08-02-2013, 09:34 PM

Lackan110f
Junior Member

Teisco SX400 MIDI install

I have a Teisco SX400 wich I very much would like to find a suitable MIDI retrofit for. It has the CV/Gate jacks, but that turns it in to a mono, and I really would like to be able to control it in poly m

As for functions - I really only want key on/off. Even the MIDI-channel can be fixed, doesn't matter, just as simple as possible!

The keyboard is a matrix-type, divided in to 8 lines. But I haven't been able to find a matrix layout for the keyboard. Maybe I can measure the lines to determine how they are divided if this is cruci

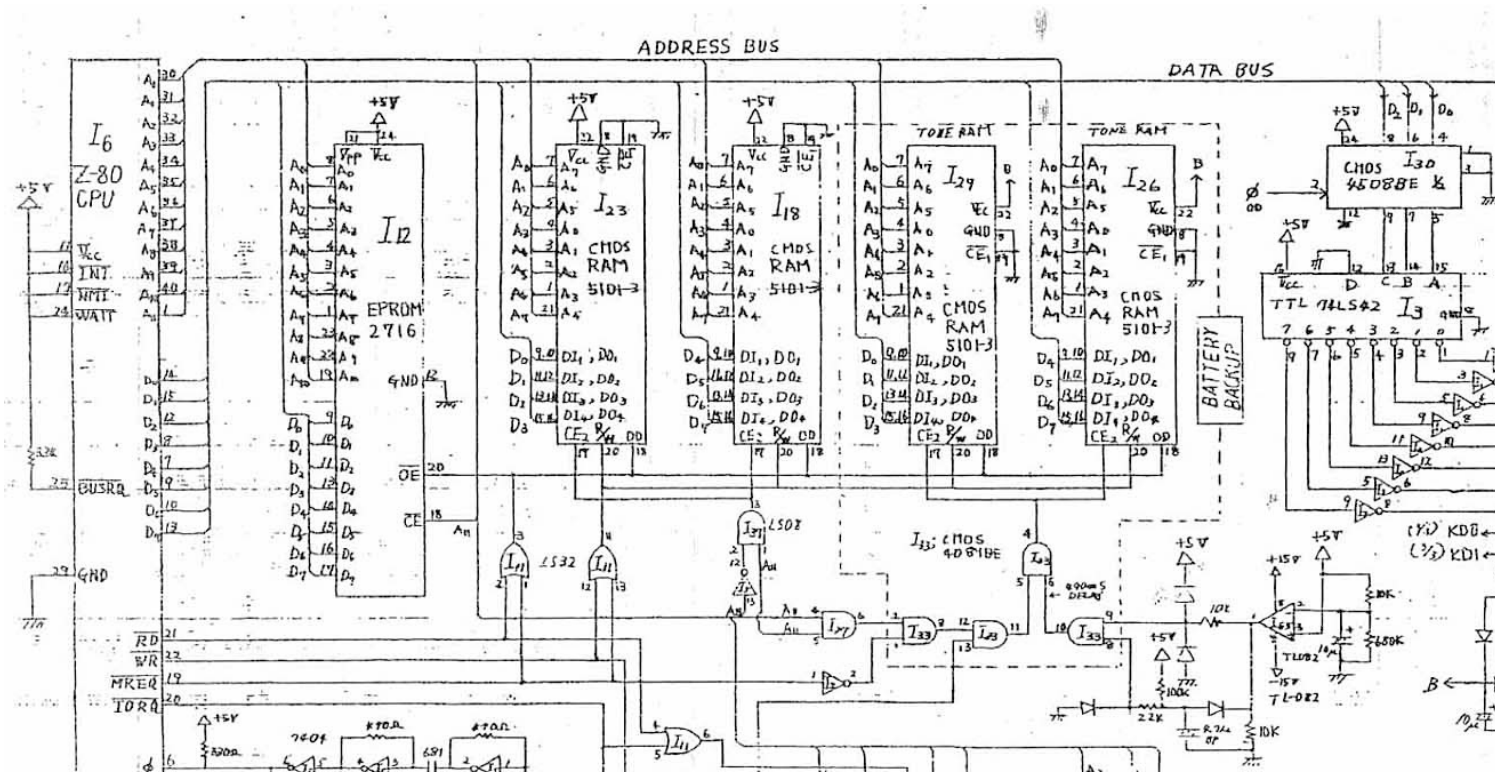
One weird thing is that besides the 10 legged connection there is another 5 legged connection from the keyboard (see the schematics attached).

