should conform to MMA hardware and software specifications however, there are some products which might not. MMA is the recognized organization to ensure compatibility between different MIDI manufacturers.
2. There is no MIDI output and the green LED (located at the back of the pedalboard) is *not* flashing.
 - Make sure you have the DC adaptor plugged into a working power outlet.
 - Make sure you have the correct MIDI connections. 'MIDI OUT' should be connected to the 'MIDI IN' port on sound modules and MIDI equipment to send MIDI data to that equipment. The Pedalboard 'MIDI IN' port can be left unconnected. If you wish to have MIDI equipment output MIDI data to the pedalboard, then connect the 'MIDI OUT' port on MIDI equipment to the Pedalboard 'MIDI IN' port.
3. One or more of the keys do not produce a MIDI sound. The others are fine.
 - Check the connectors on JP1 and JP4 of the MKSC-4A circuit board. There might be loose or damaged wires or connectors which need to be replaced.
 - Check to make sure that the keys were not damaged during shipping.
4. You have tried all the suggestions above but, still do not have a working Pedalboard.
 - Contact Classic Organ Works.

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CLASSIC 'AGO' MIDI PEDALBOARD

DIAGRAMS

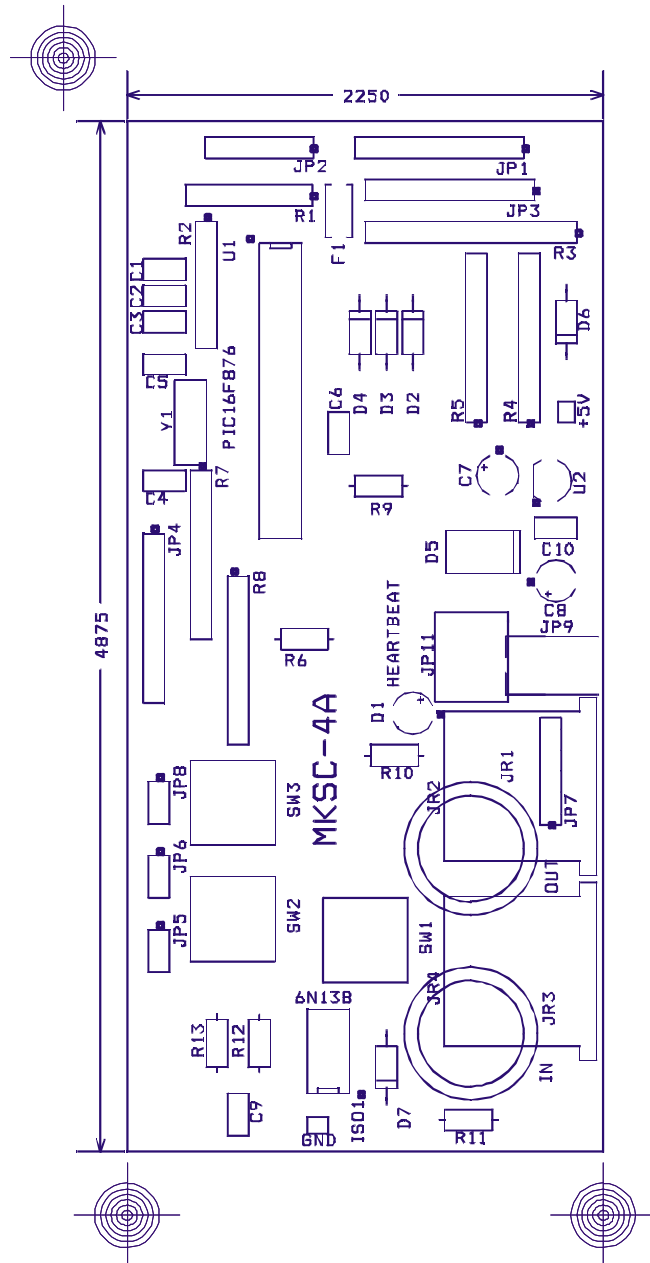
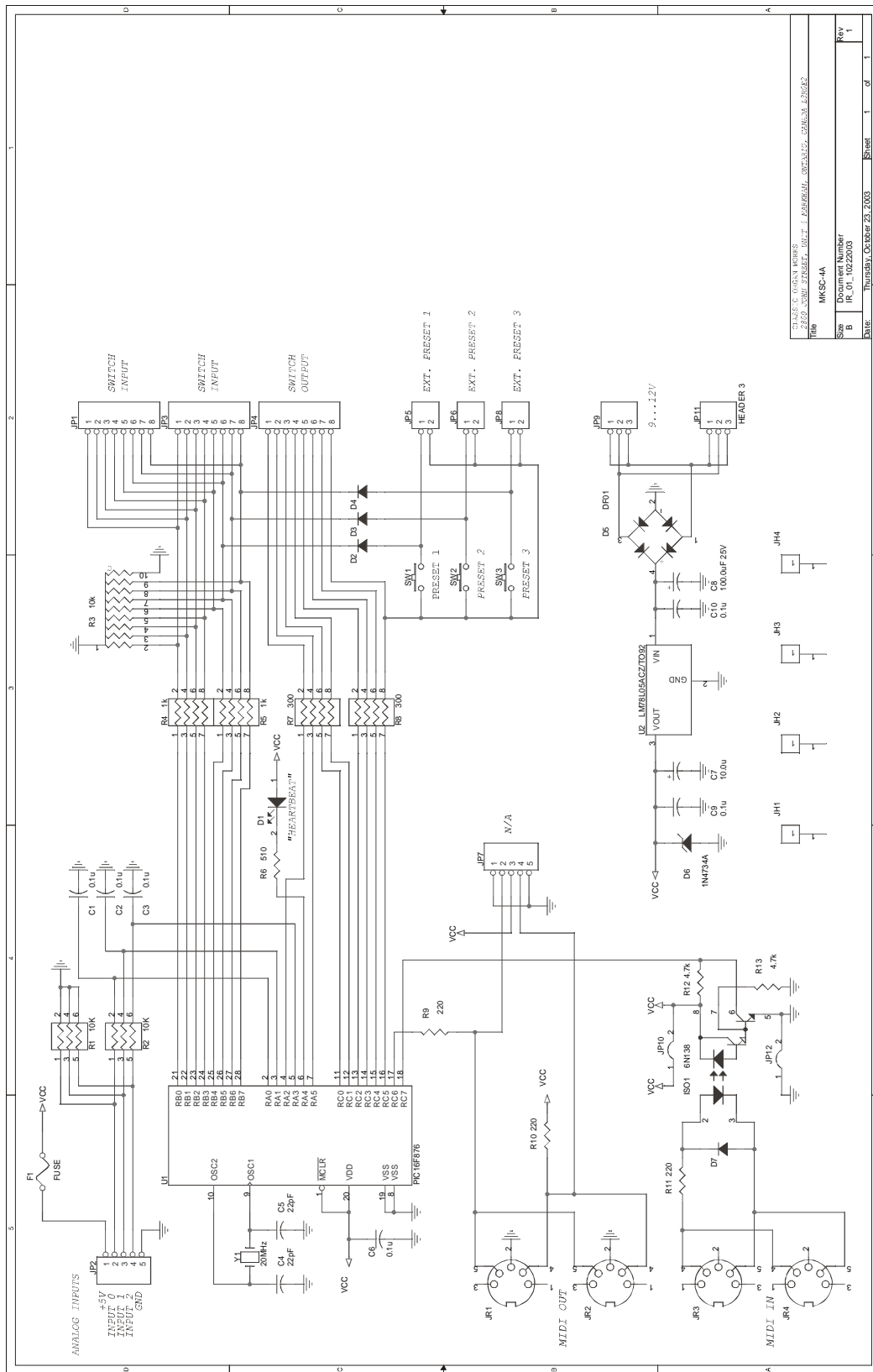


Figure 5: Silk Screen of the MKSC-4A circuit board



CLASSIC 'AGO' MIDI PEDALBOARD	
E2021_C001_01_022003_MKSC-4A	
Size	B
Document Number	MKSC-4A
Rev	1
Date	Thursday, October 23, 2003
Sheet	1 of 1

