



MIDI Patch Changer User Guide

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1: Introduction

The MIDI Patch Changer is the perfect solution when you need to control MIDI presets for one or more devices, but a giant keyboard controller or a MIDI footswitch/pedalboard just won't do.

The MIDI Patch Changer has all the features you'd expect in a full-featured patch-changing controller.

- **Manual Operation.** Manual Mode is used to key-in or scroll-through Program Change messages with or without MIDI Bank Select messages.
- **Preset Operation.** Preset mode is for live or studio performance situations. The unit can send a complete set of 16 patch and bank select changes *for every Preset*. Each Preset can contain up to 180 bytes of other MIDI data too!
- **Speed-Dials.** Pick your 9 favourite Presets and access them at any time using a hot-key¹.
- **Chain Operation.** Chain Presets together into a list that you can navigate through.²
- **Expandable and upgradeable.** The MIDI Patch Changer is programmable including re-flashing the firmware.
- **Durable.** Made with high-quality switches (50 million+ operations) on a metal sub-frame.
- **Stable.** No PC operating system to worry about crashes, hang-ups or viruses.

The standard unit includes:

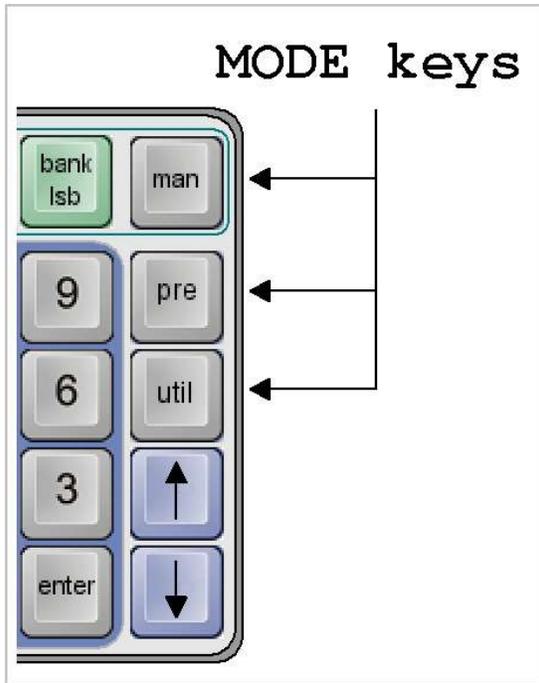
- 20-key keypad with 16-character **backlit** liquid crystal display (LCD).
- Power adapter (110-240v AC input to 5v DC output).
- Rear-panel RJ connector supports multiple cable types.
- RJ-to-USB cable for USB-MIDI connection (using OS built-in driver).
- RJ (Cat-5) cable for 5-pin DIN MIDI In and Out (on small external box).
- System Exclusive implementation for reading/storing the Presets and other settings.

¹ v3.10 or later.

² v3.10 or later.

Understanding the Keypad

The Mode Keys:



The MIDI Patch Changer has three major function groups (modes).

- Manual Mode is for sending patch changes by hand “on-the-fly”.
- Preset Mode is for sending pre-arranged patch changes and MIDI data during live performance.
- Finally there is a Utility Menu for changing the keypad preferences.

The three MODE keys indicated by the arrows (see diagram left) are used to change the operating mode of the keypad.

The Numeric Key Section:

The numeric key section is used for manually entering Patch Change and Bank Select numbers (in decimal). In each case the number range can be 0 to 127 or 1 to 128 to match the receiving MIDI device. Future updates may allow for alphabetic patch numbers (some vintage synths collect patch sets of 8 or 16 into “banks” called A, B, C, D, etc.).

In addition the ENTER keys serves as a yes/confirm key in certain menus and likewise the CLEAR key serves as a no/escape.



The Arrow Keys:

The up and down keys are active in all three operating modes. They are used to manually scroll through banks and patches in Manual Mode, to manually scroll through Presets or Chains in Preset or Chain Mode (respectively), and to navigate the Utility Menus.



The Other Keys



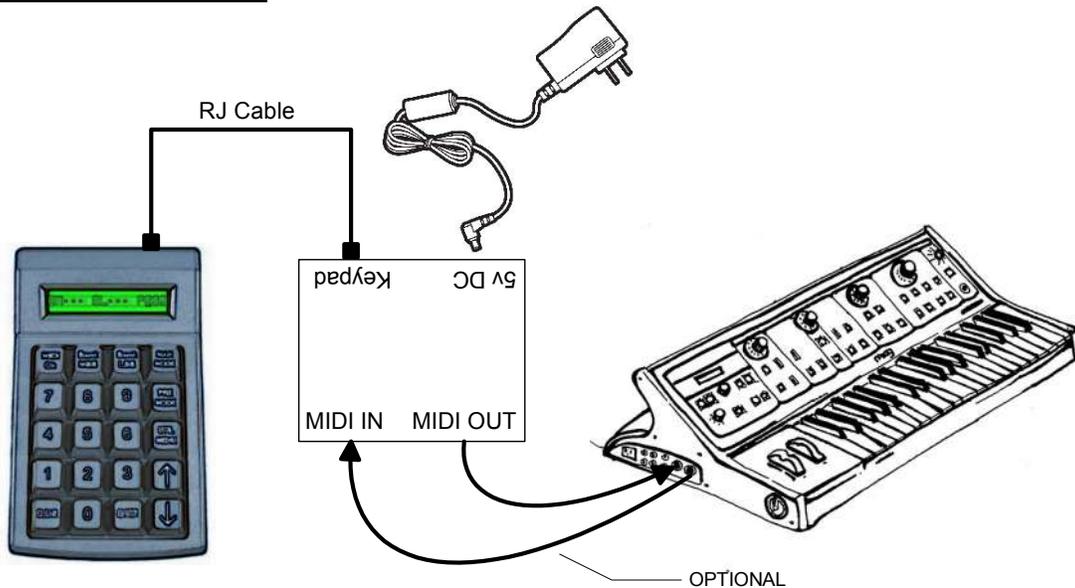
The MIDI Channel key is used to change the transmit channel for patches in Manual Mode as well as to review the settings for each MIDI channel in a Preset (or Chain).

The Bank MSB and Bank LSB are used to select/enable/disable the sending of Banks Select messages in Manual Mode. In this mode they act like a mute button.

Hooking Up

There are several ways to connect the MIDI Patch Changer to your gear and/or PC.

5-Pin DIN MIDI Gear

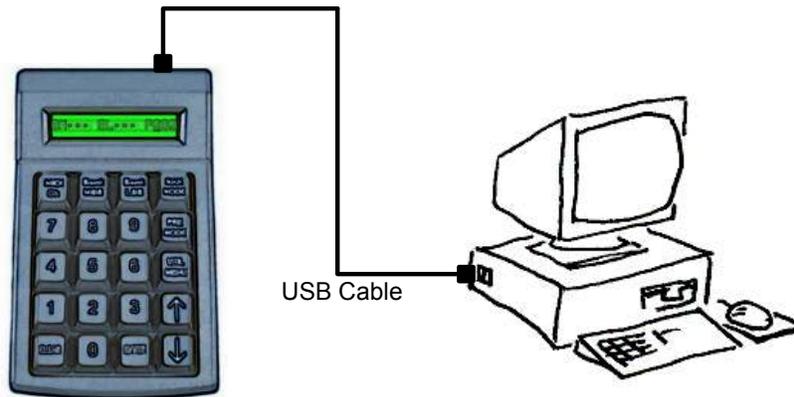


If you need to connect to **5-pin DIN MIDI** gear, then use the supplied Cat5 cable and supplied MIDI adapter box.

- Plug the short Cat5 cable into the back of the keypad and into the RS232 MIDI adapter box.
- Plug the supplied DC power adapter into the wall socket and then into MIDI adapter box.
- Then hook your MIDI gear into the IN and OUT jacks on the MIDI adapter box.



USB to PC (Sequencer, Soft Synth, etc.)



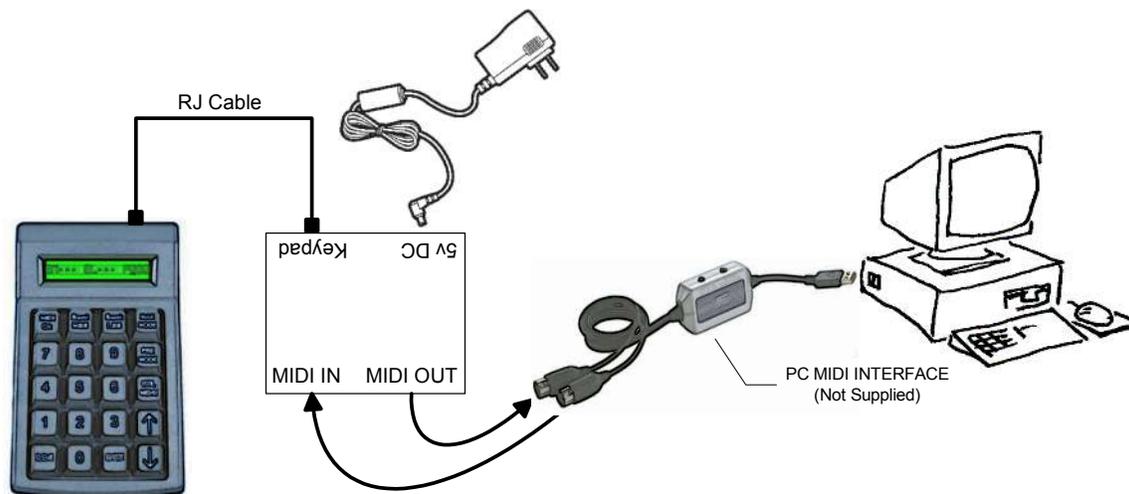
If you are hooking the MIDI Patch Changer keypad to a **PC that has USB**, then you can use the supplied RJ-to-USB cable:

- Connect the RJ end into the back of the keypad
- Then connect the USB connector into your PC or USB hub



The PC (Mac or Windows) will use the basic class drivers supplied with the OS. No additional driver is needed.

Alternate USB to PC (Firmware Upgrade, Configuration, etc.)



2: Manual Mode

In Manual Mode you can send one, two or all three of the following standard MIDI messages on the MIDI channel of your choosing:

Program Change (always transmitted)

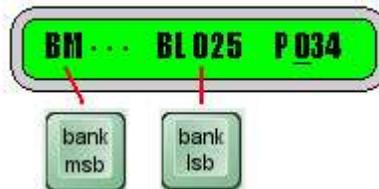
CnH	1100nnnn	0pppppppp	Program Change pppppppp: program number (0-127) nnnn: MIDI Channel number (1-16)
-----	----------	-----------	--

Bank Select MSB - Controller number 0 (optionally transmitted)

Bank Select LSB - Controller number 32 (optionally transmitted)

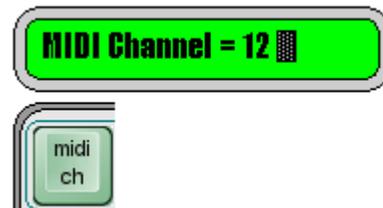
BnH	1011nnnn	0ccccccc 0vvvvvvvv	Control Change ccccccc: control # vvvvvvvv: control value
-----	----------	-----------------------	--

The LCD will show what the current patch value is and what components are enabled or disabled. If one or both of the Bank Selects is disabled (muted), then the LCD will show “...” next to the name on the LCD. For instance, on the LCD shown below, the Bank MSB is not enabled, the Bank LSB value is 25 and the Program Change value is 34³.



MIDI Channel

Once you have your cables hooked up, the first thing you should do is set the MIDI channel used for manual mode. This is done by pressing the **MIDI CH** key and using the **Up** or **Down** arrow keys to scroll to the channel you want (1 to 16). Alternatively you can erase the displayed value using the **CLEAR** key and then type in the



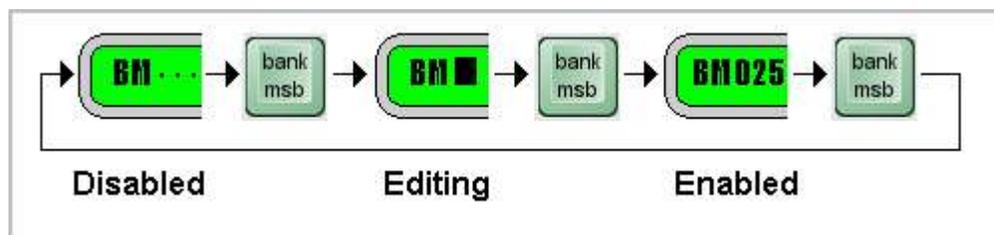
³ As per common convention, Bank numbers range from 0 to 127 and Patch Change numbers range from 1 to 128. In both cases the underlying MIDI messages use the number range 0 to 127.

channel you want and then press **ENTER**.

Press **ENTER** to save your new MIDI channel number. You can abandon your changes by pressing **MIDI CH** a second time. The MIDI Channel value will be retained even if power is lost.

Enable/Disable Banks Select(s)

The Bank Select MSB and Bank Select LSB can be enabled and disabled by repeated depressing of their respective keys.



When the Bank Select is disabled (muted), the three dots appear: "...". When the value is being editing the cursor is flashing over the value being edited. When the value is solid then the value is enabled for transmitting. Normally, when not editing a bank value, the cursor is flashing over the program change value at the far right of the LCD since this is the value you will be changing most often.

To Change a Bank Value Without Sending

This allows you to establish what patch you want to send, but not send it yet. Press one of the **Bank Select** keys until you are in the edit mode (cursor flashing on the bank value). Enter the new value for the Bank Select using the number keys. Press the same **Bank Select** key again (do NOT press Enter). This changes the value on the display but does not transmit anything.

To Change a Bank Value With Sending

To Edit a Bank Select and send it immediately (along with the current Patch value), press one of the **Bank Select** keys until you are in the edit mode (cursor flashing on the bank value). Enter the new value for the Bank Select using the number keys. Press **Enter**.

To Send the Bank and Patch Values

While in Manual Mode, pressing **Enter** at any time causes all of the displayed (enabled) data to be transmitted.

Scrolling through Patches

With the cursor flashing on the Patch value, pressing an **Up** or **Down** arrow key causes the displayed patch value to be incremented or decremented by one, and the new displayed (enabled) data to be transmitted.