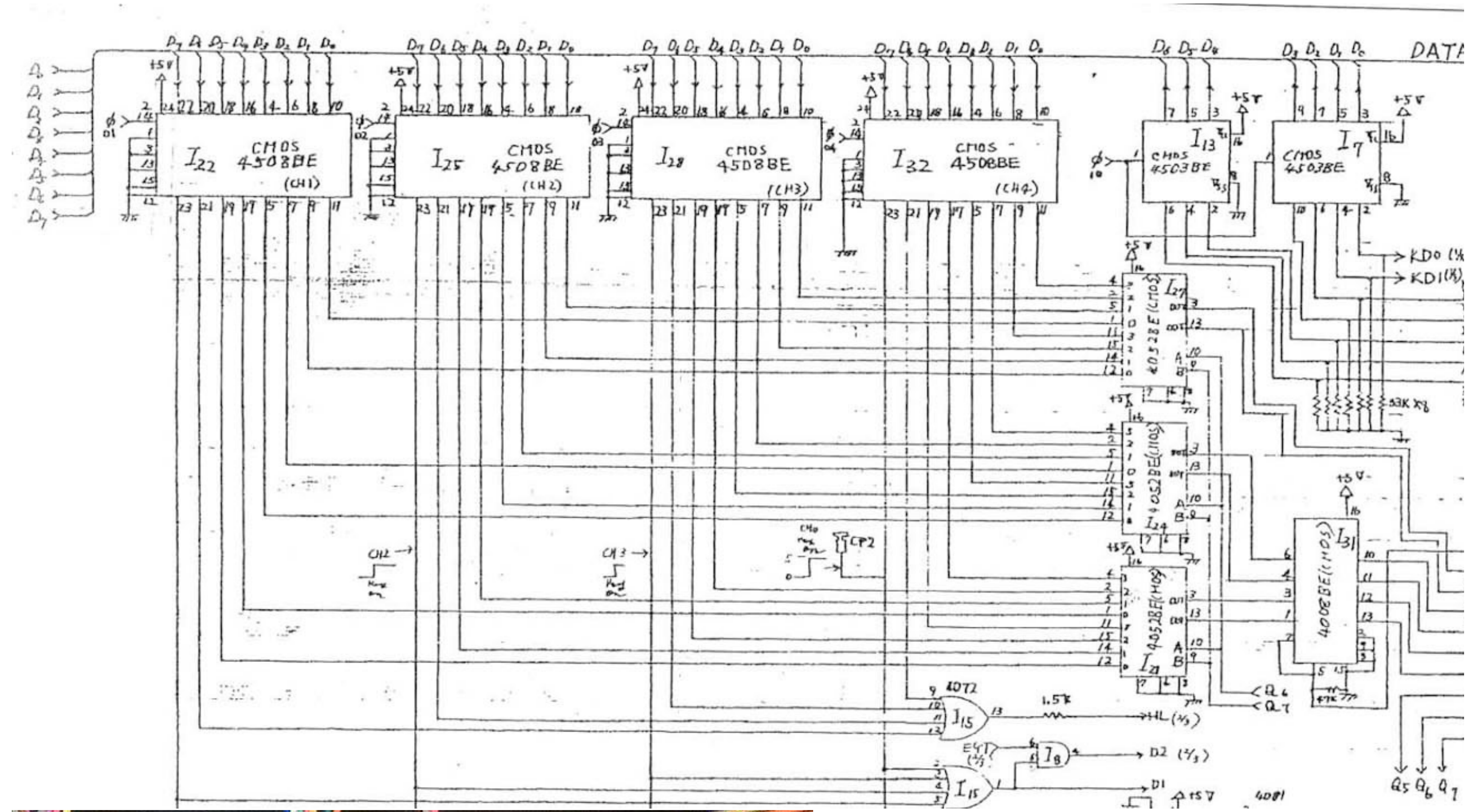
I really have no clue to what this does. Could it be to control the aftertouch? The complete schematics can be downloaded at:
http://home.telfort.nl/~smeyer/teisco/sx-400.html