Figure 6: MKSC-4A schematic

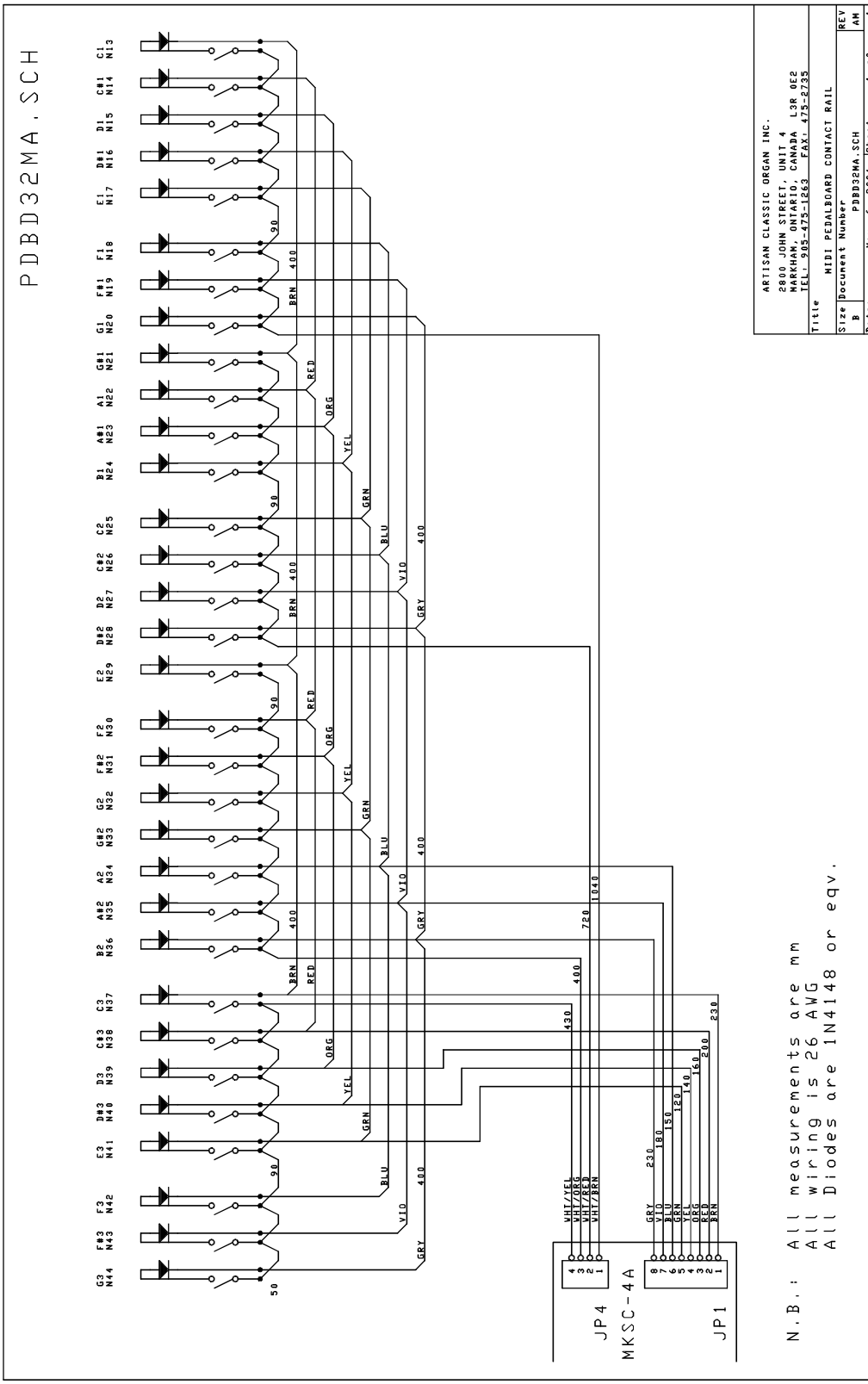
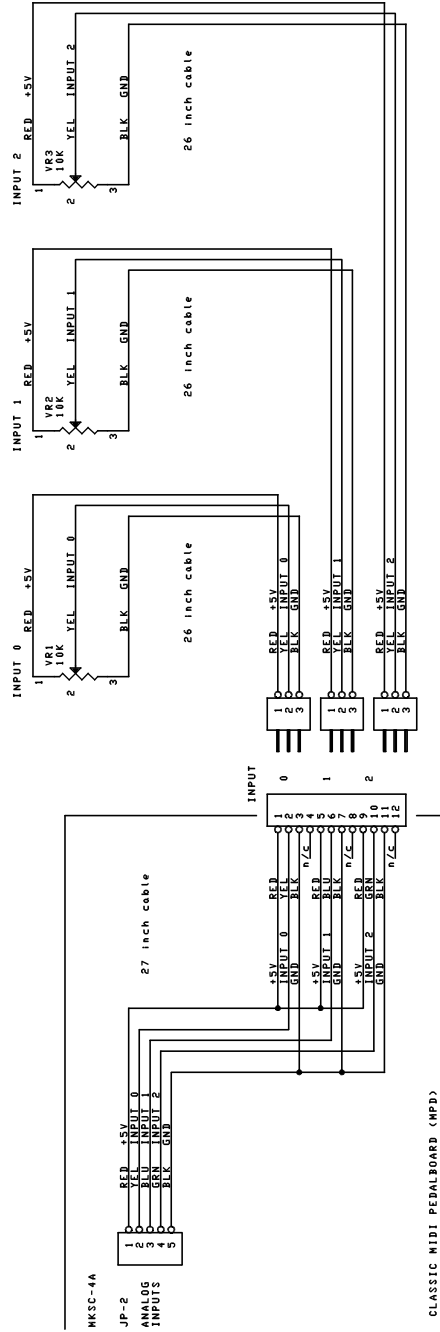