If the Patch value overflows or underflows, then the Bank Value (if enabled), is modified by one also. This allows you to scroll seamlessly over bank boundaries in both the forward or reverse direction.

Using the Arrow Key on a Bank Select

To quickly change to the next or previous bank, put one of the Bank Select value in edit mode and press the desired **Up** or **Down** arrow key. This will cause the Bank Select value to change by one, followed by transmission of enabled data.

3: Preset Mode

Preset mode allows you to pre-configure the keypad for performance situations where you need to change patches on a lot of gear with minimum fuss. In this mode you can set up to 16 patch/bank changes per Preset (one per MIDI channel). Of course you will need to set these values up ahead of time. This is normally accomplished by using the Librarian Software or by manually sending System Exclusive dumps (see Appendix A for a description of the System Exclusive implementation).

There are 200 Presets (1-200) and you can move through them using the number pad or with the arrow keys (either “browsing” or “live” depending on user preference).⁴



The number on the left indicates the Preset number. The user name for the patch is shown on the right. It consists of (up to) thirteen ASCII characters. Each time a new Preset is selected the keypad can transmit any or all of the following information:

Blank Preset Sheet

Pre-Patch Arbitrary MIDI Data:			
MIDI Channel	Bank Select MSB (0-127)	Bank Select LSB (0-127)	Program Change (1-128)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
Post-Patch Arbitrary MIDI Data:			

⁴ As of v0.76 Preset browse mode allows for scrolling through the presets with the arrow keys without transmitting. Use Enter to transmit the preset you browsed to. This is defined in a UTIL setup menu.

Changing Presets By Number

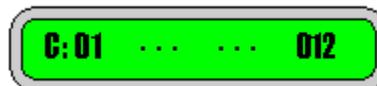
When you begin to type in a number on the **number pad**, the display briefly changes to show only the number being entered in.



When you have completed typing in the Preset number you want, press the **ENTER** key. The complete Preset will be transmitted and the display will return to the standard screen. While entering the number, you can also edit the value using the **CLEAR** key.

The MIDI Channel Key

In this mode, the MIDI Channel key is used to browse through the table values shown on the previous page. Select a Preset using the number pad or the arrow keys. Press **MIDI CH**. The display will show, for each MIDI channel, what elements are being transmitted. Again, values that are disabled are shown with three dots: "...".



The LCD elements shown from left to right are:

- The **C:** indicates that you are browsing the data for each MIDI channel.
- MIDI channel (1 to 16).
- Bank Select MSB (user settable).
- Bank Select LSB (user settable).
- Program Change (user settable).

You can then use MIDI CH or the arrow keys to scroll through the MIDI channels and see what you have previously programmed into the device. Any other key exits this browse mode (acts as an Escape key).

Arbitrary MIDI Data

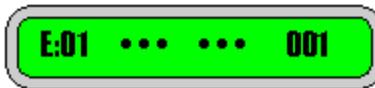
Each Preset can also send up to 90 bytes of arbitrary MIDI data **before** and up to 90 bytes of arbitrary MIDI data **after** the patch change data. This data cannot be edited on the device at this time. Use the Librarian Software (PC Editor) to configure this data.

4: Editing Presets (on the keypad)

You can edit the individual Presets on the device or by sending new values using System Exclusive. To edit a Preset on the device, while in Preset Mode, press **PRE MODE** (again). You will be asked to verify that you want to edit the current Preset:



Press **ENTER** to confirm or **CLEAR** to go back to the previous Preset. In Edit Preset mode the LCD screen information starts with **E:**.



You can cycle through the various edit screens using the **PRE MODE** key.

Sub-menu	Navigation
Edit Patch Change Data	<small>PRE Mode Key</small> 
Edit Name	
View Pre-Patch MIDI Data	
View Post-Patch MIDI Data	
Save Preset Confirm	

Modifying the Preset

In Preset Edit mode, the editing is similar to the Manual Mode.⁵

MIDI CH lets you scroll through the list of 16 MIDI channels and on each one you can assign a Bank Select MSB and/or a Bank Select LSB and/or a Patch Change value.

Bank MSB moves the cursor to the Bank Select MSB if the cursor is not there already. If it is, then it enables/disables it. If the Bank Select MSB is enabled and the cursor is flashing on its position, then you can modify the value using either the arrow keys or typing a new value on the keypad.

Bank LSB moves the cursor to the Bank Select LSB if the cursor is not there already. If it is, then it enables/disables it. If the Bank Select LSB is enabled and

⁵ There is no method currently to modify the pre and post arbitrary MIDI data fields on the keypad.

the cursor is flashing on it's position, then you can modify the value using either the arrow keys or typing a new value on the keypad.

MAN MODE takes on the role of PATCH CHANGE. It moves the cursor to the Patch Change value if the cursor is not there already. If it is, then MAN MODE enables/disables it. If the Patch Change is enabled and the cursor is flashing on it's position, then you can modify the value using either the arrow keys or typing a new value on the keypad.

Editing the Preset Name

Press **PRE MODE** again and you will be prompted for the name you wish to assign to the Preset. The LCD screen shows **N? :** to indicate that it is in name editing mode.

Use the **UP** and **DOWN** arrow keys to change each character value (see table). **ENTER** moves the cursor to the right and **CLEAR** moves it to the left.

You can also use the **0 to 9** keys to enter numbers directly.

If you wish to blank out the name in order to start editing with a blank slate, press **CLEAR** until the cursor is at the far left. Press it one more time and the display shows "**Clear Name?**". At this point you can press **ENTER** to confirm or **CLEAR** to abandon name clearing.⁶

		HIGHER 4BIT (D4 TO D7) of Character Code(Hexadecimal)							
		0	1	2	3	4	5	6	7
HIGHER 4BIT (D0 TO D3) of Character Code(Hexadecimal)	0			sp	0	P	`	P	
	1		|	!	1	A	a	9	
	2		|	"	2	R	b	r	
	3			#	3	C	s	c	s
	4			\$	4	D	T	t	t
	5			%	5	E	e	u	u
	6			&	6	F	f	v	v
	7			'	7	G	g	w	w
	8			(	8	H	h	x	x
	9			)	9	I	i	y	y
	A			*	:	J	j	z	z
	B			+	;	K	k	{	{
	C			,	<	L	l	|	|
	D			-	=	M	m	}	}
	E			.	>	N	n	~	~
	F			/	?_	O	_	o	o

LCD character table

⁶ v3.10 and later.

Pre/Post-Patch Arbitrary MIDI Data

Press **PRE MODE** one more time to take you to the screen that shows the first 6 bytes of Arbitrary MIDI Data (if used). The LCD shows **Pre:** followed by the data, if any. One more press and the LCD shows **Pst:** followed by the data, if any.

Saving

To save the Preset, press **PRE MODE** one more time and you will be prompted to save the changes. Here you can also edit the Preset number. This allows you to save the Preset to the same location or you can copy the Preset to a new location. Once you set the number of the Preset location you want to save to, Press **ENTER** to confirm the save.

Alternatively, pressing **PRE MODE** again takes you back to editing without saving.

Abandon Changes

If you want to abandon the changes, press the **UTIL MENU** button to switch out of editing.

5: Using Speed Dials

Preset Mode Speed Dials

You can select any 9 Presets and assign them to be Speed Dials (favourites). Once they are assigned, you can launch a Speed Dial from the Preset screen by pressing and holding **CLEAR** and then tapping on one of the speed dial numbers **1 to 9**.

When you press and hold CLEAR, you will see



As soon as you tap on the number key, the Preset you have assigned will be fired off and the screen will reflect that you have sent that Preset:



The new Preset will now become the active Preset and the LCD will reflect that:



A Speed Dial can contain any valid Preset number from 1 to 200. If the number is out of range (say 0 or above 200), then the Speed Dial is considered “empty” and you will see “....” when you look at the value from the edit menu.

Assigning Speed Dials (on the keypad)

Speed Dials (favourites) as assigned using the Utility Menu or by sending Set Parameter MIDI commands using System Exclusive.

See **Section 8: Utility Menu** on how to configure your keypad using the setup menus.

6: Chain Mode

If Presets can be likened to parts in a song (verse, chorus, etc.), then Chains can be likened to songs. You can link 18 Preset “parts” into a Chain “song” that can be navigated through quickly and easily. The device will store 99 Chains.

Chains can be created and edited on the keypad or they may be created using a PC editor and downloaded to the keypad using System Exclusive MIDI commands.

Accessing Chain Mode

Chain mode is a variation on Preset mode, so it is accessed using a special key combination. From within Preset mode, **press and hold the CLEAR key**. While the key is held down you will see the following message on the LCD:



Now tap the **PRE MODE** key. The unit will switch to Chain Select mode and you should see something like:



The display is very similar to the Preset one. In this case the first element is the Chain number (1 to 99) followed by an arrow, followed by the Chain name.

Leaving Chain Mode

You can leave Chain mode in several ways, depending on what you want to do. **MAN MODE** will take you to Manual mode and **UTIL MENU** takes you to the setup menus. If you want to go from Chain mode directly to Preset mode then you need to make use of the CLEAR key again. In this case, **press and hold the CLEAR key**. While the key is held down you should see the following message on the LCD:



Now tap the **PRE MODE** key to return to regular Preset mode.

Chain Select (Browsing)

While in Chain Select mode you can see the Chain number followed by the Chain name. At this point you are browsing through the Chains and nothing is being sent over MIDI. You can browse by using the **Up** and **Down** arrow keys.

Chain Run

As you are browsing through the Chains using the arrow keys, you can launch the Chain using the **ENTER** key once you have located the Chain you are interested in. Alternatively, while browsing, you can simply enter the number of the Chain you want using the **0 to 9 keys** and then press **ENTER**. Using either method, once you launch the Chain, the first link in the Chain (the first Preset) is immediately transmitted over MIDI. You will also see the LCD change to reflect that you are now in Chain Run mode.



The C:01 indicates that Chain #1 is running. The first number (001) is the current Preset. This will be one of the Preset numbers from 1 to 200. This data has already been sent over MIDI. Then we see the Chain mode “arrow” again. Finally we see the second number (002). This is the next link (next Preset) in the chain. Again it will be another Preset number from 1 to 200.

You move forward and backward in the Chain using the **Up** and **Down** arrow keys. Each time you press an arrow key, the new current Preset is transmitted.

At any time if you press the **ENTER** key, the current Preset will be re-transmitted.

The end of the Chain is denoted by the “...” symbol. This symbol means that the link has no Preset defined for it (it is empty).

Whether you are in Chain Run or Chain Select, if you type in a number and press **ENTER**, that particular Chain will be launched immediately.

To exit Chain Run mode, press the **CLEAR** button to return back to Chain Select mode.

Chain View

If you recall Preset mode, pressing MIDI CH allowed you to view (but not edit) the contents of a Preset. Similarly, while in Chain Select mode if you press **MIDI CH** you can view, but not edit, the links in the current Chain.

In this view you can see the Chain #, the link # and the Preset stored in that link:



The format of the LCD is `Chain.chain#[link#]=preset#`

Use the **Up** and **Down** arrow keys to scroll through the 18 links in the Chain to see what Presets are assigned to the links in the Chain. Press **CLEAR** to return to Chain Select mode.

7: Editing Chains (on the keypad)

To edit a Chain on the device, while in Chain Select mode, press **PRE MODE**. You will be asked to verify that you want to edit the current Chain:



Press **ENTER** to confirm or **CLEAR** to go back to the previous screen. In Edit Chain mode the LCD screen looks like this:



You can cycle through the various edit screens using the **PRE MODE** key.

Sub-menu	Navigation
Edit Chain Links	<small>PRE Mode Key</small> 
Edit Chain Name	
Save Chain Confirm	

Modifying Chain Links

Editing Chain links is simple:

- The **Up** and **Down** arrow keys allow you to move through the 18 links that make up a Chain.
- The **0-9** number keys are used to enter the Preset number that you would like to associate with that Chain link.
- The **CLEAR** key is used to remove (delete) a Chain link. In all cases, after removing a link, the last link in the Chain (#18) will be "empty".
- The **ENTER** key is used to insert a Chain link. In all cases, after inserting a new link, whatever was in link #18 will be pushed off then end and lost.

Editing the Chain Name

Press **PRE MODE** (again) and you will be prompted for the name you wish to assign to the Chain. The LCD screen shows **N?→** to indicate that it is in Chain name editing mode.

Use the **UP** and **DOWN** arrow keys to change each character value (see table). **ENTER** moves the cursor to the right and **CLEAR** moves it to the left.

You can also use the **0 to 9** keys to enter numbers directly.

If you wish to blank out the name in order to start editing with a blank slate, press **CLEAR** until the cursor is at the far left. Press it one more time and the display shows "**Clear Name?**". At this point you can press **ENTER** to confirm or **CLEAR** to abandon name clearing.

		HIGHER 4BIT (D4 TO D7) of Character Code(Hexadecimal)						
		0	1	2	3	4	5	6	7
HIGHER 4BIT (D0 TO D3) of Character Code(Hexadecimal)	0			sp	0	P	`	P
	1		|	!	1	A	a	9
	2		|	"	2	R	b	r
	3			#	3	C	s	c
	4			\$	4	T	d	t
	5			%	5	E	e	u
	6			&	6	F	f	v
	7			'	7	W	w	
	8			(	8	H	h	x
	9			)	9	I	i	y
	A			*	:	J	j	z
	B			+	;	K	k	(
	C			,	<	L	l	l
	D			-	=	M	m)
	E			.	>	N	n	→
	F			/	?	O	_	o

LCD character table

Saving

To save the Chain, press **PRE MODE** one more time and you will be prompted to save the changes. Here you can also edit the Chain number. This allows you to save the Chain to the same location or you can copy the Chain to a new location. Once you set the number of the Chain location you want to save to, Press **ENTER** to confirm the save.

Alternatively, pressing **PRE MODE** again takes you back to editing without saving.

Abandon Changes

If you want to abandon the changes, press the **UTIL MENU** button to switch out of Chain edit mode.