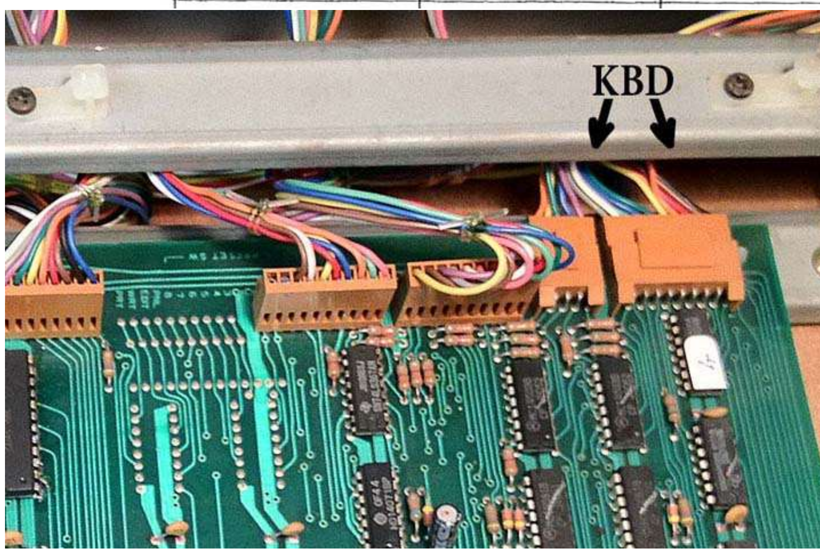
What I finally would like to know - do you think that the UMR2 will fit in my SX400 and solve my problems?

best/Peter

Attached Images







08-05-2013, 04:39 PM #2

John
Moderator

Join Date: Jan 2009
Posts: 3,007

Hi Peter, welcome to the forum.

Yes, the UMR2 might work, but a little more information is needed. Usually you can map out the keyboard schematic by visual inspection (a continuity tester will also help) of the keyswitch PCB. If you can sketch the schematic and post it, that will help a lot.

The other thing to check out is the voltage of the logic signals on the keyboard matrix. The UMR2 requires 5V logic, so some level shifting will have to take place if the keyboard uses larger voltages.

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08-06-2013, 08:52 PM #3

Lackan110f
Junior Member

Join Date: Aug 2013
Posts: 10

Hi John and thank you, this is great news. I am away from home right now, but as soon as I get back I will check the keyboard lines more careful. I am pretty sure that it is 5V so that won't be a problem.

What is the easiest way to identify the matrix? Is it with a scope and check each line, where it starts and ends?

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08-07-2013, 02:57 PM #4

John
Moderator

Join Date: Jan 2009
Posts: 3,007

Quote:

> Originally Posted by **Lackan110f**
> *Hi John and thank you, this is great news. I am away from home right now, but as soon as I get back I will check the keyboard lines more careful. I am pretty sure that it is 5V so that won't be a problem.*
>
> *What is the easiest way to identify the matrix? Is it with a scope and check each line, where it starts and ends?*

Yes, a scope will help a great deal. For some background information about how the UMR2 interfaces with a switch matrix, see:

http://forum.highlyliquid.com/showthread.php?t=1133

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08-14-2013, 10:48 PM #5

Lackan110f
Junior Member

Join Date: Aug 2013
Posts: 10

Now I have measured the SX400 keyboard, and it doesn't work at all as I first suspected:

There is a 10-pin and a 5-pin cable going from the keyboard. The first 8 pins of the larger cable determins the part of the keyboard that is active.

The last 2 pins and all of the 5 pins on the smaller cable determins what key is played.