Figure 7: Classic 'AGO' MIDI Pedalboard wiring schematic

ANALOG INPUTS FOR SHOES:



NOTE: The Analog Input cable is connected to the MKSC-4A board, under the front black cover. Remove the front black cover, pull the cable through the notch leaving the notch on the outside, replace the front black cover.

CLASSIC ORGAN WORKS	
2800 JOHN STREET, UNIT 4	
MARKHAM, ONTARIO, CANADA L3R 0E2	
TEL: 905-475-1875 FAX: 475-2735	
Title	SSM2 SHOE WIRING
Size	SSM2-01.SCH
B	1 of 1
Date:	June 21, 2004
Sheet	1 of 1
REV	AM

Figure 8: Organ Shoe Wiring

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CLASSIC 'AGO' MIDI PEDALBOARD MPD

WARRANTY

Classic Organ Works warrants the Classic 'AGO' MIDI Pedalboard to be free from defects in materials and workmanship under normal use for a period of **ONE YEAR** from the delivery date. This warranty applies only if the product is owned by the original purchaser who has the bill of sale.

This warranty explicitly excludes any cables provided with the Classic 'AGO' MIDI Pedalboard, which may become defective as a result of normal wear and tear.

In the event of a defect in materials or workmanship, please contact Classic Organ Works immediately. Defects due to shipping should be reported within 15 days for insurance claim purposes. For all other defects, Classic Organ Works agrees to repair or replace all defective parts of said products which are returned, transportation prepaid, for inspection at its service centre within the period of the warranty.

The conditions of the warranty are that the equipment had not:

- Been altered.
- Been subjected to misuse, improper maintenance, or negligence.
- Been damaged by excessive voltage or incorrect installation and connections.
- Had its serial number or any part altered, defaced or removed.

In the event that Classic Organ Works determines the product requires repair because of user misuse or regular wear, it will assess a fair repair or replacement fee. The customer will have the option to pay this fee and have the unit repaired and returned, or not pay this fee and have the unit returned un-repaired.

Classic Organ Works will not be liable for consequential, special, indirect, or similar damages or claims including loss of profit or any other commercial damage, and in no event will Classic Organ Works' liability for any damages to the purchaser or any other person exceed the price paid for the product, regardless of any form of the claim. Classic Organ Works specifically disclaims all other warranties, expressed or implied. Specifically, Classic Organ Works makes no warranty that the product is fit for any particular purpose.

This warranty shall be interpreted, and governed by applicable laws in the province of Ontario, Canada. If any provision of this warranty is found void, invalid or unenforceable, it will not affect the validity of the balance of the warranty, which shall remain valid and enforceable according to its terms. In the event any remedy hereunder is determined to have failed of its essential purpose, all limitations of liability and exclusion of damages set forth herein shall remain in full force and effect.

Classic Organ Works

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Document: MPD Manual 001.doc
Revised: August 10, 2010