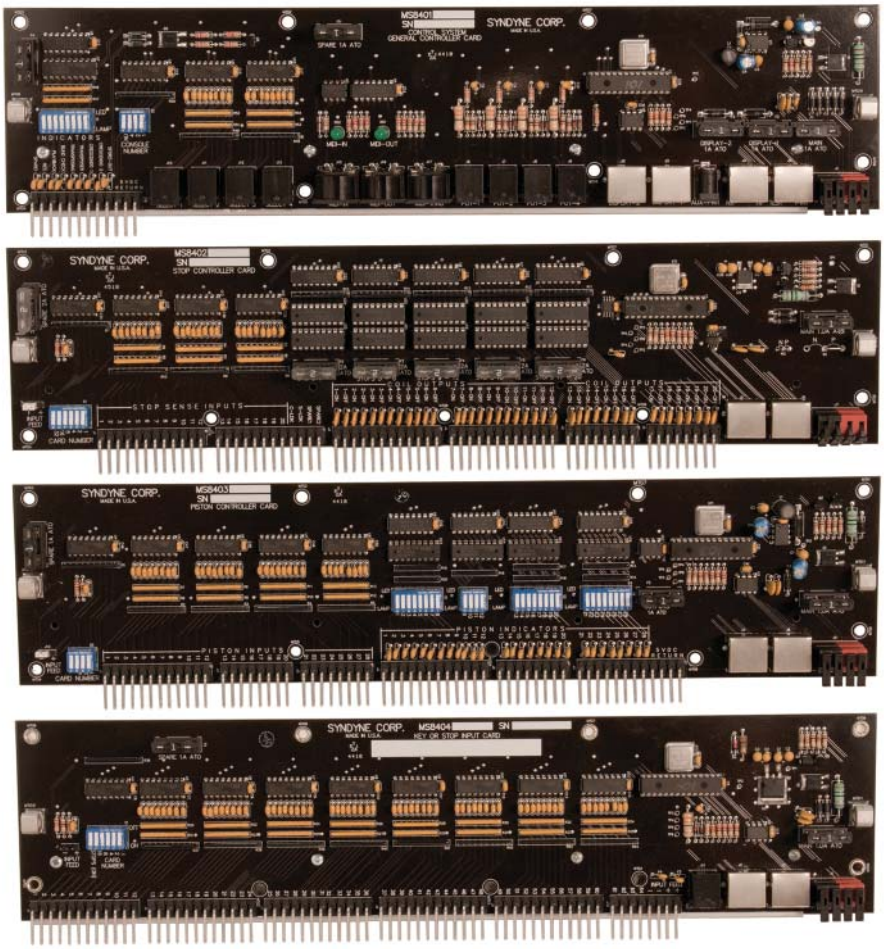
MS8400 Installation Manual



This manual covers the installation of the MS8400 Pipe Organ Control System. For configuration of the MS8400, see the MS8400 Configuration Manual. Additional documentation can be found online at syndyne.com and the Syndyne YouTube channel www.youtube.com/syndyneco