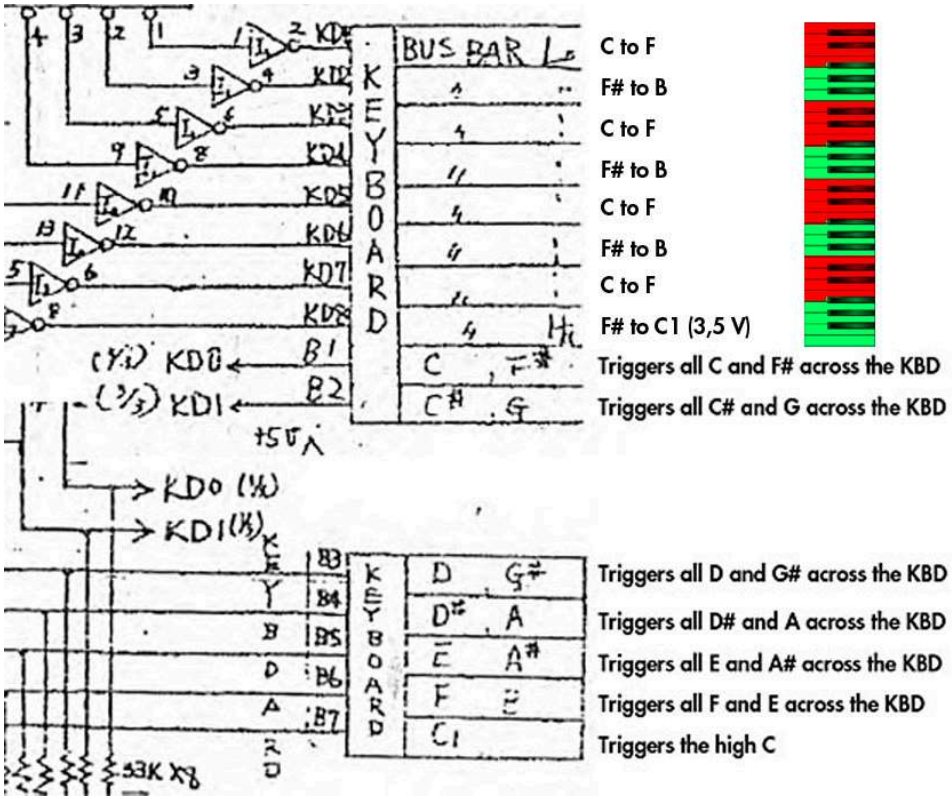
The voltage on all pins are very low (150 mV circa) but there is a positive jump the first millisecond when triggered. i.e from 150 mV to 155 mV. But when pressed for a longer period it drops from 150 to 145 mV.

All except for pin nr 8 (the uppermost part of the keyboard). There is a 3,5 V carrier going on at all times. But when triggered it first makes a positive millisecond jump, but then drops to 3,2 V when pressed longer.

Please see my image.

Have you ever encountered this type of keyboard before? Do you think that there is any hope to be able to midify this keyboard?

Attached Images



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08-19-2013, 04:25 PM #6

John
Moderator

Join Date: Jan 2009
Posts: 3,007

As far as I can tell, this is a 8x7 active-high matrix. "Bus bar" lines KD1-KD8 appear to have line drivers/buffers, suggesting that they are the select lines. Lines B1-B7 appear to have pull-down resistors, suggesting that they are the data lines. It looks like the last data line serves only a single key (the highest C, or 49th key, which is orphaned by the 8x6 arrangement of the other keys).

Measurements from a voltmeter can be misleading because the speed of the select signals are much faster than the refresh of the voltage reading. Therefore, changes in the select/data signals will "read" as slight changes in DC voltage, since it is only displaying the average voltage over time as the signal changes state rapidly between low and high voltages.

To get a better idea of how things are working, using an oscilloscope to see the signals will help a lot.

Again, this article will provide information about how a keyboard matrix typically functions:

http://forum.highlyliquid.com/showthread.php?t=1133

The best thing to do is to inspect and sketch a diagram of the switches and diodes on the key switch PCB. That will provide a definitive strategy for connecting the UMR2.

Last edited by John; 08-19-2013 at 04:36 PM.

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08-20-2013, 09:55 PM #7

Lackan110f

Join Date: Aug 2013
Posts: 10

Junior Member

Hi John and thank you for being so patient with me. Iam a total noob when it comes to this. When you explain it like that, it seems so obvious.