8: Utility Menu

The menu structure for editing on the MIDI Patch Changer keypad looks like this:

Operating Mode	Sub-menu	Navigation
Manual Mode		
Preset Mode	Edit Patch Change Data	PRE 
	Edit Preset Name	
	View Pre-Patch MIDI Data	
	View Post-Patch MIDI Data	
	Save Preset Confirm	
Chain Mode	Edit Chain Links	PRE 
	Edit Chain Name	
	Save Chain Confirm	
Utility Menu	Preset Mode (norm/browse)	UP/DN 
	Receive Program Change	
	Edit SpeedDial	
	Send a Preset (via Sys Ex)	
	Send a Chain (via Sys Ex)	
	Send Everything (v4.00+)	
	Sys Ex Manufacturer ID	
	MIDI Pass-Thru	
	MIDI Monitor	
	Restore Factory Defaults	
	Show Version Info	
	Download New Firmware	
	Set Patch Range	

To view the Utility Menu, press the **UTIL MENU** key, then navigate the menu using the **Up** and **Down** arrow keys. The vertical line at the far right of the LCD is meant to mimic a window scroll bar on a PC. As you move up and down the menu the scroll bar indicates your relative position in the menu tree.

Press **ENTER** on the item you wish to view/modify. From within a menu item you can press **CLEAR** to abandon a change and return to the menu list.

Preset Mode Browsing

With Preset Mode set to NORMAL, using the arrows keys (or ENTER or typing a preset number in) causes an instant Preset data transmit.

With Preset Mode set to BROWSE, the arrow keys do NOT cause a data transmit. Therefore in browse mode you can scroll through your list of presets until you find the one you like, then send it using the ENTER key.

Receive Program Changes

The unit can be set to accept program change commands on its MIDI IN. This allows an external device to send a patch change command to the MIDI Patch Changer, thus triggering a specific Preset. **Beware of MIDI loops if you use this!** This parameter can be turned OFF, set to a single MIDI channel (1 to 16) on which to receive the program change commands, or ALL channels (v3.30+).

Note that received program changes 1 to 127 are assigned to Presets 1 to 127. The other Presets (128 to 200) cannot be accessed in this fashion.

Edit Speed Dial

You can define the Presets that are assigned to Speed Dial #1 through Speed Dial #9 using this setup menu.

When editing the Speed Dials, the **Up** and **Down** arrow keys change the Speed Dial number.

Start typing a number to enter the Preset number that you would like to assign. Key in a Preset number from 1 to 200 using the **0 to 9** number keys. Press **ENTER** to save the changes. **CLEAR** can be used to correct typing mistakes.

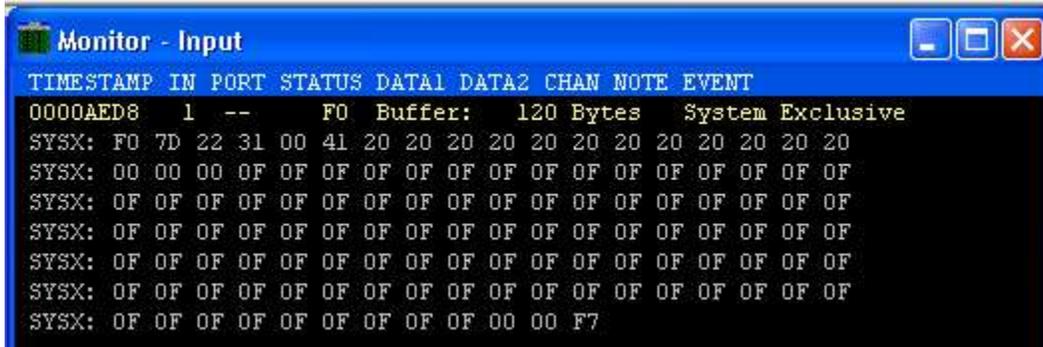


There is no real need to erase a Speed Dial, but in the unlikely event you wish to empty a slot, simply enter a Preset number outside of the valid range 1 to 200 (say, zero). When empty, you will see “...” instead of the Preset number.

Send a Preset (via System Exclusive)

You can send one Preset manually to a host PC using this menu. Type in the number of the Preset you wish to transmit (1 to 200) and press **ENTER**. The keypad will send the Sys Ex data (as described in the appendix).

Make sure your PC is set to NOT echo the data back out again to the Keypad!



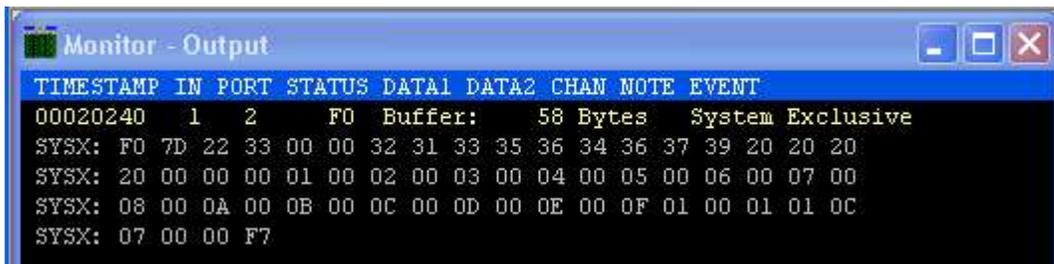
```
Monitor - Input
TIMESTAMP IN PORT STATUS DATA1 DATA2 CHAN NOTE EVENT
0000AED8 1 -- FO Buffer: 120 Bytes System Exclusive
SYSX: FO 7D 22 31 00 41 20 20 20 20 20 20 20 20 20 20
SYSX: 00 00 00 0F 0F
SYSX: 0F 0F
SYSX: 0F 0F
SYSX: 0F 0F
SYSX: 0F 0F
SYSX: 0F 00 00 F7
```

In order to send a Preset to the keypad, simply send it at any time from your PC. The keypad is always ready to receive Sys Ex. It does not have to be configured to receive Sys Ex (make sure you are using the correct device ID).

Send a Chain (via System Exclusive)

You can send one Chain manually to a host PC using this menu. Type in the number of the Chain you wish to transmit (1 to 99) and press **ENTER**. The keypad will send the Sys Ex data (as described in the appendix).

Make sure your PC is set to NOT echo the data back out again to the Keypad!



```
Monitor - Output
TIMESTAMP IN PORT STATUS DATA1 DATA2 CHAN NOTE EVENT
00020240 1 2 FO Buffer: 58 Bytes System Exclusive
SYSX: FO 7D 22 33 00 00 32 31 33 35 36 34 36 37 39 20 20
SYSX: 20 00 00 00 01 00 02 00 03 00 04 00 05 00 06 00 07 00
SYSX: 08 00 0A 00 0B 00 0C 00 0D 00 0E 00 0F 01 00 01 01 0C
SYSX: 07 00 00 F7
```

In order to send a Chain to the keypad, simply send it at any time from your PC. The keypad is always ready to receive Sys Ex. It does not have to be configured to receive Sys Ex (make sure you are using the correct device ID).

Send Everything (via System Exclusive) (v4.00+)

Sends all the Presets, Chains and Speed Dials in one go.

System Exclusive Mfg ID

The System Exclusive Manufacturing ID is used to uniquely identify a specific MIDI device while doing Sys Ex dumps from a host PC. You can adjust the Sys Ex ID of the MIDI Patch Changer keypad so that it does not conflict with any of your other MIDI gear.



The displayed value is in hexadecimal (since that is the most common format for these IDs). You modify the value using the Up and Down arrow keys. Press Enter once you have made your selection. Remember to use the value you set when doing System Exclusive communications with the keypad.

NOTE: The free editor/librarian does not yet support alternate Mfg IDs!

MIDI Pass-Thru (v3.20+)

MIDI Pass-Thru is like a poor man's MIDI-merger. Everything at the MIDI Input is echoed at the MIDI output with only 350uS delay. This can simplify cabling if the MPC keypad cannot be connected at the top of the MIDI food chain.

There are, however, two caveats. One, **you must remember to turn MIDI Pass-Thru off when you are configuring the keypad by PC.** The MIDI echo can cause an endless loop.

The other caveat is that this is not a true merge. It may be possible for MIDI messages to be confused if the MPC keypad transmits data at the same instant as it receives/forwards data. If you require both the MPC keypad and (say) some sequencer to be active at the same instant, it is recommended you disable MIDI Pass-Thru and add a true MIDI Merger device to your rig.



To remind you to turn MIDI Pass-Thru off before connecting to a PC, the LCD will show "MIDI PassThru ON" every time the keypad powers on (if Pass-Thru is indeed on).

MIDI Monitor

You can set the MIDI Monitor ON or OFF. This is a very simple one-line display showing the last MIDI command received. When enabled, the monitor data is overlaid live on the MIDI Patch Changer LCD regardless of mode or menu. Press any keypad key to temporarily regain control of the LCD. This setting is not retained in non-volatile memory.



Note ON : 90 34 64

Restore Factory Defaults

This utility function allows you to restore the whole MIDI Patch Changer keypad to the default factory settings. This is recommended after any firmware upgrade.

NOTE: After the erase/rebuild operation the keypad will automatically reboot, so if you are connected via USB MIDI, any applications talking to the MIDI keypad will be “orphaned”. This is the nature of USB. Therefore it is recommended that you close any open MIDI applications BEFORE you perform the reset (otherwise you may need to restart any application that is talking to the keypad).

Show Version

Displays the firmware version number (the “OS” version number) of the keypad.

Download New Firmware

The MIDI Patch Changer will accept .SYX firmware upgrades over 5-pin DIN MIDI (not USB) from a PC. Download the latest firmware executable from the website and follow the instructions included with it or Appendix B.

Set Patch Range (v2.79, v3.30+)

You can set the range for the Patch Change values to be 1-128 or 0-127. Underneath, the firmware always transmits the hex values according to the MIDI Spec. (0x00 to 0x7F), but most MIDI gear uses 1 to 128 for patches.



Patch Range = 0 - 127



Patch Range = 1 - 128

You can modify the value using the Up and Down arrow keys or the 0 and 1 keys. Press Enter once you have made your selection.

9: Using the Windows Editor

Please Note: If you wish to craft an editor for another platform, please refer to the system exclusive implementation in the appendix.

You can edit the individual Presets on the device or by sending new values from a PC using the free editor/librarian (or manually using hand-crafted System Exclusive data).

The changes made in the editor application can be sent to the keypad directly from the editor application or transported via a 3rd party application such as Bome's SendSX, MIDIOX (or similar) if you prefer.

To edit a preset on a Windows PC, install the free MIDIPatchChanger.exe librarian utility.

If you choose to use MIDIOX to transport the "Sys Ex" files, download it at <http://www.midiox.com> .

SendSX is available at <http://www.bome.com/products/sendsx> .

Installation

MIDIPatchChanger.exe is a standalone program. There are two ways to install and use it. The first (recommended) way is to use the installation program. This will install the application in

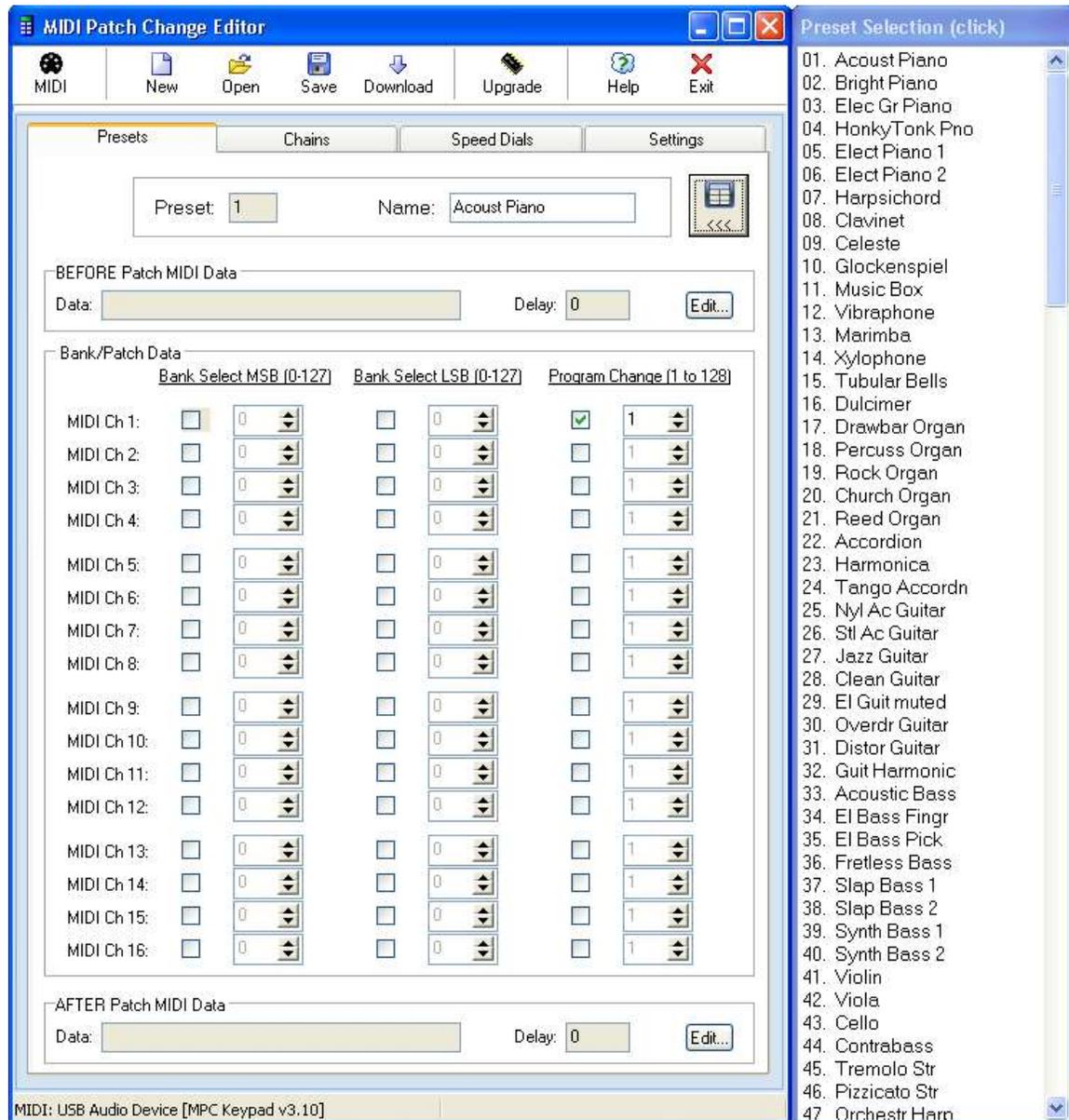
```
C:\Program Files (x86)\MusicTechGroup\MidiPatcher
```

Alternatively you can download and unzip just the exe file and place it where you like. On first run, the exe attempts to create a directory for your user files at

```
C:\Users\username\Documents\MusicTechGroup\MidiPatcher\Syx
```

And on that first run it will try and copy two example files from the EXE\Syx directory to your documents area.