Control System Installed By _____ Date Installed_____

Installer Telephone _____ Email _____ Fax_____

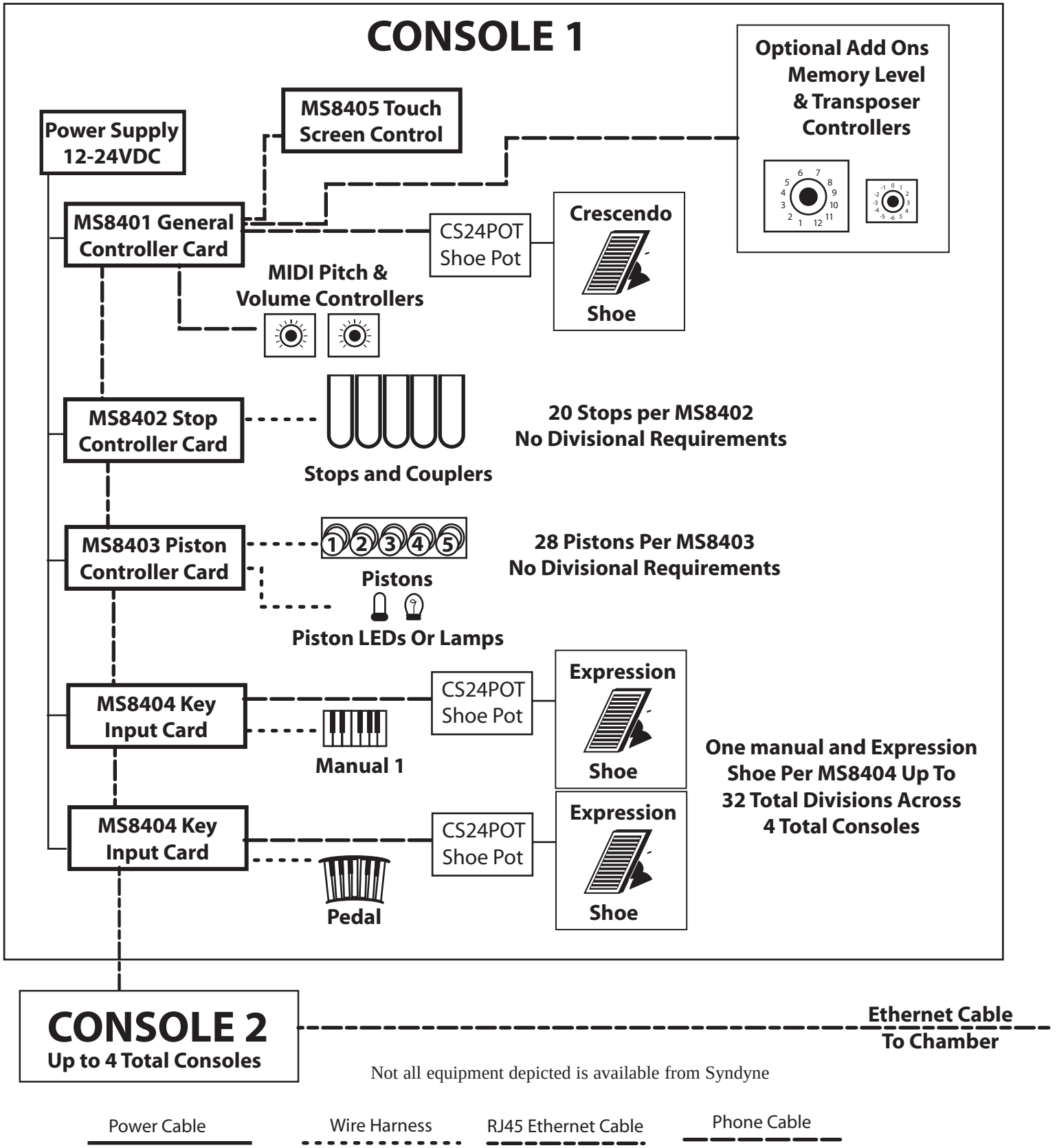
Control System Maintained By _____

Maintenance Telephone _____ Email _____ Fax_____

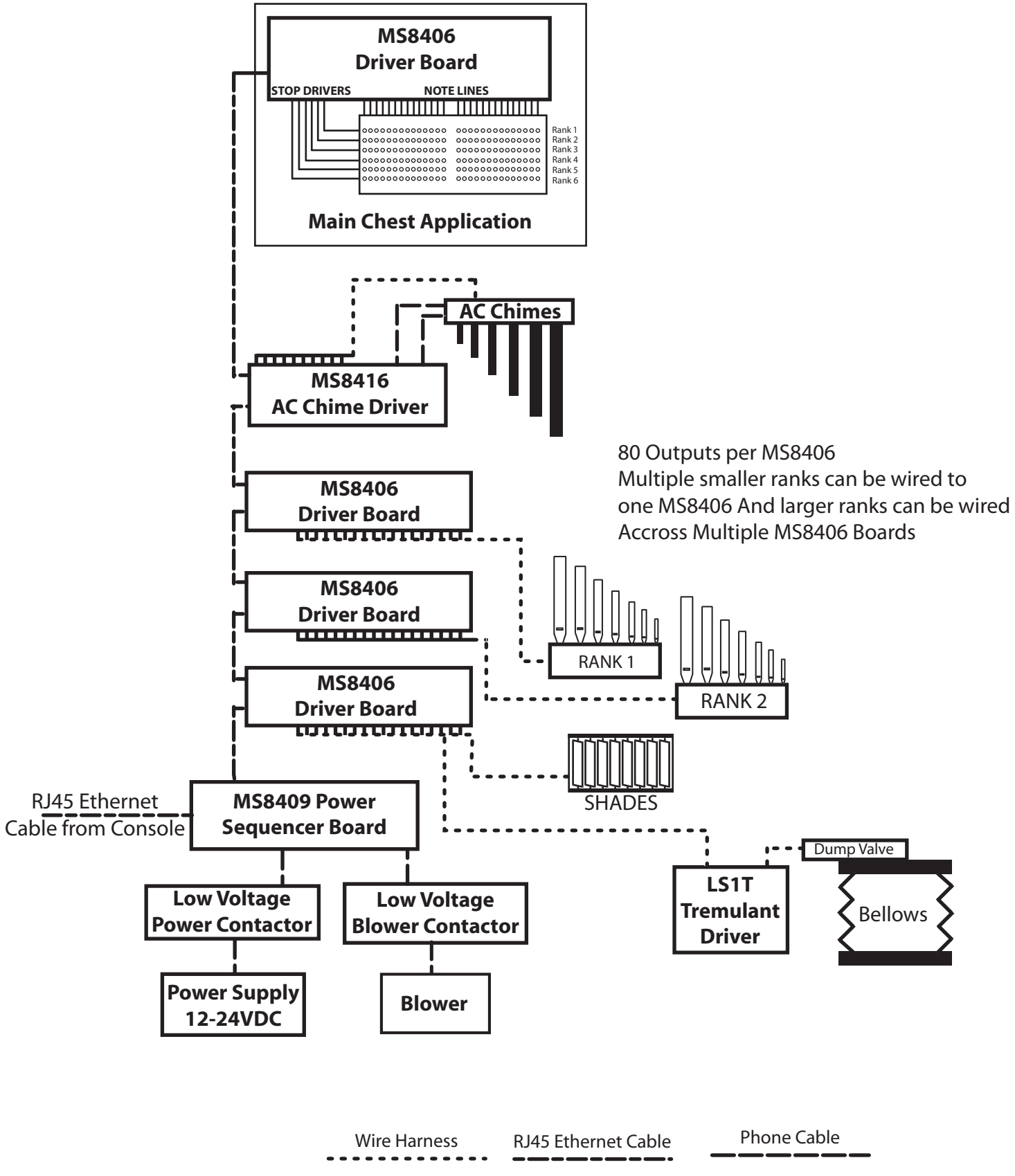
Table Of Contents

Table Of Contents Continued

CONSOLE DIAGRAM



CHAMBER DIAGRAM



Not all equipment depicted is available from Syndyne

UNPACKING AND HANDLING:

STATIC WARNING:

The Syndyne MS8400 System containts electrical components that are suseptible to damage by static discharge. To avoid damage, use antistatic handling materials and make sure you are well grounded at all times. It is recommended that all electrical components be kept in their original packaging until installed.

BENDING OR ROUGH HANDLING:

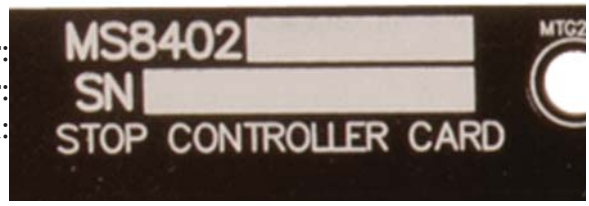
Use care when handling the products. Dropping or other rough handling can result in the products becoming damaged. Electrical components may also break if excessive bending occurs.

BOARD IDENTIFICATION:

For Identification Purposes each component is labeled with a part number, a serial number, and a name/description.

This Shows a sample board identification

Part Number:
Serial Number:
Description:



POWER:

- Only clean regulated 12-24VDC power supplies should be used.
- It is acceptable to use multiple power supplies such as one in the console and another in the chamber. The negative sides of each power supply must be connected together. There is a common negative that runs through the serial data cable and is usually suitable for this purpose. A separate negative wire is required when large currents are passing between the power supplies. It is not recommended to have more than one power supply's negative terminal tied to earth ground. If it is permissible with local codes we recommend not connecting any negative terminals to earth ground; this is to minimize the risk of damage due to a direct lightning strike.
- Daisy chaining of power connections is not recommended. Each board's power and chest returns should be routed individually to a common buss.
- **Due to risk of accidental shorting wires should not be routed beneath boards.**

FUSING:

The use of fuses to protect all electrical circuits from accidental shorting and compliance with local NEC (National Electric Code) guide lines is highly recommended.

MS8401 General Controller Card

Description:

The MS8401 General Controller is primarily used as a connection point for common system controls such as crescendo shoes, Midi pitch tuning or a rotary transposer switch. It also provides a convenient connection point for the MS8405 touch screen control panel. MIDI-In, MIDI-Out and MIDI-Thru ports are available for MIDI device hook ups. One General Controller is required for each console with up to 4 consoles system wide. The MS8401 also has indicators for common system functions.

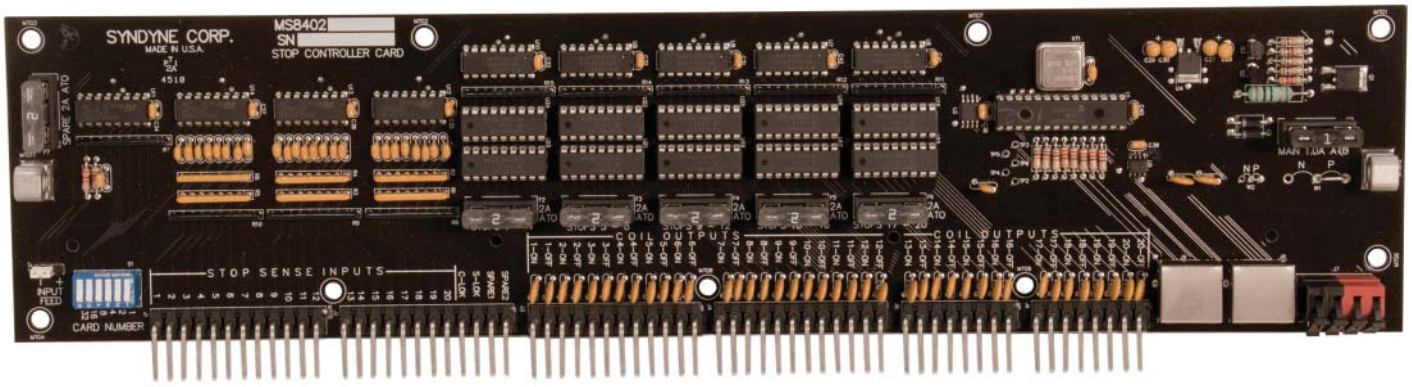
Dimensions:

Length: 15"
Width: 4"
Height: 1-1/2"

Features List:

- One general controller is used in each console with up to 4 separate consoles
- Provides power and data connection to the MS8405 touch screen controller
- Each general controller supports dual touch screens for added functionality
- Four universal twelve position rotary selector inputs can be used to control transposer, memory banks and memory levels.
- Four universal analog inputs can be used for Crescendo 1, Crescendo 2, MIDI volume, and MIDI pitch.
- Eight Indicator outputs (LED or lamp) are available for crescendo 1 and 2, Transposer, Transposing, Blind Check, MIDI Playback and Midi Record.
- MIDI-In, MIDI-Out, and MIDI-Thru ports are available for connections to a stand-alone record/playback unit or for a remote Midi keyboard. Sound module devices are connected to the MS8400 system through the MS8410 board.
- Configuration can be backed up to a USB flash drive
- Standardized firmware that can be upgraded using a standard USB flash drive
- Easily Configurable on site using the touch screen Control Panel (MS8405). No PC required

MS8402 Stop Controller Card



Description:

The MS8402 Stop Controller Card can control up to 20 stops. The master system can support a total of 64 Stop Controller cards for an overall system size of up to 1280 stops. There are no special wiring requirements for stops with the MS8402. Stops can be easily organized into divisions, and made into couplers or reversibles using the friendly touch screen interface of the MS8405. All outputs are fused and each output is short circuit protected.

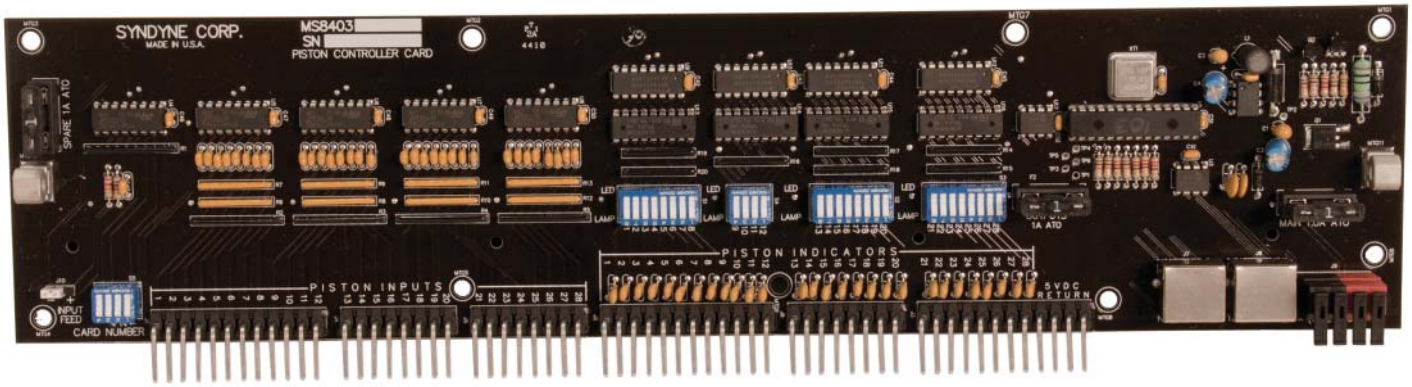
Dimensions:

Length: 15"
Width: 4"
Height: 1-1/2"

Features List:

- Modular design allows the builder to expand their system in increments of 20 stops
- If a single card is damaged, the rest of the stop cards continue playing
- Stops on the same card can be grouped into different divisions
- Any Stop can be configured as a coupler, and/or MIDI Stop
- Each card stores up to 5000 memory levels across 50 organists
- Each organist has two separate 60 step crescendos with 4 memory levels
- Each organist has two Tuttis/Sforzandos with 4 memory levels
- Blind check for crescendos, tuttis and ventils
- Organist memory levels can be protected by an access code
- Organists can easily copy their memory levels
- Organists can copy memory levels from other organists
- Configurable output pulse time
- outputs are fused and each output is short circuit protected
- Available in either a positive or negative output drive
- Selectable Stop Sense polarity
- Configuration can be backed up to a USB flash drive
- Standardized firmware that can be upgraded using a standard USB flash drive
- Easily Configurable on site using the touch screen Control Panel (MS8405). No PC required

MS8403 Piston Controller Card



Description:

The MS8403 Piston Controller Card accommodates up to 28 lit pistons and is expandable up to 224 piston per console. Pistons are fully configurable through the touch screen control panel, MS8405. Piston indicator drivers can be configured to drive either an LED or a lamp.

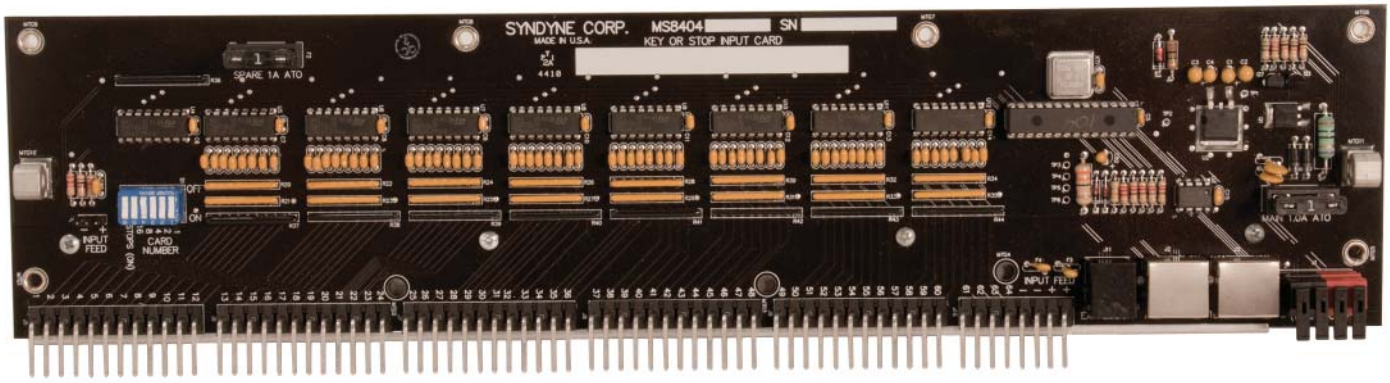
Dimensions:

Length: 15"
Width: 4"
Height: 1-1/2"

Features List:

- Modular design allows the builder to expand the system in increments of 28 pistons to a maximum of 224 piston in each of 4 consoles
- Pistons on the same card can be configured to operate on different divisions
- Any piston can be configured as a General, Divisional, Reversible, Blind Reversible or for a special function such as Memory Level Up or Manual Transfer
- Card includes 28 negative indicator drivers that can drive either a lamp or LED
- If a single card is damaged, the rest of the piston cards continue working
- Pistons do not need to be multiplexed
- General Piston Sequencer
- 2 different configurable Manual transfers between any 2 divisions
- Any number of Stops can be canceled with “Reversible with cancel” Piston configuration
- Extensive list of “special function” piston configurations are available
- Selectable Piston Sense polarity
- Built in diagnostic tool will display each Piston’s configuration
- Easily Configurable on site using the touch screen Control Panel (MS8405). No PC required
- Firmware that can be upgraded using a standard USB flash drive
- Configuration can be backed up to a USB flash drive

MS8404 KEY INPUT CARD



DESCRIPTION:

The 8404 Key Input Card has 61 note inputs, an analog expression input and short circuit protected +/- Key Feeds. The Key Input cards continually scan the entire keyboard every 2 milliseconds. The keying is scanned twice and then transmitted throughout the system within 6 milliseconds. The expression input can be programmed to turn on outputs in the chamber.

DIMENSIONS:

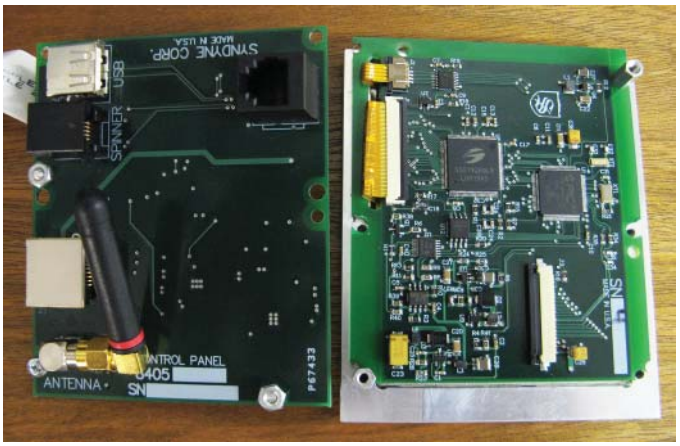
Length: 15"
Width: 4"
Height: 1-1/2"

FEATURES LIST:

- Modular design allows the builder to expand their system easily up to 32 divisions across 4 consoles
- Easily Configurable on site using the touch screen. No PC required
- Keying information is scanned and transmitted continually to the chamber
- Keying changes will reach the organ chamber within 6 milliseconds
- A protective active sense feature protects against stuck notes due to a severed data cable or failed Key Input card
- The expression input will work with either a 5k or 10k Ohm potentiometer
- Two Manual transfers can be easily configured
- Coupling is handled by the each Pipe Driver (MS8406) and is configurable on a Stop by Stop basis
- If one key input card is damaged, the remaining cards continue to play
- Selectable Key Sense polarity
- Built in diagnostics are available to show each note input number as they turn on

MS8405 Touch Screen Control Panel

Description:



The MS8405 Touch Screen provides the builder and organist with the latest technological advances in organ control systems. This single display provides security, intuitive configuration, and scalable control. If additional display real estate is desired, a second LCD display can be installed to provide continual access to indicators such as memory and crescendo level. The MS8405 simplifies the installation process and provides the organist with something to brag about.

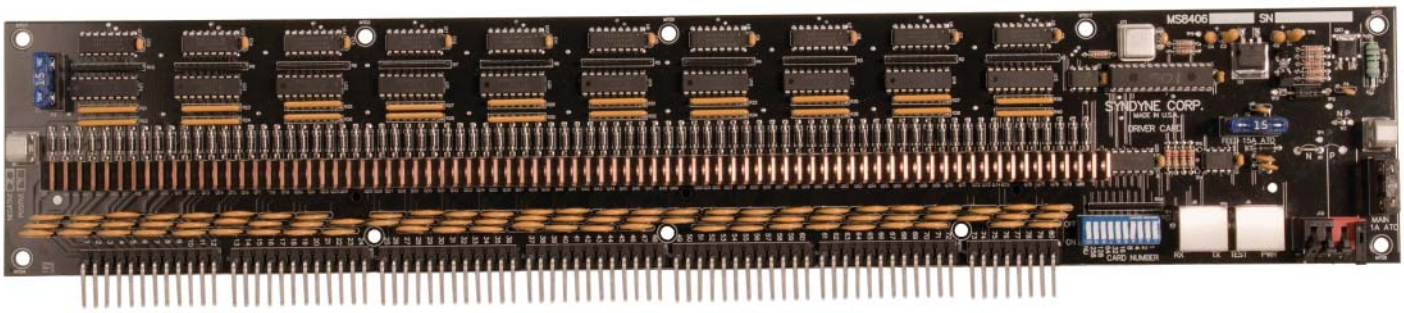
Dimensions:

Length: 3-1/4"
Width: 4-1/4"
Height: 1-3/4"

Features List:

- Primary display for the MS8400 Master System
- Uses a premium LCD display and touch screen with significant lifetimes
- Smart design allows for flexible mounting scenarios
- Screen can be used to secure the pipe organ with multiple access codes
- Allows the setup and customization of up to 50 organists
- Each organist has a customizable performance screen
- Color Scheme and brightness customizable for each organist
- Configure the entire organ through this intuitive interface
- Provides an easy to use interface as opposed to cryptic Alpha Numeric displays
- Standardized firmware that can be upgraded using a USB flash drive
- Builder can allow or deny access to nearly all functions in the system
- Integrated RF remote control for record/playback and wireless tuning
- Built in MIDI Record and Playback functionality similar to the Syndyne Pro-Filer
- Multiple screens can be used to maximize organist's access to features
- Simple compact design provides easy and attractive mounting
- Configuration can be backed up to a USB flash drive

MS8406 Chamber Driver Card 80 Output



Description:

The MS8406 chamber driver has 80 outputs used to drive pipe magnets, swell motors, stop lines, and other outputs in the chamber. The MS8406's simple and versatile design grants the organ builder complete control over how the system plays the pipe organ. The builder can configure the chamber drivers from the comfort of the console and the configuration can be backed up to a USB flash drive in case of lightning strike or other damage to a driver.