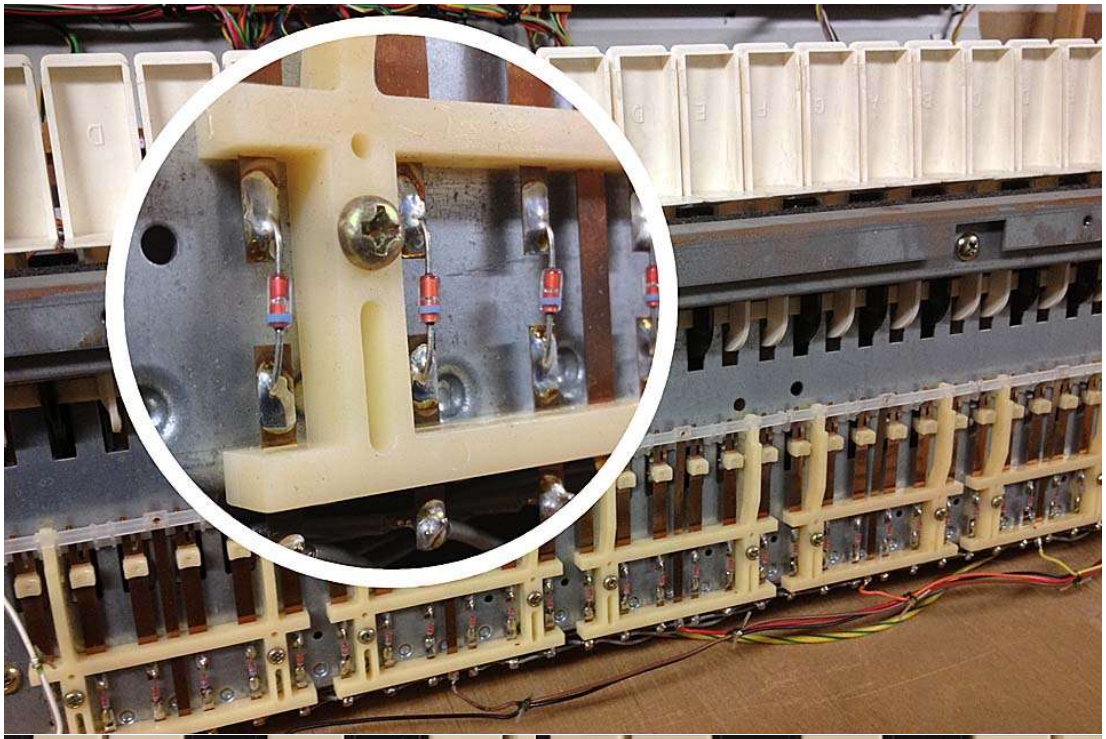
You are totally right regarding the "Bus bar" being the select-lines and the "key"-lines being the data-lines. And the highest "C" is a line for it self.

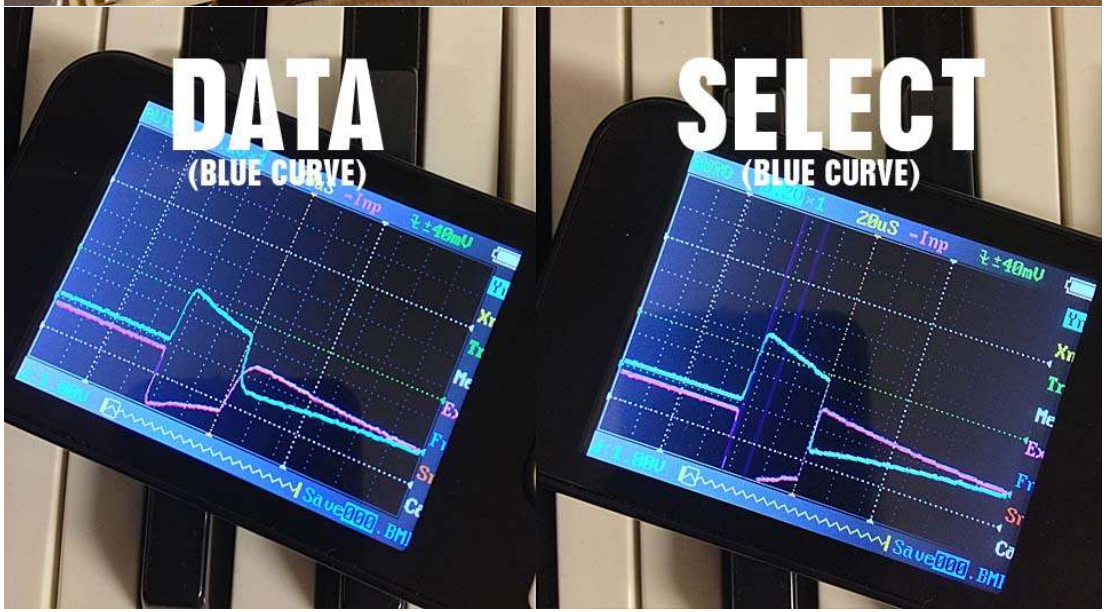
When I measured with an oscilloscope I also found out that it is a clear case of "Active-High Select" Matrix keyboard. In other words is this a very typical matrix keyboard!!! So hopefully will the UMR2 work. (fingers crossed, fingers crossed)