Editor Features



There are a couple of main areas to note:

- The top toolbar consists of buttons used for file open/save/download and similar operations.
- The large main tabbed panel has four tabs: Presets, Chains, Speed Dials and Settings. These four panels are where most of the editing takes place.
- Finally, the collapsible list to the right shows all the Presets.

One **important** point to consider is this: you should finalize your Preset positions before making your Chains (or less importantly Speed Dials). Otherwise, moving your Presets around after your Chains have been built might leave your Chains with the wrong Presets in the Links.

Preset Panel

For each Preset, 1 to 200, you can setup the MSB/LSB Bank Select and Program Change data for any or all of the 16 MIDI channels. In addition you can:

- Name each Preset (13 characters maximum).
- Optionally setup the arbitrary MIDI data that is sent before the patch change(s).
- Optionally setup the arbitrary MIDI data that is sent after the patch change(s).

To change to a new Preset, use the Preset Selection List to the right. You can show or hide the list at any time using the show/hide button.



Single-click on the list to select a new Preset for editing. Alternatively, you can use the keyboard up and down arrows to navigate the list.

You can rearrange single Presets in the list by dragging a Preset to a new spot in the list.

If you don't want to use the Preset List, you can also change Presets using the PageUp and PageDown keys if the cursor is in the Name: edit box. (v3.33+ only)

By default all of the Bank Select and Program Change values are disabled (grayed-out). Click on the checkbox next to the item you wish to enable/disable.



NOTE: At this time the editor only supports the default Mfg ID. In addition, the editor supports Bank Select numbering 0-127 and Program Change numbering 1-128 only. This is the normal MIDI convention.

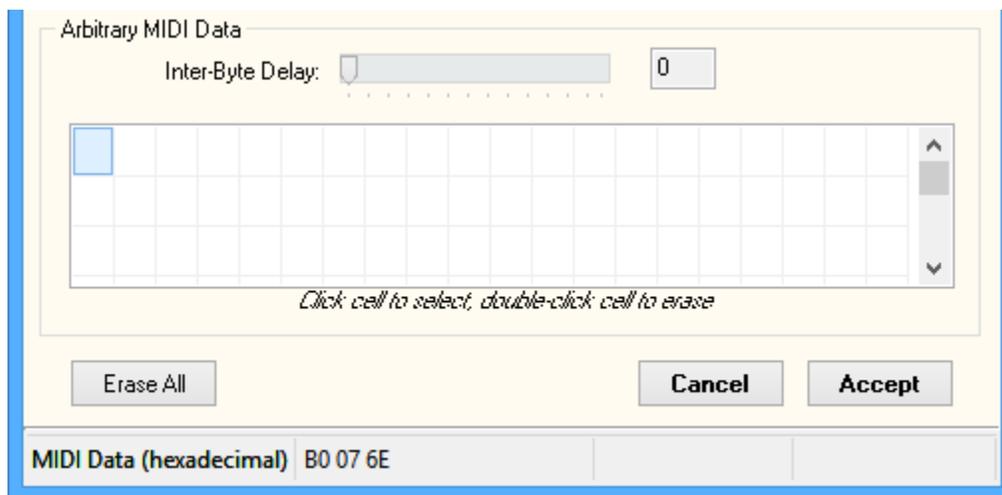
The keypad allows you to send up to 90 bytes of **any** MIDI data before and/or after the MIDI Patch Change and Bank Selects. This might consist of controller changes or Sys Ex commands.

The top box, marked **Type: Predefined**, allows you to insert data using one of the shown predefined types. You can even embed more patch changes or System Exclusive data here. Or perhaps a volume or other controller setting (though this is probably better served in the POST-data area).

As you make changes using the sliders in the predefined area, the status bar at the very bottom shows what data would be inserted when you click the **Insert** button.

The center box, marked **Type: Custom**, lets you enter any data of your choosing. The value 255 (0xFF) is reserved and cannot be used. You can enter the data using decimal or hex. The table of results at the bottom shows the cumulative MIDI data in hexadecimal format.

The delay slider is used to insert a 0 to 127ms delay **between each byte** in the resulting table. Some synths cannot accept control data sent at full speed without short pauses between bytes. If you are having problems, try setting the delay to max and slowly reduce it after you have confirmed correct operation. This will allow you to focus on getting the operations setup correctly, and later optimizing for speed.



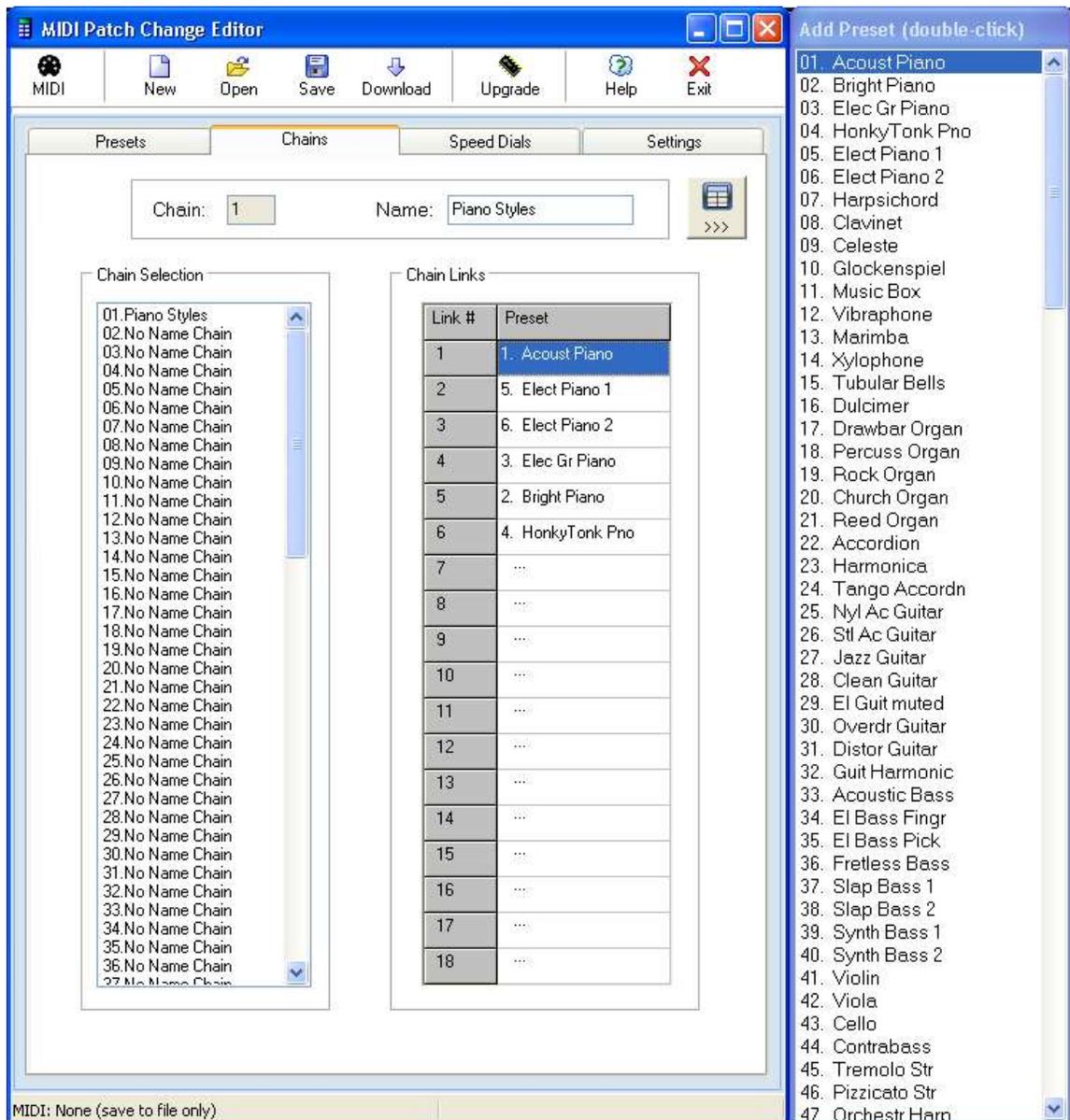
Use can use the mouse to select a point in the MIDI data table to work on. To erase an individual byte, double-click the table cell.

Once you are happy with your created MIDI data, click **Accept** to close the MIDI data editor. If you need to erase your MIDI data and start over, click **Erase All**.

Chains Panel

A Chain is a series of Presets that you progress through in order, for instance as you play a song live. The MIDI Patch Changer keypad holds 99 Chains, each of which can hold 18 Presets.

Chains are selected using the Chain Selection list on the left. The Links in a given Chain are shown beside it to the right. There can be no gaps in the Chain Links. Once the keypad encounters an empty link, that link is considered the end of the Chain.



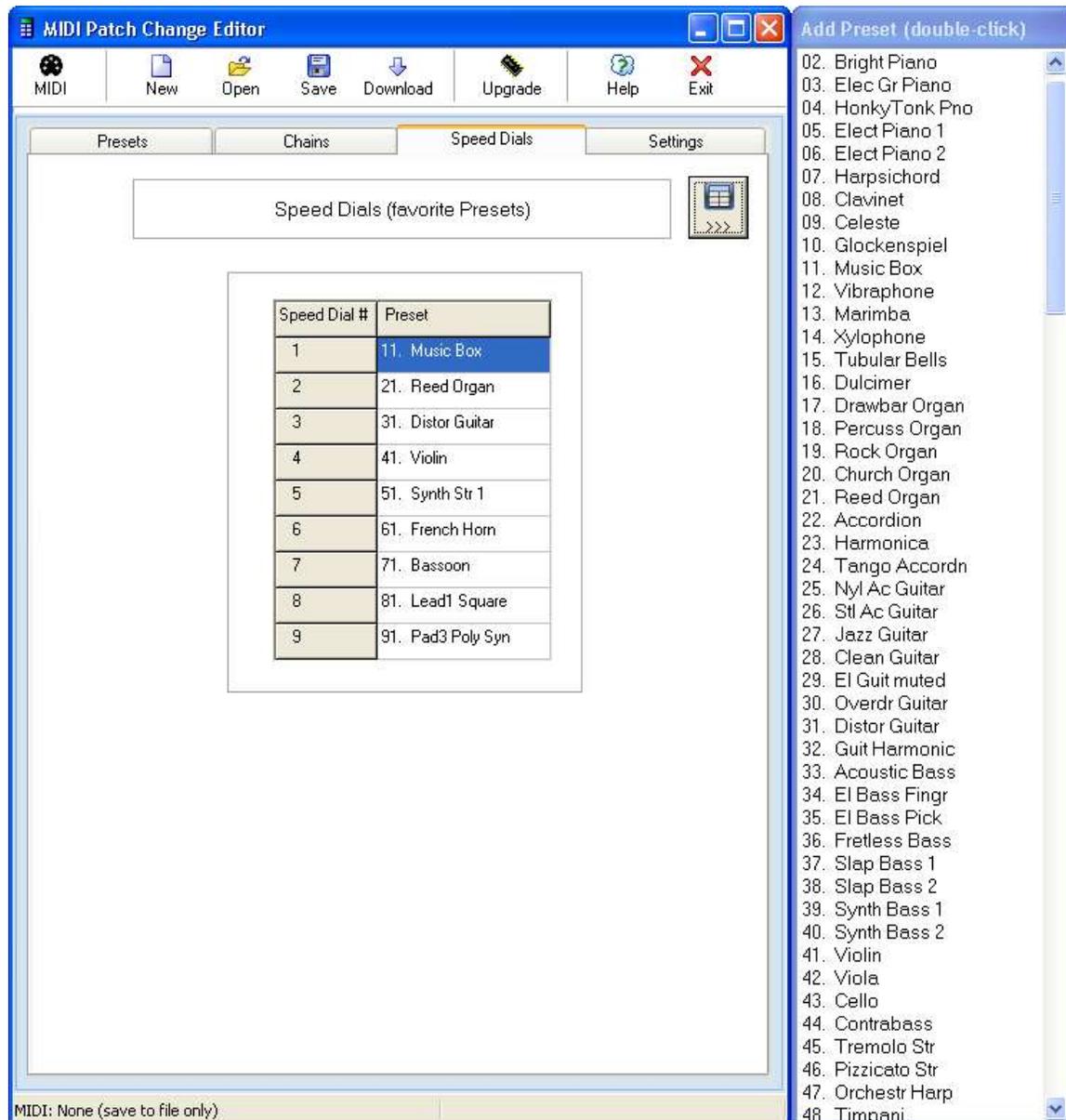
You add Links (Presets) to the Chain by double-clicking on the Preset list to the far right. Normally you would append Presets to the end of the Chain, but you can move the insertion point with the mouse.

To erase a Link, double-click on it. To erase the whole Chain, right-click on the Chain Links and then select "Delete All Links".

You can name your Chains with up to 13 characters (same as with Presets).

Speed Dials Panel

You can have up to 9 favourite Presets that can be selected from Preset mode at any time using a hot-key combination. To access them on the keypad, start in Preset mode, then press and hold **CLEAR**. While holding CLEAR down, press one of the **0 to 9** number keys. The Preset assigned to that Speed Dial will be launched.