Dimensions:

Length: 19"
Width: 4"
Height: 1-1/2"

Features List:

- The MS8400 can have up to 318 chamber drivers with 80 outputs each
- Modular design allows the builder to expand their system easily
- Each card has a 15 Amp main fuse and each output is capable of driving a 2 Amp load
- Each output is reverse voltage protected, over voltage and short circuit protected
- Borrows, Extensions and custom mixtures are easily configured
- Provides outputs for up to 128 stages of expression (spread across multiple cards)
- Stop Lines, Trap Line, Pizzicato pulse time are easily configured
- Accelerated note response for slider chests
- Built in diagnostic tool will allow discrete turn on each output
- Standardized firmware that can be upgraded using a standard USB flash drive
- Easily Configurable on site using the touch screen Control Panel (MS8405). No PC required
- Configuration can be backed up to a USB flash drive

MS8407 12 Position Rotary Selector Switch

Description:

The MS8407 Rotary Selector Switch is a small versatile switch that comes with a black anodized, satin finish knob and a choice of plates. This switch easily connects to the General Controller card (MS8401) with a standard cable and is suitable for a 12 position transposer or a 12 Bank/Level memory controller

MS8408 CAN Repeater Board

Description:

The MS8408 CAN Repeater is a very small versatile serial data repeater that can be used to create multiple console plug-in locations, extend data cable lengths or expand the number of available CAN network connections.

MS8409 Power Sequencer Board

Description:

The MS8409 Power Sequencer board can be connected into the serial CAN buss anywhere. Each Power Sequencer board has 4 fused 4Amp relays that can be remotely turned on and off either manually or automatically when the console is turned on.

Features:

- Expandable to 8 boards for a total of 32 relays.
- Each Relay has its own configurable delay timer
- Standardized firmware that can be upgraded using a standard USB flash drive
- Easily Configurable on site using the touch screen Control Panel (MS8405). No PC required
- Configuration can be backed up to a USB flash drive

MS8410 MIDI Sound Module Board

Description:

The MS8410 MIDI Sound Module Board can be connected into the serial CAN buss anywhere and will convert keying, expression and stop data into MIDI messages for a MIDI sound module to interpret. An optional temperature sensor can be added for automatic tuning.

Features:

- Expandable to 8 boards for a total of 8 discrete MIDI Sound Modules
- Coupling/Non-coupling option
- GM2.0 compliant (Bank Select Messaging)
- GM1.0, Rodgers MX200 and Viscount CM100 Voice tables
- Configurable first and last keyboard notes (handy for extensions)
- Configurable Minimum Expression
- Octave transposing
- Configurable Midi Note On velocity
- Viscount CM100 Stop conversion
- Configurable Tuning source – Pitch knob or Temperature sensor
- Standardized firmware that can be upgraded using a standard USB flash drive
- Easily Configurable on site using the touch screen Control Panel (MS8405). No PC required
- Configuration can be backed up to a USB flash drive

MS8415 30 Segment LED Bar Graph Display

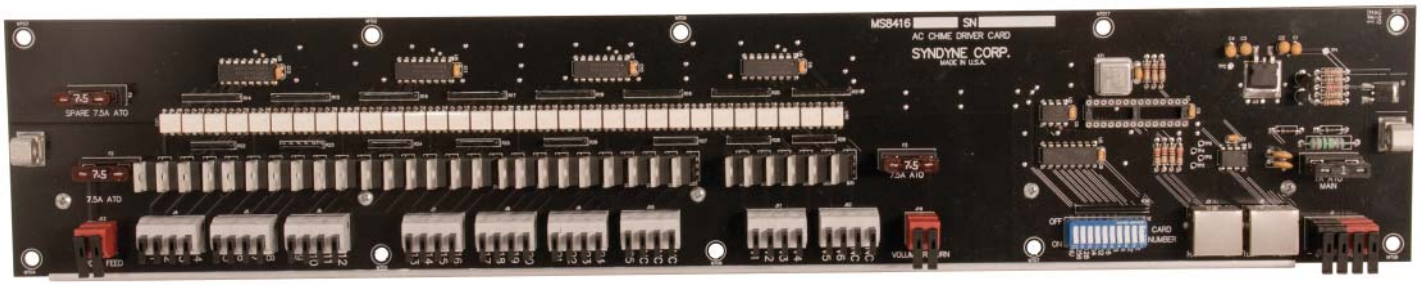
Description:

The MS8415 Bar Graph Display is a 30 segment red LED bar graph compatible with either Crescendo or Expression shoes.

Features:

- Configuration can be backed up to a USB flash drive
- Standardized firmware that can be upgraded using a standard USB flash drive
- Easily Configurable on site using the touch screen Control Panel (MS8405). No PC required

MS8416 25 Note AC Chime Driver



Description:

The MS8416 AC Chime driver has 25 note and 6 AC volume outputs. It is used to directly drive AC chime magnets. The 6 volume outputs can be connected directly to the chime volume transformer and controlled through a rotary switch in the console. The builder can configure the Chime Driver from the comfort of the console and the configuration can be backed up to a USB flash drive in case of lightning strike or other damage to a driver

Dimensions:

Length: 19"
Width: 4"
Height: 1-1/2"

Features:

- Modular design allows the builder to expand their system easily
- Each card has two 7.5 Amp main fuses and each output is capable of driving a 2 Amp load
- Spare 7.5 Amp fuse on each card
- Built in diagnostic tool will allow discrete turn on each output
- Built-in pluggable solder-less connectors
- Standardized firmware that can be upgraded using a standard USB flash drive
- Easily Configurable on site using the touch screen Control Panel (MS8405). No PC required
- Configuration can be backed up to a USB flash drive

MS8418 3 Digit LED Memory Level Display

Description:

The MS8418 Memory Level Display is a compact 3 Digit red LED Display just for memory levels.

Features:

- Configuration can be backed up to a USB flash drive
- Standardized firmware that can be upgraded using a standard USB flash drive
- Easily Configurable on site using the touch screen Control Panel (MS8405). No PC required

MS8420 CAN to Fiber Optic Converter Board

Description:

The MS8420 CAN To Fiber Optic Converter can be used to electrically isolate the organ chamber(s) providing a shield against lightning strikes or to extend data cable lengths.

Installing Equipment

Mounting Equipment With A Chassis:

The Syndyne MS8400 System normally comes in a self containing chassis. The chassis is a metal enclosure that with edge guides that each board can slide into. Thumb screws can be used to attach the board into the chassis securely. The chassis is fitted with mounting holes that allow it to be mounted straight to a flat mounting surface such as a sheet of plywood. Each board will come with a custom made PCB stiffener that helps the board to remain ridged within the chassis. Do not forget, Syndyne offers a wide variety of wiring and pre-assembly services that can make your installation easier.

Mounting Equipment Without A Chassis:

Boards can be mounted directly to a flat surface without using the chassis. The boards must be ordered with standoffs for this to be done, which requires an additional processing charge per board. This method takes up significantly more room and makes managing the boards, more difficult. Mounting the system without a chassis is completely possible, but not recommended.

Never route wires underneath an MS8400 system board. Shorting is likely to occur which can cause damage to the board, risk of fire, injury, and death.

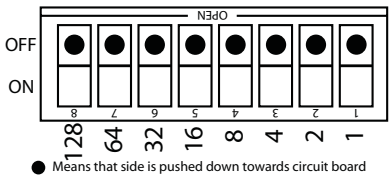
Recommendations For Laying Out Equipment Without a Chassis:

Our older systems were made without chassis, and in our years of wiring experience, we have come up with some standards which should help reduce your wiring time and improve your overall experience. Syndyne suggests that all boards be spaced at least 1/2" on edges without connectors and at least 2" for edges with connectors. This will leave sufficient room for wiring to exist between boards. It also provides enough room in the event that additional wires must be added after original wiring has been completed. Providing enough room prevents mistakes such as routing wires underneath boards. Also keep in mind that we still offer wiring solutions for our new system that do not require a chassis, although we strongly advice against it.