I have taken some pictures of the underside of the keyboard (there is no keyboard PCB) but you can clearly see the diodes. I also post the scope-readings. (Sorry, but the only scope I own is a low budget hand-held one, the blue curve is the real one).

Is there any more information you need to be able to determine how to hook up the UMR2 to this?

Attached Images





Last edited by Lackan110f; 08-20-2013 at 09:58 PM.

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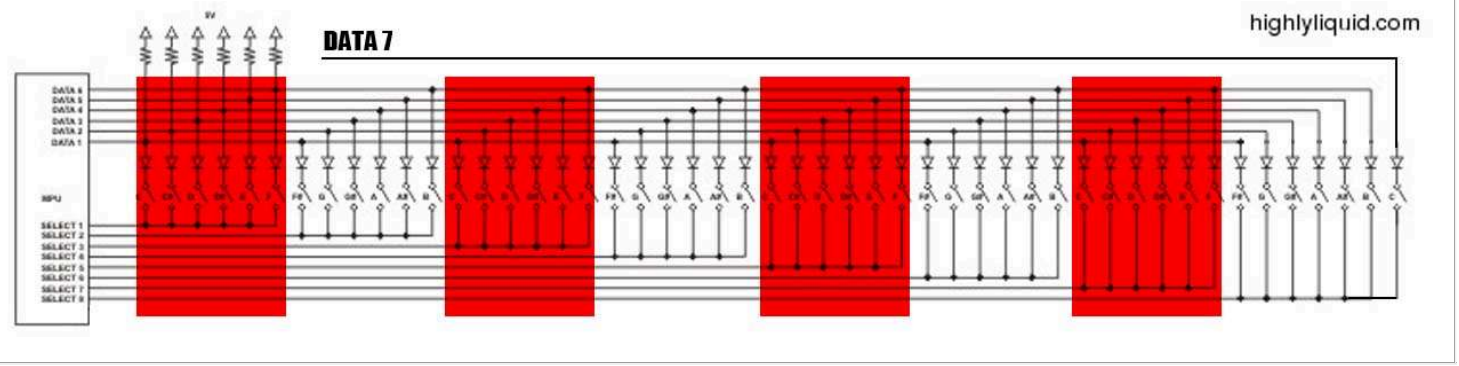
08-21-2013, 10:48 AM #8

Lackan110f
Junior Member

Join Date: Aug 2013
Posts: 10

If I understand correctly, the matrix looks something like this. Very similar to your Casio-example, but with an extra data-line for the high "C" and one select-line less for the upper part. Can this be right?

Attached Images



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08-26-2013, 05:47 PM #9

Lackan110f
Junior Member

Join Date: Aug 2013
Posts: 10

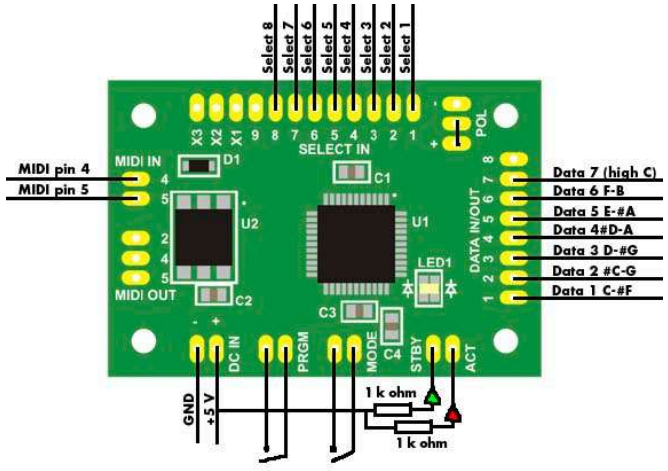
Hi John, forgive me for being impatient :) But given the input from you, in combination with reading the UMR2-manual I have come to a conclusion regarding hooking up the UMR2 with my TeiscoSX400.