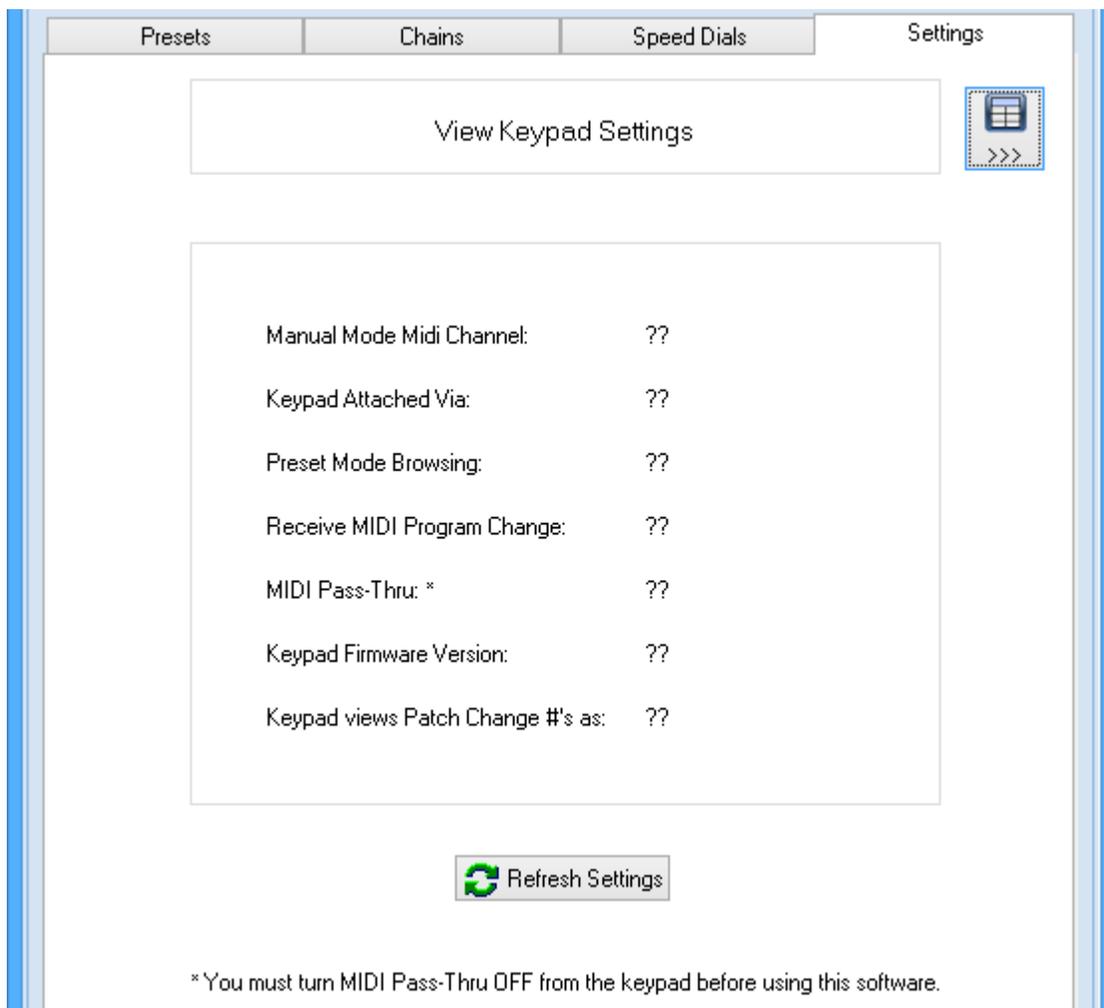
Adding Presets to Speed Dials is very similar to adding Presets to a Chain. In this case, simply select the Speed Dial of interest then double-click on the name of the Preset you wish to assign to that Speed Dial.

To delete a Speed Dial, double-click it.

Note that unlike Chains, Speed Dials do not push later Presets down when adding them in the middle. This is intentional.

Settings Panel

The Settings Panel allows you to view some of the Keypad Properties. These are global values set by using the UTIL Menu on the keypad itself.



Toolbar File Operations

All of the files used by the editor/librarian are System Exclusive files and all use the “.syx” extension. For the purposes of this program we distinguish between the three file types used by the software as follows:

1. A single-Preset file (mostly used for reading in a Preset from an older version of the software). You can also save/download a single Preset to test it quickly rather than waiting for a complete download.
2. A “complete” SYX file containing all of the Keypad parameters (200 Presets, 99 Chains and 9 Speed Dials).
3. A firmware upgrade file used to “re-flash” the keypad OS.

Because they all use the .syx extension, you should use very descriptive names to differentiate between the files and file types or it will be confusing later on when you work with your files.

The Presets can be stored individually or as a bulk set of 200 in .syx (raw System Exclusive) file format. These files can be loaded into any software that operates directly on such files (e.g. MIDIOX). Single Preset .syx files contain the target preset # (see Appendix A for more information) and are formatted as a Set One Preset command. Thus any sequencer or software or device that can load this data can be used for programming a Preset into the keypad.

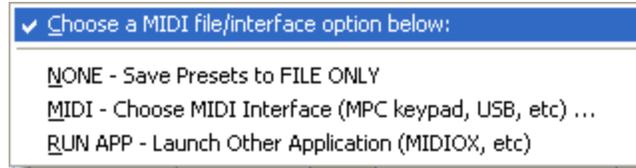


From the toolbar menu you can perform the following actions:

- **MIDI** – Allows you to choose which MIDI connection/method is used to talk to the keypad.
- **New** – Erases all the current data and starts with the default settings (same as exiting the program and restarting it again).
- **Open** – Import 1 Preset –or– read in a .SYX file containing “everything”.
- **Save** – Export 1 Preset –or– save “everything” to a .SYX file.
- **Download** – Downloads 1 Preset or all Presets/Chains/etc either directly to the keypad or via the external MIDI transport application.
- **Upgrade** – Performs a firmware upgrade of the keypad.
- **Help** – About box (version info) and access to this PDF user manual.
- **Exit** – Closes the application.

MIDI

There are several ways to manage and send the data to the keypad. These methods differ more in the way the file is managed rather than how the cabling is hooked up.



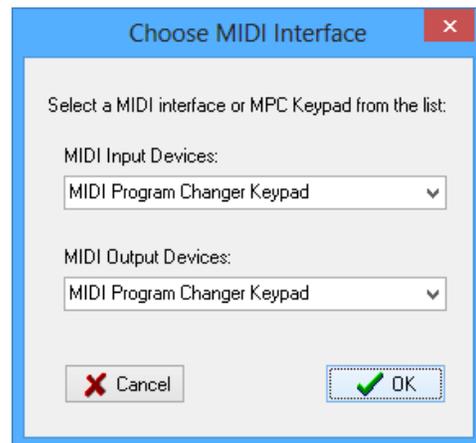
1. **File Only.** In this case you don't update the keypad. You only work with files. Later on you can download your files to the keypad. This choice will also close the MIDI ports if they were opened using MIDI Interface, below.
2. **MIDI Interface.** Send data directly from within this editor/librarian to the keypad. In this case the keypad is either connected using its USB cable or it is connected through your existing MIDI interface (5 pin DIN MIDI). **This is the most common setting.** You will need to choose your USB connection from the list of available interfaces.
3. **External Application.** In this case files created by the editor/librarian are passed to an intermediate 3rd party application (such as SendSX or MIDI0X) for transport. You would choose this method if you prefer to work at a low level with your MIDI data.

MIDI Port Selection

Hook-up your keypad. Click on "Send to MIDI Interface..." and choose the MIDI interface you want to work with.

If the keypad is connected you will see its version information displayed on the status bar at the bottom of the program.

MIDI In: MIDI Program Changer Keypad [MPC Keypad v3.20]
MIDI Out: MIDI Program Changer Keypad



External Application Selection

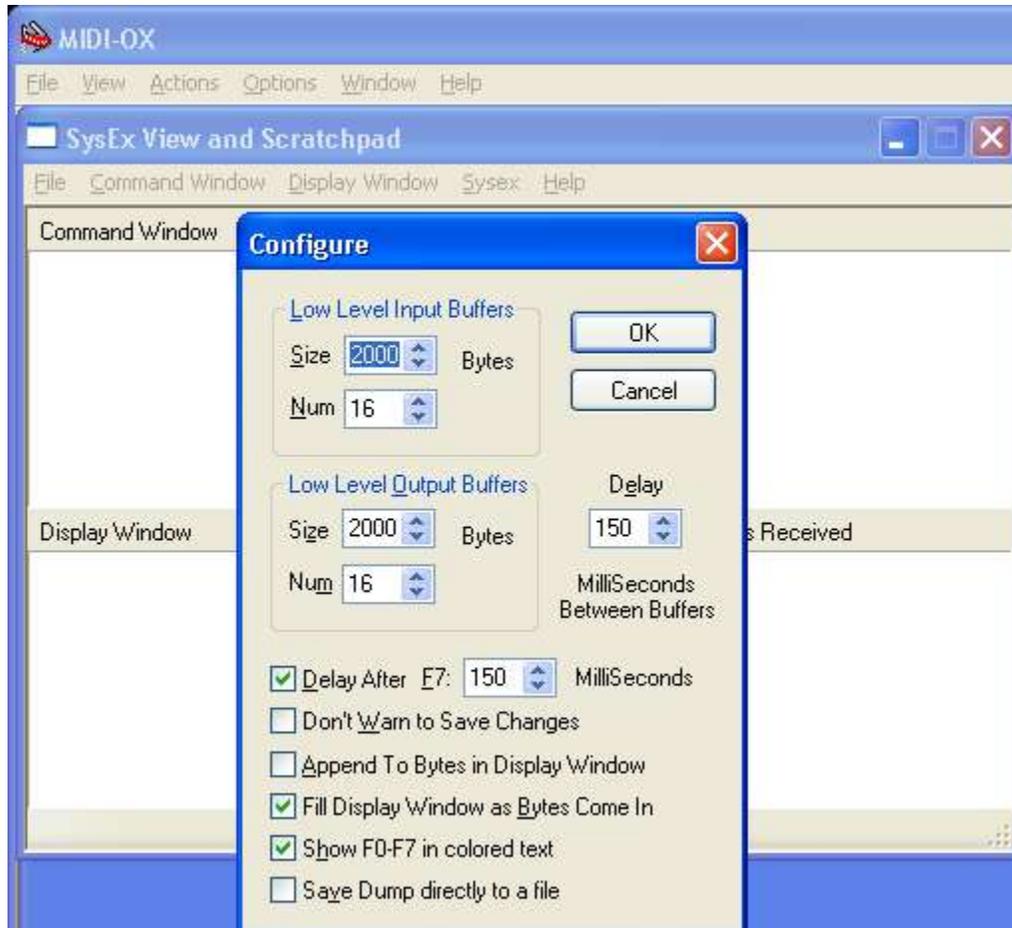
If you prefer that your MIDI files be transported to the keypad using a 3rd party application, choose "External File Application". The editor/librarian will then open the default application the OS has configured for the .SYX file type. Your 3rd party application will then need to choose which MIDI interface to use.

Notes for MIDIOX

At this time we take a moment and a few pages to discuss how one might use an external MIDI application such as MIDIOX ... if that's your thing.

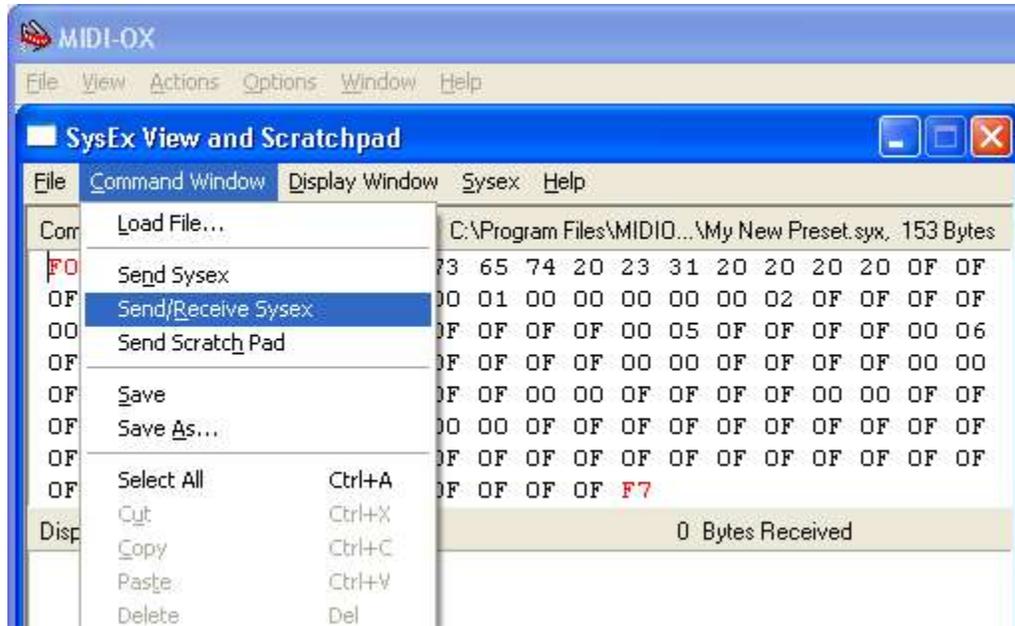
If you are using MIDIOX, you should set up MIDIOX's SysEx configuration. The following recommended settings can be entered by clicking:

View -> SysEx... then SysEx->Configure.



Once MIDIOX is configured and you have a Preset edited to your liking, you can download it to the keypad by following these steps:

- Click on **Download**. Then choose whether you want to send one or all.
- If you choose one, then you must choose which Preset slot you wish to save it to (this value is embedded into the .SYX file) and then click on **Continue**. The data will be written to an intermediate .SYX file.



- After a moment you should receive a 7-byte ACKnowledge packet (F0 7D 22 24 00 41 F7 or similar). Click on **Done**. Downloading occurs in the background on the keypad so even though the keypad has been programmed, the LCD display is not automatically updated until you do something on the keypad that requires the LCD to be refreshed (E.g. change modes or presets).

Close the SysEx window in MIDIOX and when prompted to save the received data, click on **No**.

Uploading

This is not a function you would normally need to perform. Uploading is most easily accomplished using the keypad **UTIL MENU** key. Close and Open a fresh MIDI-OX SysEx window and then click on

SysEx -> Receive Manual Dump...