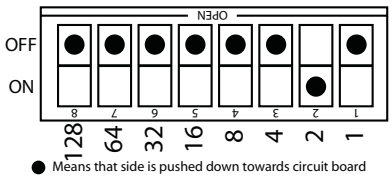
Addressing Boards

Addressing through dip switches:

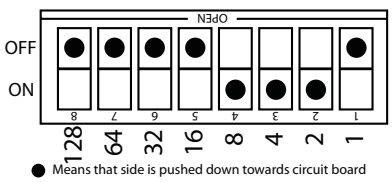
Each type of board in the MS8400 System requires a unique address number that is assigned through on board dip switches. To assign an address, turn on the DIP switches on each board so that the numbers add up to the desired address. It is important to remember that address 0 is a valid address. Here are some examples: To select address 0, turn all the switches off. To select address 1, turn all the switches to off except for switch number 1. To select address 3 turn on both switch number 1 and switch number 2. To select address 7, turn on switches 4, 2, and 1 which add up to 7. Below is a more visual example of numbering boards in the MS8400 System.



Board Address 0



Board Address 2



Board Address 14

Duplicate Addresses:

Duplicate addresses of the same board type can cause issues with configuration later. No long term damage or harm can come from duplicate numbers. Also, boards of different types can share the same number. So two MS8401 boards cannot share the same address, but an MS8401 and an MS8402 can both have the same address number. Also, the MS8403 can have duplicate card numbers in separate consoles.

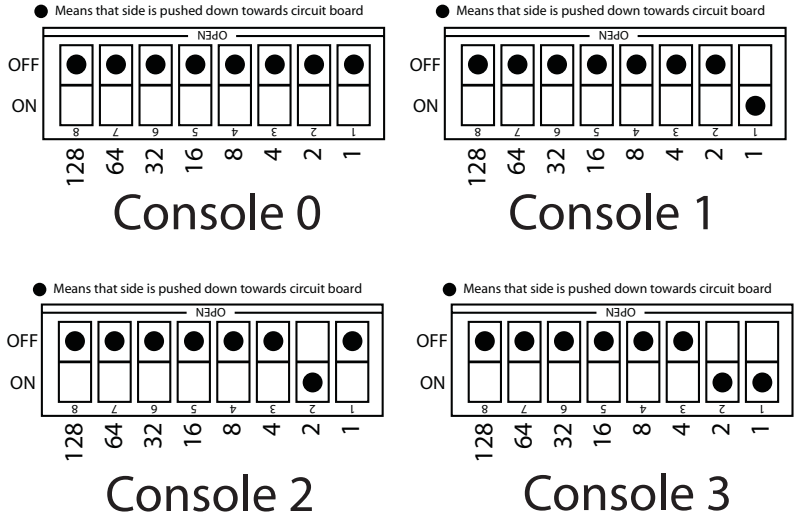
Assigning Console Numbers

8401 Console Numbers:

There is one MS8401 board for each console in an MS8400 system. MS8401 boards must each be assigned a unique console number between 0 and 3. The console number is assigned by on board dip switches.

Setting Console Number through DIP switches:

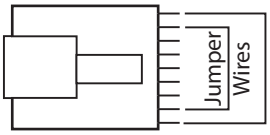
To assign a console number, turn on the DIP switches on each MS8401 so that the switch numbers add up to the desired console number. To select the Console Number 0, turn all the switches off. To select Console Number 1 turn on switch number 1. To select Console Number 2 turn on switch number 2. To select Console Number 3 turn on switch number 1 and switch number 2. To the right is an example of setting console numbers in the MS8400 System.



Wiring CAN Buss connection

CAN Buss Connection:

Each board in the MS8400 needs to be connected to the CAN buss in order to send and receive messages to the other boards in the system. The CAN connection is made through Standard RJ-45 ethernet cables. These can be purchased at a variety of lengths from Syndyne, most computer stores, or from companies online.

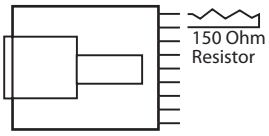


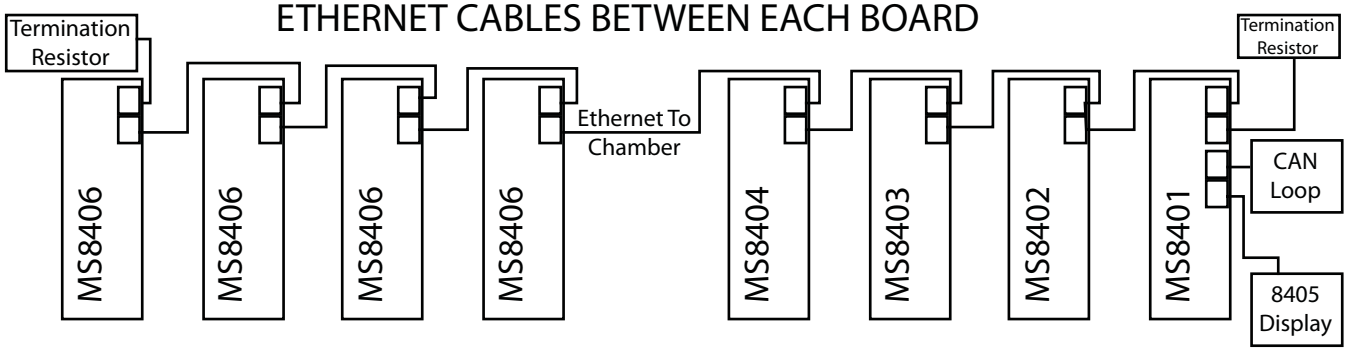
General controller-Touch Screen Display Loop Connector:

On the MS8401 General Controller, there are two display connectors. In most systems, only one of these connectors will be used. These connectors provide power and communications to the MS8405 Touch Screen Controller. If one of the display CAN ports is not used, an MS8400DJMP CAN loop must be connected. If it is left vacant, significant communication problems will result.

Termination Resistor Connector:

Every CAN connector in the MS8400 must be connected to prevent communication problems. The last board in every CAN run will have a vacant CAN port due to the fact that it is the last board to be connected. This empty CAN port must have an MS8400DTR Termination Resistor inserted.





IMPORTANT!! Every CAN port in the system has to have an RJ-45 Ethernet cable, CAN Loop, or CAN Termination Resistor. If any ports are left open this will cause problems communication problems throughout the entire system.

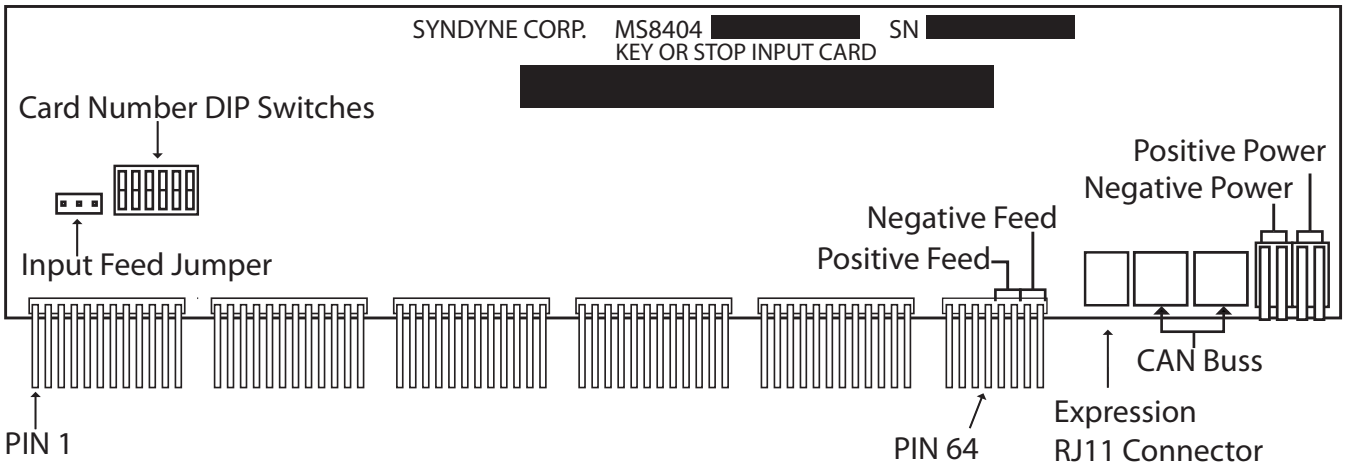
MS8408 CAN Repeater:

The MS8408 is designed to boost the CAN signal in systems where large quantities of boards and/or long cable runs are used. CAN repeaters are required in systems with over 100 boards. They can also be used in situations where multiple console connections are required. Remember that all ports on the MS8408 that are not being used must be populated with an MS8400DTR Termination Resistor.

WIRING KEYS

OVERVIEW:

In the MS8400 system there can be up to 32 divisions of keying including manuals and pedals spread accrossed 4 consoles. A single console could have 32 divisions, 4 consoles could have 8 divisions each, 1 console could have 5 divisions with a 3 division secondary console, or any combination in-between. Each keyboard or pedal board is wired into an MS8404 Keying Input Board with its own unique address between 0-31. Divisional and console information for each MS8404 is configured rather then hard wired in, which provides more flexibility and simplified wiring.



WIRING KEY CONTACTS:

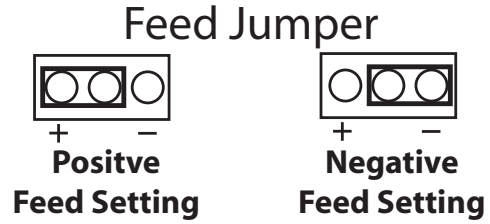
On the desired MS8404 begin wiring each key contact starting with the lowest key wired to Pin 1 on the MS8400. Wire the second key to pin 2 on the MS8400. Continue until all key contacts are wired to the MS8404. Most keyboards will end with pin 61.

WIRING KEY FEED:

The MS8404 has pins for either a negative or positive key input feed directly on board. Wire your feed to either the positive or negative key feed pin on the MS8404. Having the feed in the wiring bundle to the board helps your keyboards to be more removeable.

SETTING KEY FEED JUMPER:

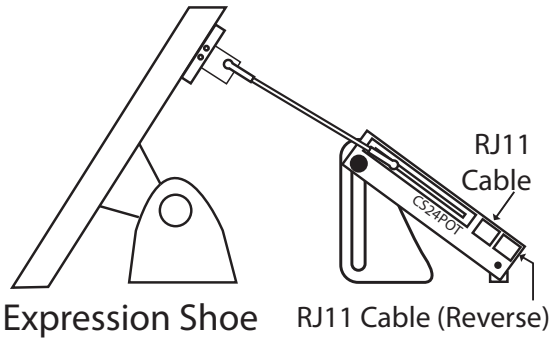
The MS8404 has a selectable key input feed on the board. Simply change the key input feed jumper to either a positive or negative setting as indicated by the picture to the right. Setting the key feed incorrectly will not damage the board, but the keys will not work until the key feed is set correctly.

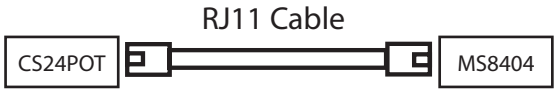


WIRING EXPRESSION

INSTALLING THE CS24POT:

The CS24POT is a potentiometer designed to mount on swell or crescendo shoes. It is highly adjustable and allows for easy connection to the MS8400 System. Simply mount the CS24POT to the shoe and connect an RJ11 cable to the Expression connector on the desired MS8404 Board. If the shoe operates backwards from what is desired, switch the RJ11 cable to the CS24POT second RJ11 connector. The second connecter reverses the shoe operation.

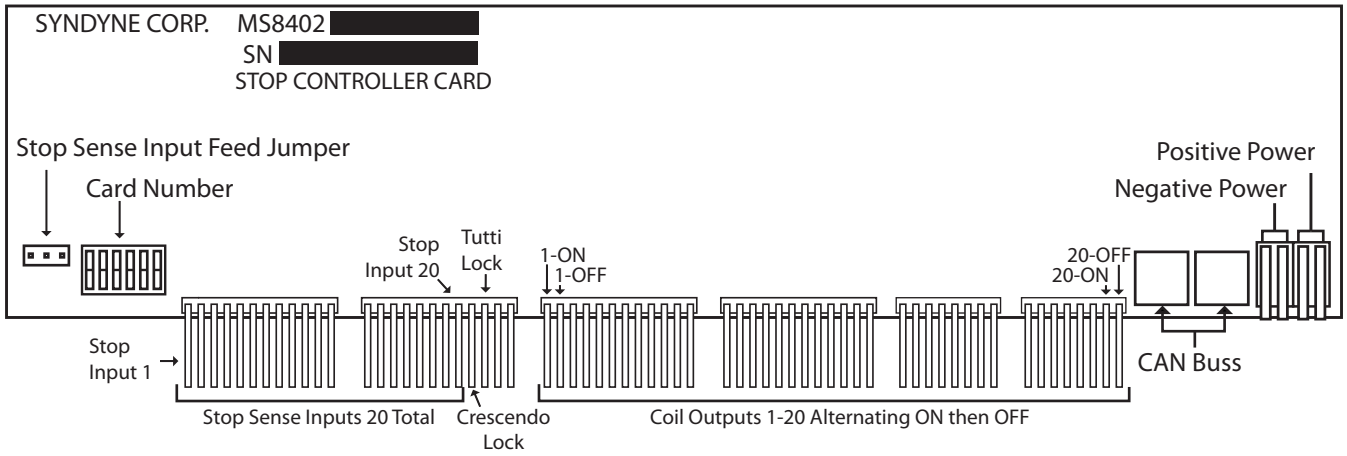




WIRING STOPS

OVERVIEW:

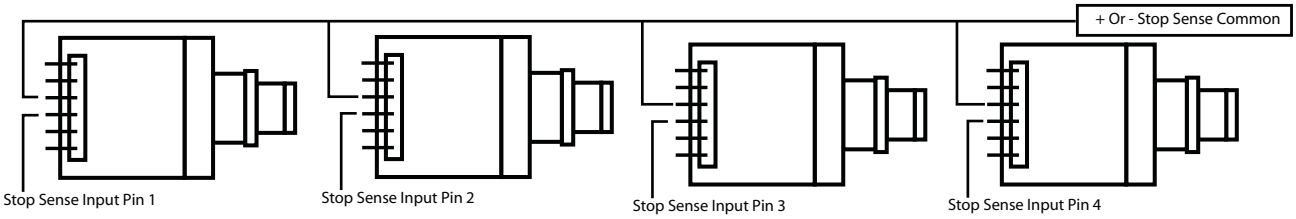
The MS8400 system can address up to 1280 stops. This is made up of 20 stops per MS8402 board. The stop inputs and ON/OFF coils are wired into the MS8402 directly which broadcasts each stops status to the entire system through the CAN Buss. The MS8402 is built for either a positive or negative coil common. The stop sense common can be selected by an on-board jumper.



WIRING STOP SENSE INPUTS:

In the MS8400 system, divisional information is configured through the control panel, not wired in. This means that you can wire any stop into any location and it can be configured to play in any division. Solder the first desired stop sense to the stop sense input pin 1 on the MS8402. Continue wiring the stop sense inputs until you run out of stops or solder to stop sense input pin 20. Any remaining stops get wired to the next MS8402 in the same way. Any unused inputs are left unconnected. Wire the other side of the stop senses to the stop sense common, which can be attached to either positive or negative by setting the Stop Sense Input Feed Jumper.

Wiring Syndyne SDK Stop Sense Inputs

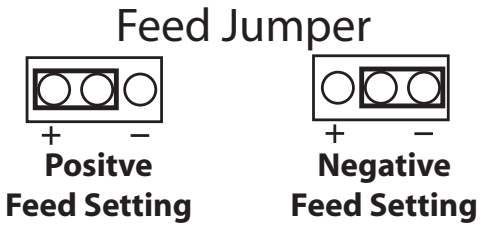


WIRING STOP ON/OFF COILS:

In the MS8400 system, divisional information is configured through the control panel, not wired in. This means that you can wire any stop into any location and it can be configured to play in any division. Solder the first desired stop sense to the stop sense input pin 1 on the MS8402. Continue wiring the stop sense inputs until you run out of stops or solder to stop sense input pin 20. Any remaining stops get wired to the next MS8402 in the same way. Any unused inputs are left unconnected.

SETTING STOP SENSE INPUT FEED JUMPER:

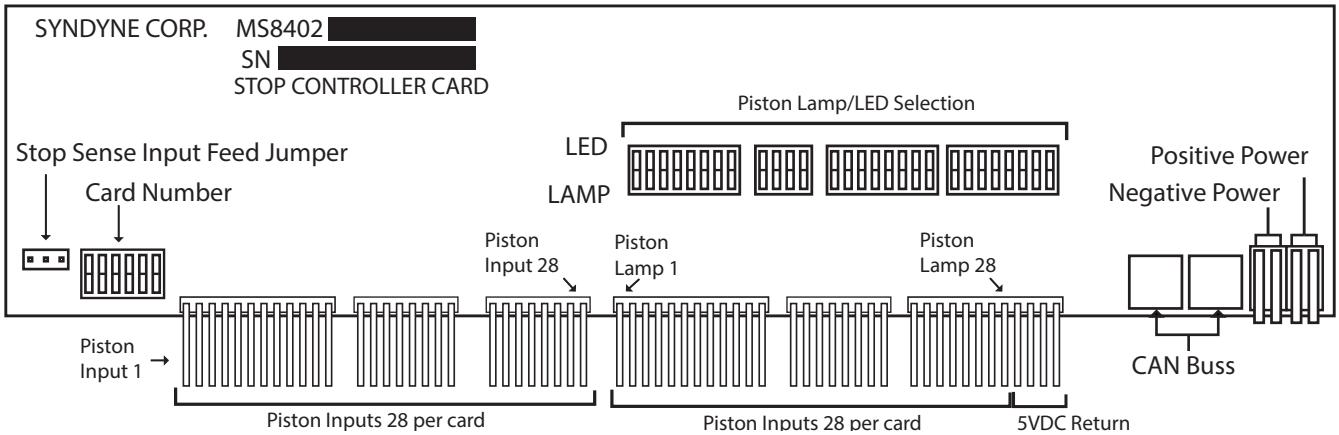
The MS8404 has a selectable stop input feed jumper on the board. Simply change the stop input feed jumper to either a positive or negative setting as indicated by the picture to the right. Setting the stop feed incorrectly will not damage the board, but the stops will not work until the stop feed is set correctly.