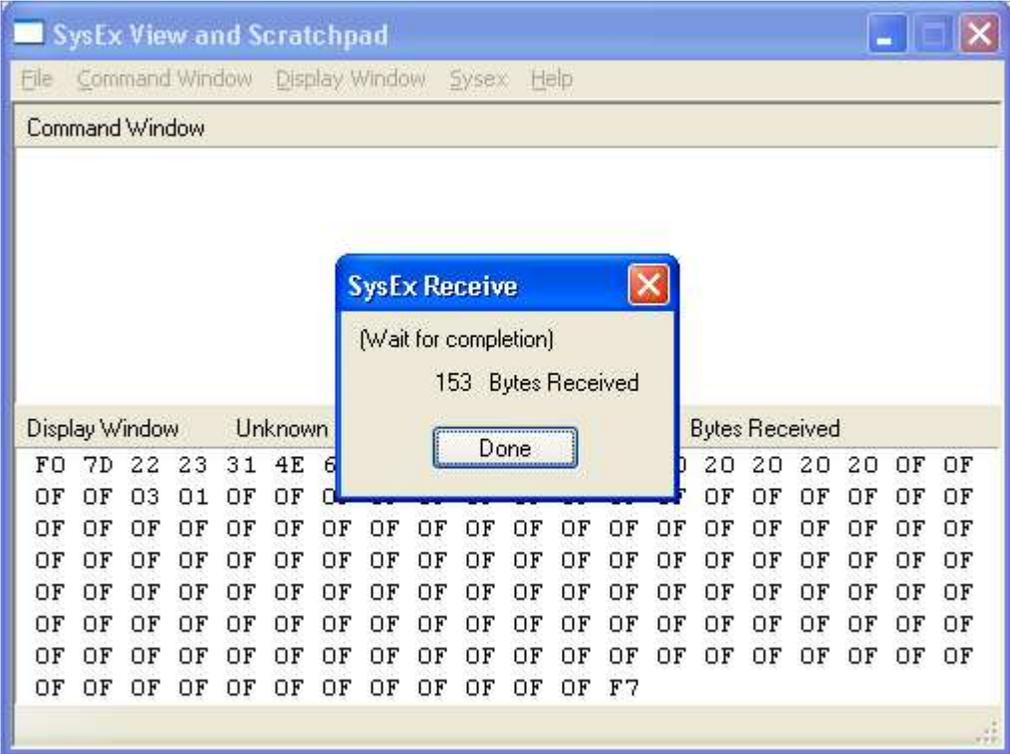
MIDI-OX then waits for the data from the keypad.

Next, on the keypad, from the **UTIL** menu, choose the keypad menu item **Send a Preset** and enter a number (1 to 100):



Send Preset #: 100_

When you press **ENTER** on the keypad the data will be sent to MIDIOX.



Click **Done** and then save the data by clicking on

Display Window -> Save As...

Choose a suitable file name (using the default extension of .SYX). By default the file will be saved in the Syx subdirectory of MIDIOX. You can load that file into MIDIPatchChanger.exe if you wish to edit it.

... end of Notes for MIDIOX.

Firmware Upgrade

New operating system code is made available on the website. This code can be used to “reflash” the firmware in the keypad. These files can be sent to the keypad using the editor/librarian, SendSX or MIDIOX (or similar). Either way, the keypad must be connected to the PC using its 5-pin DIN interface box (not via USB).



To perform the upgrade from within the editor/librarian, simply choose your (Direct) MIDI connection, click the Upgrade button, set the keypad to upgrade mode (see below) and select the file to download.

There are two ways to set the keypad in a mode that accepts new firmware.

1. The first method is using the UTIL menu. Press the **UTIL** button and then press the **down** arrow key repeatedly until you see the menu item:



Press **ENTER** and when prompted to confirm (`ENTER to upgrade`), then press **ENTER** again. At this point the MIDI Patch Changer passes control to the internal MIDI Loader.



2. The other method can be used even in the unlikely event that you “brick” the firmware (cause the device to malfunction due to improper reprogramming). In this case unplug the keypad. Press and hold down **CLEAR** and **ENTER**. With these two keys down, plug in the powered 5-pin DIN cable/box. Once power has been applied through the box to the keypad, release the keys. You should see:



To perform the upgrade using MIDIOX, see Appendix C.

Appendix A: System Exclusive Implementation

In order to understand the System Exclusive data presented in this chapter you will need to have a working understanding of hexadecimal numbers. There are many fine tutorials on the internet that explain hex as it relates to MIDI.

Note: The “old” v2.xx Get/Set One Preset system exclusive message was not flexible enough to support the changes we wanted for v3.xx so a “new” Preset format was added. Both old and new format presets can be loaded into the latest keypads.

Command Types

The table below shows the system exclusive commands supported by the MIDI Patch Changer. The keypad also responds to a Universal Device Inquiry system exclusive command.

Command (hex)	Description	Size (# bytes)
04	Restart	5
05	Get Port	5
21	Get Global Parameter (see list)	8
22	Set Global Parameter (see list)	8
23	Get One Preset (old format)	6
24	Set One Preset (old format)	Up to 153
30	Get One Preset (new format)	7
31*	Set One Preset (new format)	Up to 500
32	Get One Chain	58
33	Set One Chain	58

General Format

Roughly speaking, all the MIDI commands look something like this:

(hex)	F0	System Exclusive
	<id>	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	<cmd>	Command type byte from table above.
	<addr>	Parameter # (0x08 to 0x19) or old Preset # (0x00 to 0x63) or new Preset # (using two bytes).
	(data)	Data (if any). The data format is described below.
	F7	End of System Exclusive (EOX)

* As of v3.00+. All Presets are stored internally using the “new” format which allows for more Pre- and Post- Patch MIDI data.

Restart Command

You can command the keypad to reboot by issuing this command. If you are connected using USB, then you may need to close and reopen the ports in your MIDI software.

Transmitted:

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	04	Command type.
	F7	End of System Exclusive

Received: ACK packet (then the keypad reboots)

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	04	Echo of whatever the command was.
	00	Echo of parameter(none in this case).
	41	'A' – ACK – ACKnowledge
	F7	End of System Exclusive

Get Port Command

You can query the keypad to determine if the keypad is connected using it's 5-pin DIN cable/box or it's USB cable using this command.

Transmitted:

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	05	Command type.
	F7	End of System Exclusive

Received:

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
4D or 55	4D	'M' = MIDI
	55	'U' = USB
	05	Command type.
	F7	End of System Exclusive

Get/Set Global Parameter List

The following table describes the address and data elements that are valid for the Get/Set Global Parameter commands.

Parameter # (hex)	Combined Byte Value (binary)	Description
08	0000 nnnn	n = MIDI Channel for manual mode 0 to 15 (for MIDI channels 1 to 16)
09	0000 000x	x = Program Change number range 0 is 0-127 1 is 1-128
0A	0000-000x	x = Bank Select number range 0 is 0-127 1 is 1-128
0C	0ddd dddd	d = Sys Ex Mfg ID (default is 7D) 01 to 7D (7E and 7F are reserved)
0D	0000-000b	Keypad beeper enable.
0E	0000 000m	m = 0 = Preset Mode NORMAL m = 1 = Preset Mode BROWSE
0F	0000n nnnn	0 = Do not receive program change. 1-16 = Rx Pgm Chg on ch 1 to 16. 17 = Rx Pgm Chg on ALL channels.
10 to 19	pppp pppp	Preset number assigned to Speed Dial (0 to 199 decimal corresponds to Presets 1 through 200).
1A	0000 000m	m = 0 = MIDI Pass-Thru OFF m = 1 = MIDI Pass-Thru ON ⁷

Crossed out commands are not recommended. Using other parameter numbers is undefined.
Program Change Range works in v2.79 and then v3.30+, not in between

⁷ MIDI Pass-Thru should always be OFF when configuring the keypad over MIDI! Attempting to communicate with the keypad over MIDI while it is ON will be fruitless!

Get Global Parameter Command

By sending a Get Global Parameter Sys Ex command from a host device, the user can query the settings (similar to using the keypad's Utility menu). In this implementation one parameter byte is read at a time from the table listed above. Byte addresses outside of the parameter list range are ignored.

The command reads/writes a single byte parameter from the keypad, but the data value is split and received as two (nibble) bytes over MIDI. The first byte is the most significant nibble of the data. The second byte is the least significant nibble of the data.

Example: Read the Manufacturer ID

Transmitted:

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	21	Command type (get parameter command).
	0C	Parameter # from parameter list table (ie. Mfg ID).
	F7	End of System Exclusive

Received:

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	21	Command type.
	0C	Parameter # from parameter list table.
	07	Most significant nibble of the value 7D.
	0D	Least significant nibble of the value 7D.
	F7	End of System Exclusive

Set Global Parameter Command

By sending a Set Global Parameter Sys Ex command from a host device, the user can change the settings that normally require the use of the Utility menu. In this implementation one parameter byte is changed at a time from the parameter list table. Byte addresses outside of the parameter list range are ignored.

The command writes a single byte into the keypad, but the new data value is transmitted as two (nibble) bytes. The first byte is the most significant nibble of the data. The second byte is the least significant nibble of the data.

In the case of Speed Dials (parameters 10 through 19 hex), you can erase a Speed Dial by setting its value to either 0 or FF (hex).

Example: Set Speed Dial #1 to preset # 100 (in Sys Ex Presets numbers are one lower, so we use 99 decimal or 0x63 hex).

Transmitted:

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	22	Command type (set parameter).
	10	Parameter # from parameter list table.
	06	Most significant nibble of the value 63.
	03	Least significant nibble of the value 63.
	F7	End of System Exclusive

Received: ACK packet

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	22	Echo of the command (set parameter).
	10	Echo of parameter #.
	41	'A' – ACK – ACKnowledge
	F7	End of System Exclusive

Get One Preset Command (old format)

By sending a Get Preset Sys Ex command from a host device, the user can query and save the settings for a single Preset. A Preset (old format) consists of the following data:

- 13 character ASCII name
- 16 MIDI channels worth of Bank MSB/Bank LSB/Patch Change. The values for these bytes are 0x00 to 0x7F regardless of user preferences. Disabled (unused) values will be 0x80 or 0xFF. These values are transmitted as most significant/least significant byte pairs; therefore this section of the data will be $16 \times 3 \times 2 = 96$ bytes.
- 16 bytes of pre **or** post arbitrary MIDI data. This data can contain any MIDI data. Unused data elements contain 0xFF. Again it is transmitted as msn/lsn byte pairs; therefore this section of data will be $16 \times 2 = 32$ bytes.
- Three bytes of configuration data (see below) $3 \times 2 = 6$ bytes.

A total received packet then includes all of the above plus the system exclusive packet header and EOX byte. A total received preset is 153 bytes.

Command:

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	23	Command type.
	<pre>	Preset # 0x00 to 0x7F (0 to 127 decimal).
	F7	End of System Exclusive

Example: Read Preset #100's data.

Transmitted:

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	23	Command type.
	63	Preset # (0x00 to 0x7F)
	F7	End of System Exclusive

Received:

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.

24	Command type (ready for re-transmission).
63	Preset number.
<	
:	13 bytes of ASCII data for the Preset Name
>	
<	
:	16 sets of (3 bytes x 16 MIDI channels)
:	Bank Select MSB/Bank Select LSB/Patch Change
:	bytes sent as msn/lsn byte pairs. 96 bytes total
>	
<	
:	
:	16 byte pairs of arbitrary MIDI data.
:	
>	
00	Pre/Post flag most significant nibble (always 0)
P/P LSN	Pre/Post Arb MIDI data flag least significant nibble (00 = Pre, 01 = Post)
00	Reserved
F7	End of System Exclusive

Set One Preset Command (old format)

The Set Preset Sys Ex command allows you to write one preset to the MIDI Patch Changer keypad. This command is variable length in that you don't need to send the entire 153 bytes. You can just send what you want and terminate with an EOX byte. The remainder of the preset you are modifying will be "disabled" (all values set to 0xFF). Therefore you can set the name and only a couple of patch change sets if that is all you need.

A Preset consists of the following data:

- 13 character ASCII name. Use space characters to pad if necessary.
- Up to 16 MIDI channels worth of Bank MSB/Bank LSB/Patch Change. The values for these bytes are 0x00 to 0x7F regardless of user preferences. Disabled (unused) values should be 0xFF. These values are transmitted as most significant/least significant byte pairs; therefore this section of the data will be up to $16 \times 3 \times 2 = 96$ bytes.
- Up to 19 bytes of (optional) arbitrary MIDI data. This data can contain any MIDI data. Unused data elements should contain 0xFF. Again it is transmitted at msn/lsn byte pairs; therefore this section of data will be up to $19 \times 2 = 38$ bytes.

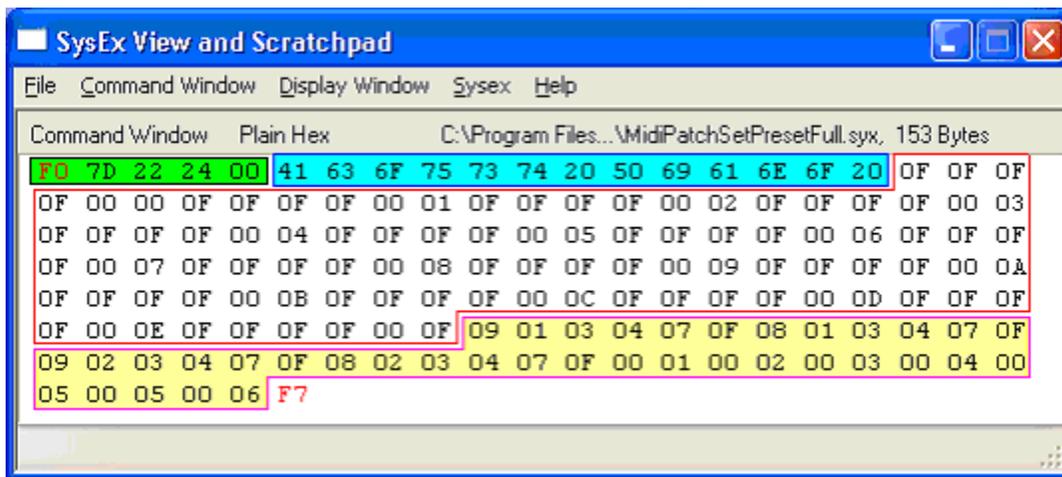
Transmitted:

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	24	Command type.
	<pre>	Preset # 0x00 to 0x7F (0 to 127 decimal).
	<	
	:	13 bytes of ASCII data for the Preset Name
	>	
	<	
	:	Up to 16 sets of (3 bytes x 16 MIDI channels)
	:	Bank Select MSB/Bank Select LSB/Patch Change
	:	bytes sent as msn/lsn byte pairs. 96 bytes max.
	>	
	<	
	:	
	:	16 byte pairs of arbitrary MIDI data
	:	
	>	

00	Pre/Post byte most significant nibble (always 0)
P/P LSN	Pre/Post byte least sig nibble (00 = Pre, 01 = Post)
00	Reserved
F7	End of System Exclusive

Received: ACK packet

Example:



In the data captured above you can see the following elements (in order):

- The green portion represents the Sys Ex header [F0 ... 00].
- The blue portion represents the ASCII patch name [41 ... 20].
- The white portion represents the MSB/LSB/Pgm Chg data (16 of). Remember that the bytes are split into MSN/LSN pairs.
- The yellow portion represents the arbitrary MIDI data section. In this case we have the following MIDI data (again in MSN/LSN pairs):
 - 09 01 03 04 07 0F = 91 34 7F (note on)
 - 08 01 03 04 07 0F = 81 34 7F (note off for above)
 - 09 02 03 04 07 0F = 92 34 7F (note on, different channel)
 - 08 02 03 04 07 0F = 82 34 7F (note off for above)
 - 00 01 00 02 03 00 04 00 05 00 05 00 06 (sample MIDI gibberish)
- The red F7 is the End-of-Exclusive.