WIRING PISTONS

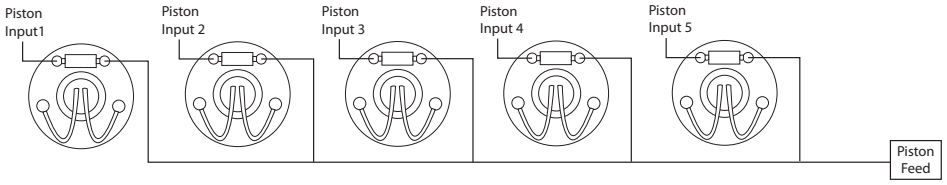
OVERVIEW:

The MS8400 system can address up to 224 pistons per console in up to 4 consoles. Pistons are wired to the MS8403 Piston Controller Card in increments of 28 pistons per board. Each piston can have a lamp or LED indicator attached to it if desired. The piston input feed can be either positive or negative and is selectable through an on-board jumper. A 5VDC return is available on board for piston lamps/LEDs.

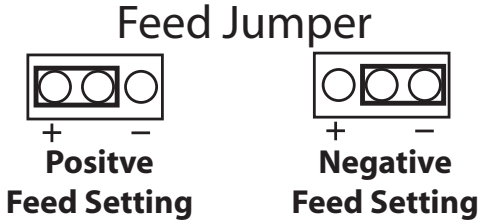


Wiring Syndyne Thumb Piston Inputs

WIRING PISTON INPUTS AND COMMON:



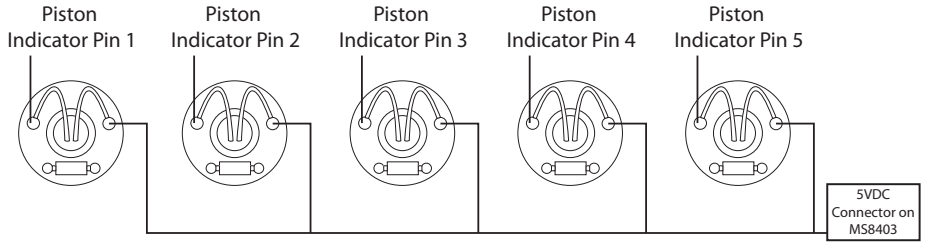
In the MS8400 system, divisional information is configured through the control panel, not wired in. This means that you can wire any piston into any location and it can be configured to play in any division. It is recommended to at least wire your pistons in order for ease of troubleshooting. To wire in piston inputs, take the first desired piston and wire one side of the switch contact to Piston Input 1 on the MS8404 and wire the other side to the piston common. Continue wiring until all pistons are connected. The piston feed can be wired to either positive or negative.



SETTING THE PISTON INPUT FEED JUMPER:

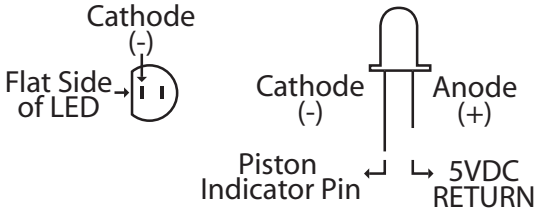
The MS8403 has a selectable piston input feed on the board. Simply change the piston input feed jumper to either a positive or negative setting as indicated by the picture to the right. Setting the piston feed incorrectly will not damage the board, but the pistons will not work until the piston feed is set correctly.

Wiring Syndyne Thumb Piston Lamps or LEDs



WIRING THE PISTON LAMPS/LED:

The MS8403 has corresponding indicator outputs for each piston input. It also has an onboard 5VDC return for the indicators. If using an LED wire the Cathode side to the corresponding Piston Indicator pin on the MS8403. Wire the Anode side to the 5VDC connector on the MS8403. When using a lamp, either side can go to the piston indicator input.

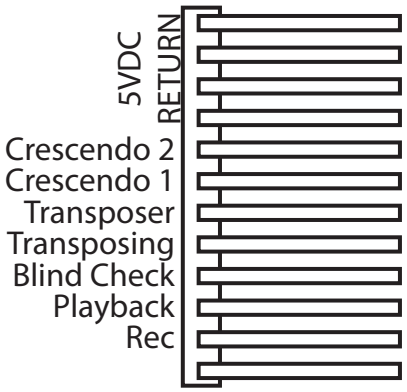


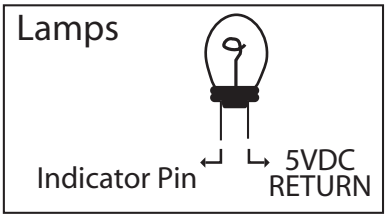
Note: The indicators must be set to either drive a Lamp or LED using the DIP switches on the MS8403. Turning the switch to OFF makes that indicator an LED turning it ON makes that indicator a Lamp.

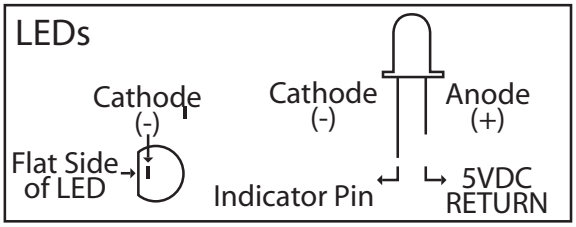
Wiring Additional Indicators

Wiring Indicators on MS8401:

The MS8401 has a connector that can be used to power additional system indicators such as crescendo, transposer, blind check, and record/playback. The method for wiring these indicators is the same as wiring piston indicators. When using LEDs, connect the Cathode side to the Indicator pin on the MS8401. Connect the Anode side of the LED to the 5VDC common on the MS8401. When using a lamp either side can be connected to the indicator pin on the MS8401 and the other side is wired to the 5VDC common on the MS8401.



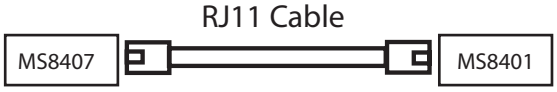




Wiring Rotary Selectors

MS8401 Rotary Selectors:

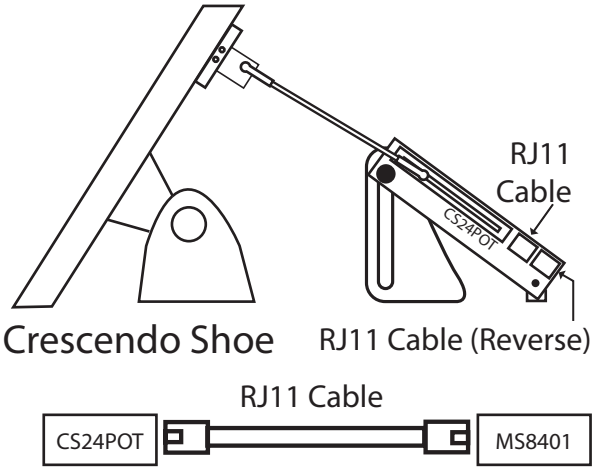
The MS8401 has 4 RJ11 connectors that can be used for Rotary Selectors. A cable with two RJ11 connectors is used to connect between the MS8401 and the MS8407 rotary selector switch. Possible functions for the rotary selectors are external transposer or memory control. The function of each rotary selector is configured by the touch screen control panel and is not port specific. Any MS8407 rotary switch can be connected to any of the 4 ports on the MS8401.



Wiring Crescendo, and Other Pots

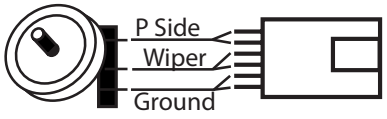
Wiring Crescendo:

The MS8401 has 4 RJ11 connectors for connecting potentiometers. The MS8400 system can have up to 2 crescendo shoes per console. Connecting a crescendo shoe to the MS8401 is done by using the CS24POT. This adjustable slide potentiometer mount is attached to the crescendo shoe. It has two RJ11 connectors used to connect to the MS8401 using an RJ11 Cable. Plug the RJ11 into the first RJ11 on the CS24POT and check the operation. If the operation is backwards, reverse the operation using the other RJ11 connector on the CS24POT.