Get One Preset Command (NEW format)

By sending a Get Preset Sys Ex command from a host device, the user can query and save the settings for a single Preset. A Preset consists of the following data:

- 13 character ASCII name.
- Pre-Patch MIDI data Delay value. 0x00 to 0x7F (0ms to 127ms per byte sent).
- Patch Change data Delay value. 0x00 to 0x7F (0ms to 127ms per byte sent).
- Post-Patch MIDI data Delay value. 0x00 to 0x7F (0ms to 127ms per byte sent).
- 16 MIDI channels worth of Bank MSB/Bank LSB/Patch Change. The values for these bytes are 0x00 to 0x7F. Disabled (unused) values will be 0x80 or 0xFF. These values are transmitted as most significant/least significant byte pairs (nibbles); therefore this section of the data will be $16 \times 3 \times 2 = 96$ bytes.
- One byte of Pre-Patch data length (0x00 to 0x5A). This indicates the length of Pre-Patch MIDI data to follow from 0 to 90 bytes.
- Optional up to 90 bytes of Pre-Patch MIDI data sent as most significant/least significant byte pairs (nibbles).
- One byte of Post-Patch data length (0x00 to 0x5A). This indicates the length of Post-Patch MIDI data to follow from 0 to 90 bytes.
- Optional up to 90 bytes of Post-Patch MIDI data sent as most significant/least significant byte pairs (nibbles).

A total received packet then includes all of the above plus the system exclusive packet header and EOX byte.

Command:

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	30	Command type.
	<pre_msn>	Preset # 0x00 to 0xC7 (0 to 199 decimal) msn.
	<pre_lsn>	Preset # lsn (least significant nibble).
	F7	End of System Exclusive

Example: Read Preset #100's data.

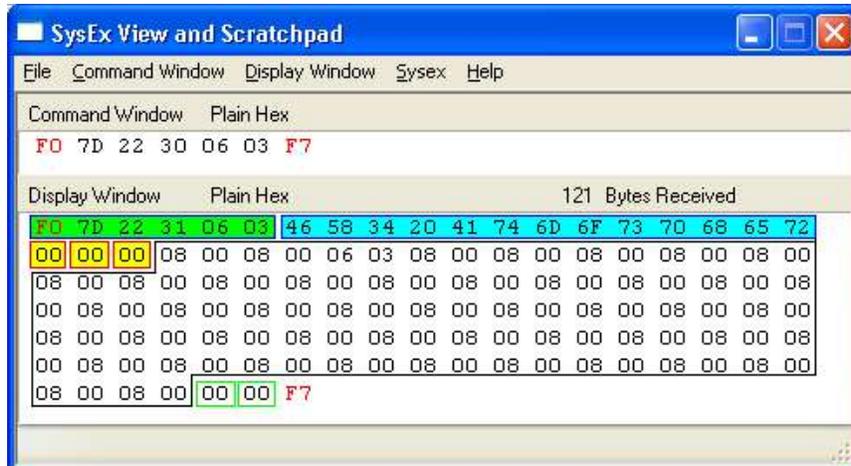
Transmitted:

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	30	Command type.

06 Most significant nibble of the value 63.
 03 Least significant nibble of the value 63.
 F7 End of System Exclusive

Received:
 (hex)

F0 System Exclusive
 7D Manufacturer ID. User settable – default is 7D.
 22 Device ID for the MIDI Patch Changer.
 31 Command type (ready for re-transmission).
 06 Preset number msn.
 03 Preset number lsn,
 <
 : 13 bytes of ASCII data for the Preset Name
 >
 dd One byte of Pre-Patch delay (in ms)
 dd One byte of Patch-Change delay (in ms)
 dd One byte of Post-Patch delay (in ms)
 <
 : 16 sets of (3 bytes x 16 MIDI channels)
 : Bank Select MSB/Bank Select LSB/Patch Change
 : bytes sent as msn/lsn byte pairs. 96 bytes total
 >
 LL One byte of Pre-Patch length data (0x00 - 0x5A).
 <
 : Zero to 90 msn/lsn byte pairs of Pre-Patch
 : arbitrary MIDI data.
 >
 LL One byte of Post-Patch length data (0x00 - 0x5A).
 <
 : Zero to 90 msn/lsn byte pairs of Post-Patch
 : arbitrary MIDI data.
 >
 F7 End of System Exclusive



Set One Preset Command (NEW format)

The Set Preset Sys Ex command allows you to write one preset to the MIDI Patch Changer keypad. This command is variable length and depends on the size of Pre-and Post- Patch arbitrary MIDI data contained within.

A Preset consists of the following data:

- 13 character ASCII name.
- Pre-Patch MIDI data Delay value. 0x00 to 0x7F (0ms to 127ms per byte sent).
- Patch Change data Delay value. 0x00 to 0x7F (0ms to 127ms per byte sent).
- Post-Patch MIDI data Delay value. 0x00 to 0x7F (0ms to 127ms per byte sent).
- 16 MIDI channels worth of Bank MSB/Bank LSB/Patch Change. The values for these bytes are 0x00 to 0x7F. Disabled (unused) values will be 0x80 or 0xFF. These values are transmitted as most significant/least significant byte pairs (nibbles); therefore this section of the data will be $16 \times 3 \times 2 = 96$ bytes.
- One byte of Pre-Patch data length (0x00 to 0x5A). This indicates the length of Pre-Patch MIDI data to follow from 0 to 90 bytes.
- Optional up to 90 bytes of Pre-Patch MIDI data sent as most significant/least significant byte pairs (nibbles).
- One byte of Post-Patch data length (0x00 to 0x5A). This indicates the length of Post-Patch MIDI data to follow from 0 to 90 bytes.
- Optional up to 90 bytes of Post-Patch MIDI data sent as most significant/least significant byte pairs (nibbles).

Including the Sys Ex header and EOX byte, the command size varies from 168 bytes (both arb MIDI data sections have only the 00 length byte) to 528 bytes (both arb MIDI data sections contain the length byte and 90 byte pairs each).

Transmitted:

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	31	Command type.
	pp_msn	Preset number (most significant nibble).
	pp_lsn	Preset number (least significant nibble).
	<	
	:	13 bytes of ASCII data for the Preset Name
	>	
	dd	One byte of Pre-Patch delay (in ms)

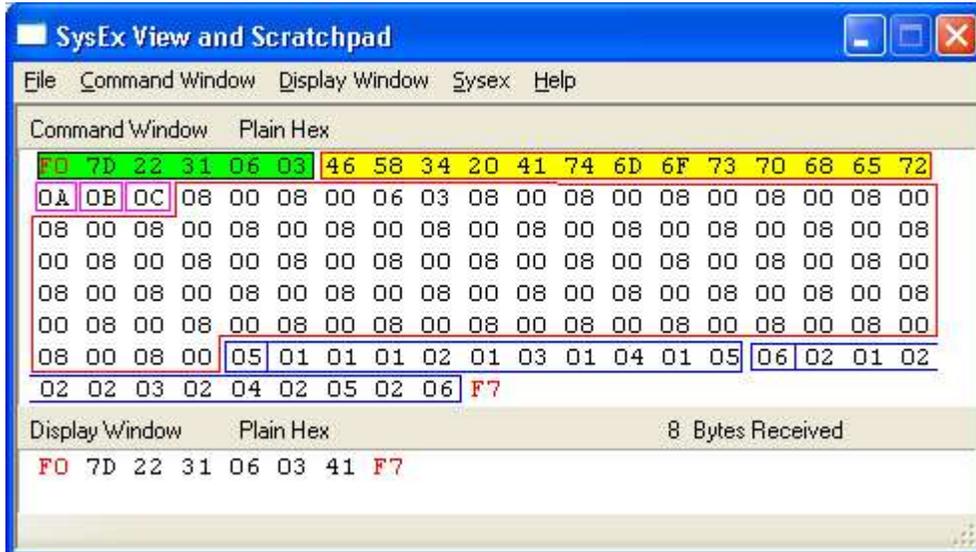
```

dd      One byte of Patch-Change delay (in ms)
dd      One byte of Post-Patch delay (in ms)
<
:       16 sets of (3 bytes x 16 MIDI channels)
:       Bank Select MSB/Bank Select LSB/Patch Change
:       bytes sent as msn/lsn byte pairs. 96 bytes total
>
LL      One byte of Pre-Patch length data (0x00 - 0x5A).
<
:       Zero to 90 msn/lsn byte pairs of Pre-Patch
:       arbitrary MIDI data.
>
LL      One byte of Post-Patch length data (0x00 - 0x5A).
<
:       Zero to 90 msn/lsn byte pairs of Post-Patch
:       arbitrary MIDI data.
>
F7      End of System Exclusive

```

Received: ACK packet

F0 7D 22 31 06 03 41 F7



Get One Chain Command

By sending a Get One Chain Sys Ex command from a host device, the user can query and save the settings for a single Chain. A Chain consists of the following data:

- 13 character ASCII name
- 18 Links of Chain data (18 Preset numbers). Valid Preset numbers are in the range of 0 to 199 (decimal). Higher values, such as 255 are considered “empty” chain links. The first empty chain link indicates end-of chain to the keypad at run time. These preset links are transmitted over sys ex in msn/lsn byte pairs.
- Two bytes of reserved configuration data (both 0).

A total received packet then includes all of the above plus the system exclusive packet header and EOX byte. A total received chain is 58 bytes.

Command:

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	32	Command type.
	ch_msn	Chain # msn
	ch_lsn	Chain # lsn
	F7	End of System Exclusive

Received:

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	32	Command type.
	ch_msn	Chain # msn
	ch_lsn	Chain # lsn
	<	
	:	13 bytes of ASCII data for the Chain Name
	>	
	<	
	:	Eighteen Preset “links” in msn/lsn byte pairs.
	>	
	00	Reserved
	00	Reserved
	F7	End of System Exclusive

Example: Read Chain #1's data. Assume the links in the chain are

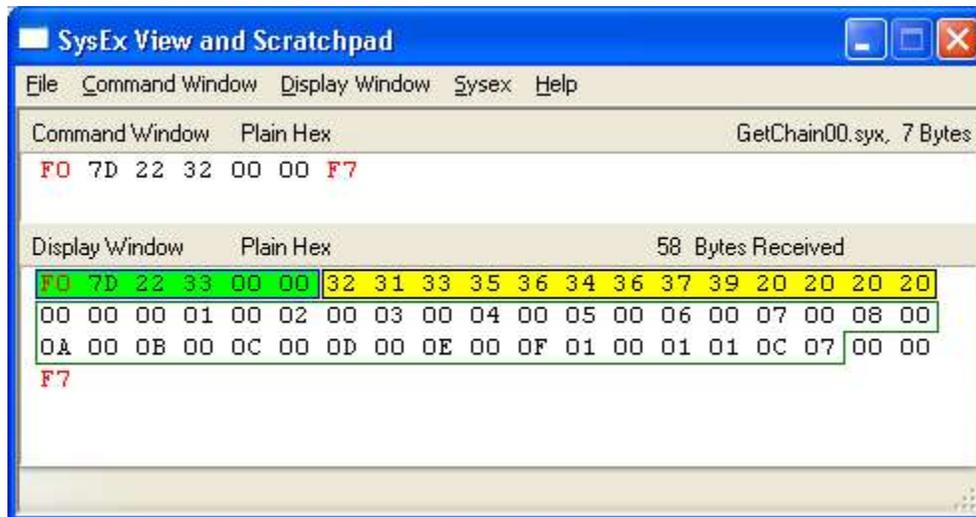
Chain Link	Preset #
1	001
2	002
3	003
4	004
5	005
6	005
7	007
8	008
9	009
10	011
11	012
12	013
13	014
14	015
15	016
16	017
17	018
18	200

and that there is no arbitrary MIDI data (both length bytes are set to 0).

Transmitted:

(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	30	Command type.
	06	Most significant nibble of the value 63.
	03	Least significant nibble of the value 63.
	F7	End of System Exclusive

Received:



Set One Chain Command

The Set One Chain Sys Ex command allows you to write one Chain to the keypad. A Chain consists of the following data:

- 13 character ASCII name
- Up to 18 Links of Chain data (18 Preset numbers). Valid Preset numbers are in the range of 0 to 199 (decimal). Higher values, such as 255 are considered “empty” chain links. The first empty chain link indicates end-of chain to the keypad at run time. These preset links are transmitted over sys ex in msn/lsn byte pairs.
- Two bytes of reserved configuration data (both 0).

You can send a smaller command. That is, you can just send what you want and terminate with an EOX byte. The remainder of the chain you are modifying will be “disabled” (all links set to 0xFF). Therefore you can set the name and only a couple of links if that is all you need.