Wiring Other Potentiometers:

The MS8401 has 4 RJ11 connectors for connecting potentiometers. In addition to two crescendo shoes, the MS8400 system can also accomodate MIDI-Pitch, MIDI-Volume, and MIDI-Tuning (for certain MIDI sound modules). These functions are connected using a standard 5k or 10k potentiometer. Connect the P side of the potentiometer, the Wiper, and the Ground to an RJ11 connector as shown in the drawing. Configuration is done through the touch screen control panel and is not connector specific.



MIDI Connection

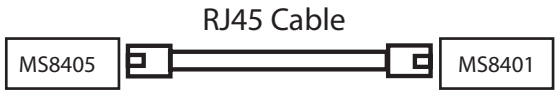
MIDI In, MIDI Out, and MIDI Thru:

The MS8401 has MIDI In, Out, and Thru connectors. These can be used to connect to an external Record and Playback unit, or connect a MIDI cable device, such as a keyboard, to control the MS8400 System's keys and tops.

Wiring the Touch Screen Control Panel

The MS8401 Display Connectors:

The MS8401 has 2 separate display connectors. At this time, only one display can be connected to the MS8400 system per MS8401 board. The second port will be used for an additional display for dedicated additional functionality. To connect the MS8405 to the MS8401, an RJ-45 Standard Ethernet cable is used. Simply connect one end of the RJ45 to the MS8405 and connect the other side to the MS8401.



External Power Connector:

An external power connector is located on the MS8401 in order to maintain power to the MS8405 display screen. This allows the user to power on the organ using the MS8405. It also maintains power to the real time clock so that any clock functions on the MS8405 keeps correct time. The external power connector uses a wall pack power supply that can be purchased from Syndyne.

Remote Control Antenna Connector:

The MS8401 has a connector for an antenna. If purchased, this antenna receives messages in from a remote control that can allow remote tuning and remote activation of record / playback. To connect the antenna, screw it onto the MS8405 board onto the connector labeled "Antenna." The remote control has a good range, although it changes drastically depending on its surroundings. For best results, mount the antenna as high as possible.

USB Connection:

The MS8405 can record and playback information sent to it through the CAN buss. The MS8405 can also save system configurations, programming information from system implementation, and backup user memory combinations. All these actions require a USB flash memory drive connected into the MS8405's USB connector. The flash drive can be plugged directly into the MS8405 or into a USB connector installed in the front of the console. The USB connector from the front of the console must be connected to the MS8405's USB connector for the USB flash drive to work.

Wiring Chest Magnets

Overview:

In the MS8400 system, the MS8406 Driver Cards have 80 outputs which can be configured to drive chest magnets, stop-lines, or swell motors. Each output on the MS8406 can drive down to a 10 Ohm load up to a 15 Volt power supply. Each stop control can be programmed to play at up to 7 different pitches per driver card. This allows the builder to split the chest magent wiring across multiple sets of outputs and even across multiple boards. We highly recommend to keep the chest wiring in a logical order, rather than overuse the flexibility of the system. For example, splitting chest wiring accross several different MS8406 cards in order to use every extra output in the system is possible, but makes trouble shooting and configuration more difficult. It is best to keep the majority of a chest's wiring in order on one or two MS8406 cards.

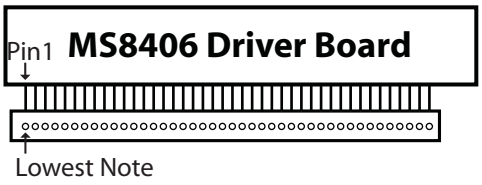
MS8406 Configuration In Regards to Wiring:

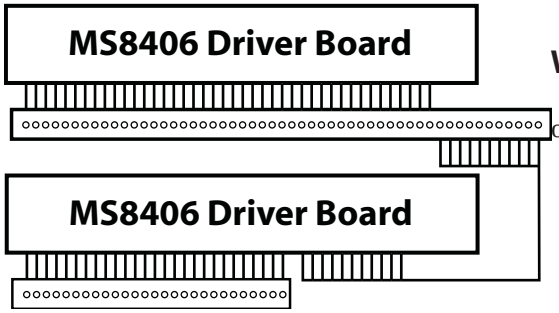
Understanding how the MS8406 cards are configured is critical to understanding how to wire chest magnets in the MS8400 system. A detailed description of configuring the MS8406 cards can be found in the MS8400 Configuration manual. It is highly recommended that this section is reviewed before wiring the MS8406 cards.

Example Wiring of Unit Chests

Wiring Ranks Under 80 Notes:

The MS8406 Driver Board is used to drive unit chests. We recommend wiring the lowest note on the chest to the lowest output pin on the MS8406. Continue wiring up the MS8406 until all the notes are connected to output pins. Any unused pins can be programmed as stop line outputs, expression outputs or note outputs for other ranks of pipes.





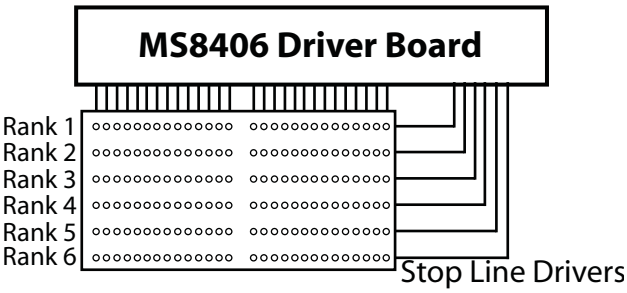
Wiring Ranks Over 80 Notes:

When a rank of pipes is over 80 notes, wire any additional chest magnets in order on another MS8406 Driver card's unused outputs.

Example Wiring of Main Chests

Wiring Main Chests:

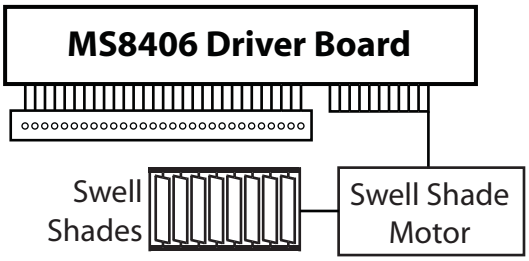
The MS8406 Driver Board is used to drive both the note magnets and stop magnets for mainchests. Simply wire the lowest note on the main-chest to pin 1 on the MS8406. Continue wiring up the MS8406 until all the notes have been wired. Use any leftover pins to wire to the Stop Lines. Any unused pins can be programmed as stop line outputs for another rank, or for expression outputs. See the respective sections for more information on wiring stop lines or expression outputs.



Wiring Swell Shades

Wiring The Swell Shade motor:

The MS8406 is used to provide outputs for a swell shade motor. Simply wire the input contacts on the swell shade motor to any leftover outputs on a MS8406 Driver Board. The outputs can be taken from any MS8406 in the system as long as it has remaining outputs. Outputs from several different MS8406 boards can be used if desired, although it does make the wiring more complicated. It is recommended not to put more than one swell shade motor on a single MS8406 card.



TIPS AND TRICKS

SOLDERING TECHNIQUES:

Wiring the MS8400 can be quick and easy if the proper technique becomes familiar. Although there are many ways to make a solder joint, the wiring team at Syndyne has found a simple method that provides a quality connection as quickly as possible. It is important to remember that as with anything else in life, soldering becomes easier with practice, so it is best not to become discouraged if the process seems difficult in the beginning. Here is the syndyne wiring team's suggested soldering method.

1. Strip the wire or wires that will be used in the solder joint.
2. Place shrink tube on the wire(s) as far away from the bare end of the wire as possible. When soldering, the wire heats up close to the solder joint, and this heat can shrink the shrink tube before it is ready to cover the joint.
3. Use a damp sponge to clean any old solder from the tip of the soldering iron before tinning.
4. Apply some solder to the tip of the soldering iron and place the solder from the tip of the iron to both the bare end of the wire(s) and the connector terminal. This process is called pretinning and is highly recommended for increased speed, accuracy, and joint integrity.
5. Use a damp sponge to clean any old solder from the tip of the soldering iron.
6. Apply solder to the tip of the soldering iron.
7. If single soldering, hold the pretinned wire on the pretinned connector terminal.
   If double soldering, hold both pretinned wires parallel with eachother. Hold both wires on the pretinned connector terminal.
8. Place the tip of the iron on the connector end of the bare wire(s).
8. Once the solder flows over the connection, run the iron over the wire up to the shielded end of the stripped wire. Do not touch the wire shielding with the iron or it may melt.
9. Let the solder joint cool and test its integrity by pulling lightly on both the connector and the wire in opposite directions.
10. Do not pull shrink tube over the solder joint at this time. First, complete all wiring to the connector then pull up and heat the shrink tube for each solder joint all at the same time. Otherwise, the shrink tube from one wire can get in the way when solder ing the wire next to the shrink tube.

Syndyne now has a training video available on YouTube showing our soldering techniques. Check out our YouTube Channel for this video as well as videos on other Syndyne Products. You can find our channel at www.youtube.com/syndyneco