Command:

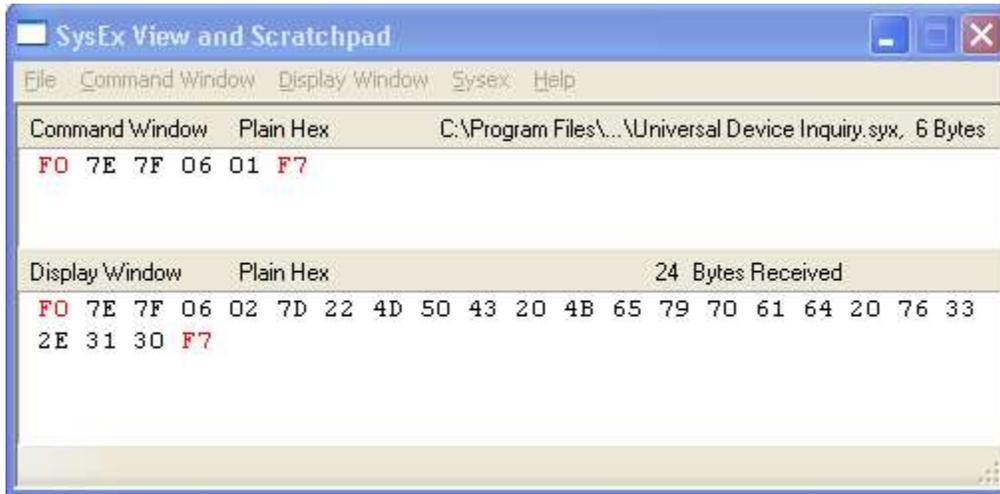
(hex)	F0	System Exclusive
	7D	Manufacturer ID. User settable – default is 7D.
	22	Device ID for the MIDI Patch Changer.
	33	Command type.
	ch_msn	Chain # msn
	ch_lsn	Chain # lsn
	<	
	:	13 bytes of ASCII data for the Chain Name
	>	
	<	
	:	Eighteen Preset “links” in msn/lsn byte pairs.
	>	
	00	Reserved
	00	Reserved
	F7	End of System Exclusive

Received: ACK packet

F0 7D 22 33 06 03 41 F7

Universal Device Inquiry

In response to the Universal Device Inquiry command (F0 7E 7F 06 01 F7), the keypad responds with a 16-character ASCII string indicating the product name and version. For example, "MIDI Patch v3.10".



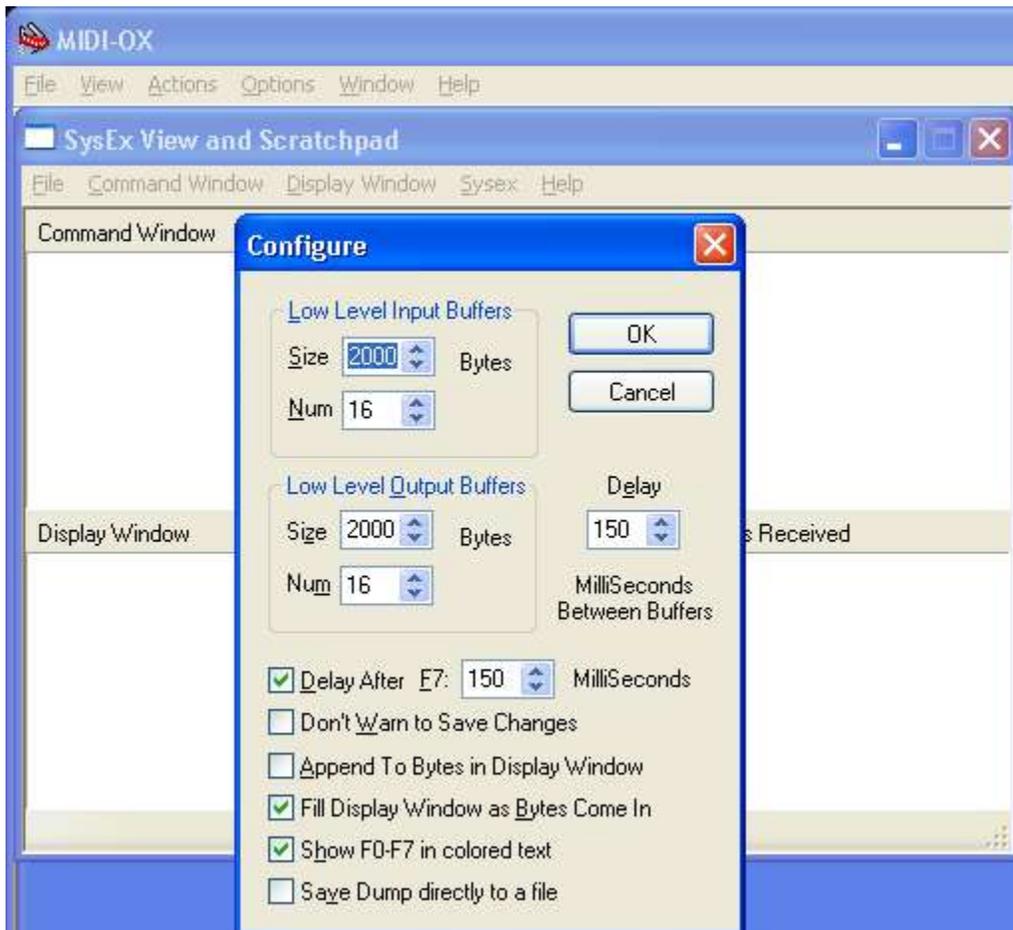
Appendix B: Sys Ex Firmware Update via MIDIOX

You can “reflash” the firmware in the MIDI Patch Changer using the supplied PC editor or by carefully following the procedure outlined in this section. Obtain the latest firmware in .SYX format from the website. Again we show the process using MIDIOX, but you should be able to use any similar program (and of course the editor/librarian on a Windows PC).

Configure MIDIOX

The configuration is the same as described in the Download Preset section of this manual. It is repeated here for convenience. Set the Sys Ex properties of MIDIOX by clicking:

View -> SysEx... then SysEx->Configure .



Use the recommended setting shown in the above Configure panel.

Prepare the Keypad for Download

You must use the 5-pin DIN cable/box for firmware upgrades. You cannot upgrade using the provided MiniTerm USB cable. The firmware upgrade will not affect your stored presets (unless the firmware upgrade is designed to add new features that make the old preset data invalid).

There are two ways to set the keypad in a mode that accepts new firmware.

3. The first method is using the UTIL menu. Press the **UTIL** button and then press the **down** arrow key repeatedly until you see the menu item:



Press **ENTER** and when prompted to confirm (`ENTER to upgrade`), then press **ENTER** again. At this point the MIDI Patch Changer passes control to the internal MIDI Loader.



4. The other method can be used even in the unlikely event that you “brick” the firmware (cause the device to malfunction due to improper reprogramming). In this case unplug the keypad. Press and hold down **CLEAR** and **ENTER**. With these two keys down, plug in the powered 5-pin DIN cable/box. Once power has been applied through the box to the keypad, release the keys. You should see:



Test the Communication

If you send a Universal Device Inquiry system exclusive packet to the keypad, it will respond with the MidiLoader version packet. In MIDIOX, click:

View -> SysEx...

Then from the SysEx menu click

Command Window -> Load File...

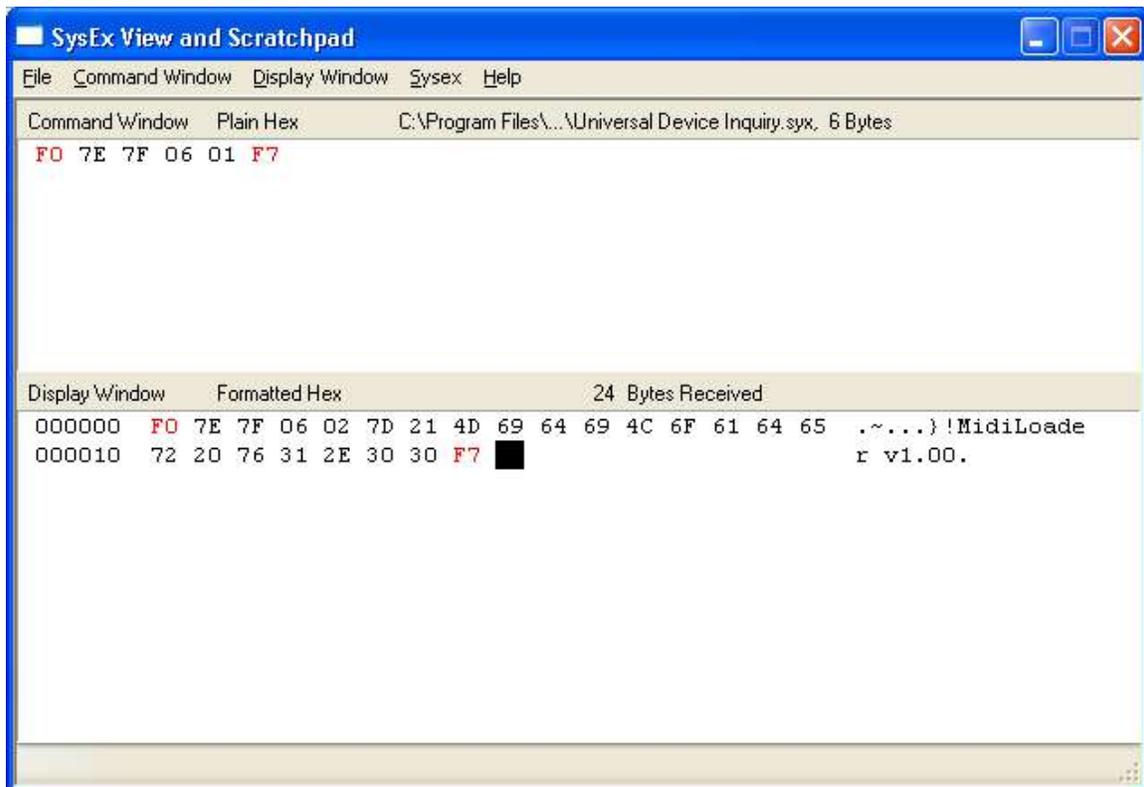
Choose the file **Universal Device Inquiry.syx** and click **open**. Click

Command Window -> Send/Receive Sysex

The keypad will respond with 24 bytes. Click on **Done**. Next click on

Display Window -> Hex View Swap

You may have to enlarge the window a little, but you should see something like this:



Now you can proceed with the firmware upgrade.

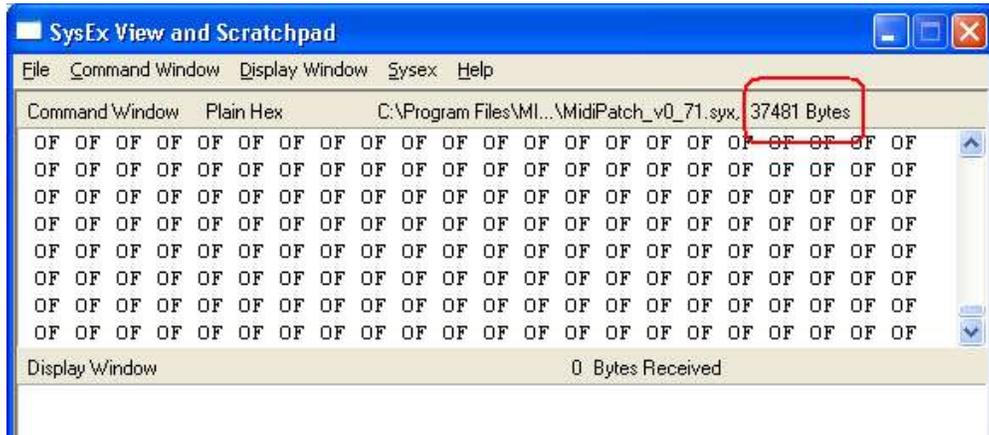
Firmware Upgrade

Close the SysEx View window and open it again to get an empty window. If you are prompted to save anything, click **No**.

Open the new firmware file by clicking

Command Window -> Load File...

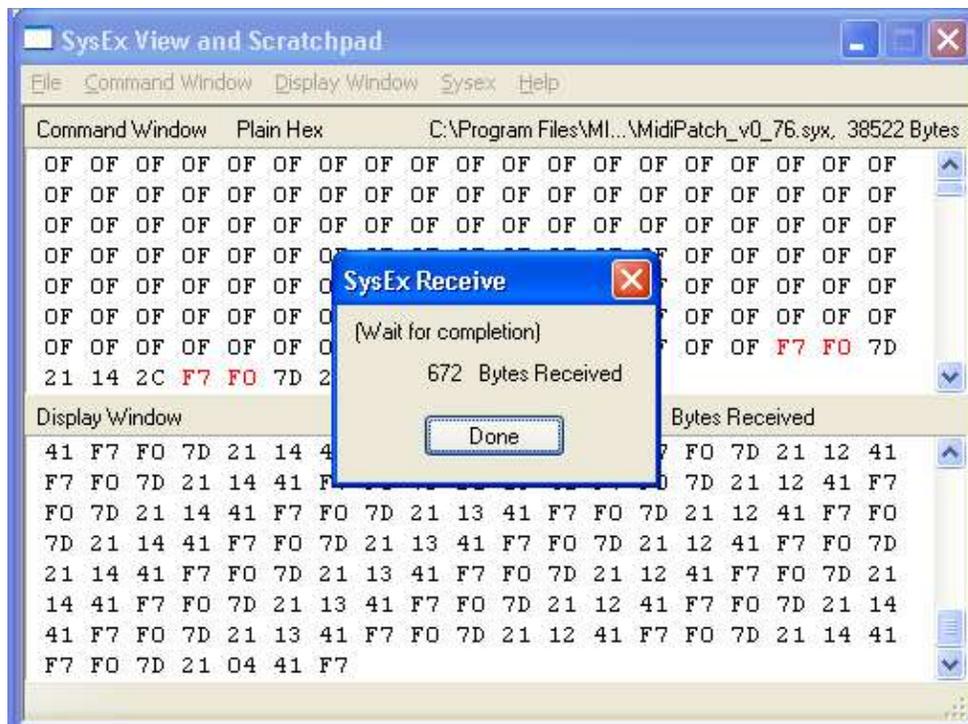
Choose the file required for the upgrade (E.g. MidiPatch_v1_00.syx). You should see that a fairly large file is opened.



Click on

Command Window -> Send/Receive Sysex

The upgrade takes approximately 30 seconds. Do not touch the computer or keypad during this time. At the end of the upgrade the keypad will reboot. Also the MIDIOX screen will show a fairly large number of transactions.



You can close MIDIOX (don't save anything) and begin using the updated keypad.