Can you please confirm that this is correct, and I'll go ahead and order it!

best regards, Peter

PS: I don't want midi-out, just midi-in on it.

Attached Images



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08-27-2013, 03:59 PM #10

John
Moderator

Join Date: Jan 2009
Posts: 3,007

> Quote:
>
> Originally Posted by **Lackan110f**
> *Hi John, forgive me for being impatient :) But given the input from you, in combination with reading the UMR2-manual I have come to a conclusion regarding hooking up the UMR2 with my TeiscoSX400.*

Your wiring diagram looks OK to me. :) I look forward to hearing about your results.

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09-12-2013, 11:02 PM #11

Lackan110f
Junior Member

Join Date: Aug 2013
Posts: 10

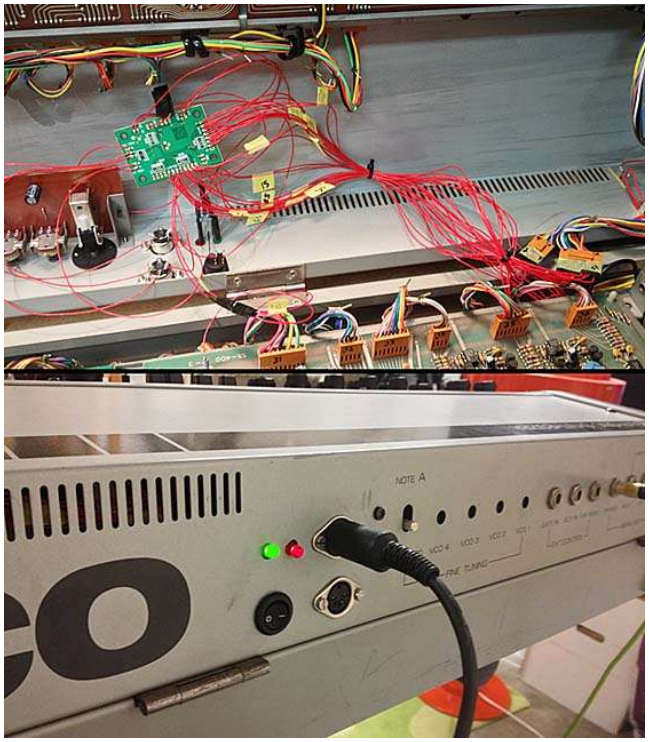
Now I finally got the time to install the UMR2 and it works like a charm! What a great product you have there. I decided on going all the way and installing the thru/out jack with a switch and external LED's just to make it look nice.

And it all works 100% - in/thru/out! Thanks a million, it really turns the SX in to a new synth for me!

And yes - my little chart is the correct way to hook up the SX. And I really can recomment it to all SX-owners out there (but I have a feeling we aren't that many).

best regards, Peter

Attached Images



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09-28-2013, 03:23 PM #12

John
Moderator

Join Date: Jan 2009
Posts: 3,007

Quote:

> Originally Posted by **Lackan110f**
> *Now I finally got the time to install the UMR2 and it works like a charm! What a great product you have there. I decided on going all the way and installing the thru/out jack with a switch and external LED's just to make it look nice.*
>
> *And it all works 100% - in/thru/out! Thanks a million, it really turns the SX in to a new synth for me!*
>
> *And yes - my little chart is the correct way to hook up the SX. And I really can recomment it to all SX-owners out there (but I have a feeling we aren't that many).*
>
> *best regards, Peter*

Hi Peter,

That's great news. Thank you for posting your results and your photos!

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09-29-2013, 08:21 AM #13

Lackan110f
Junior Member

Join Date: Aug 2013
Posts: 10

I didn't have any flat cables at home, so I used separate wires for all 40 connections. I realize it looks like sh*t with all those cables. But it works.

For a nicer looking result (on the inside) I'd strongly recommend flat cables...

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04-21-2015, 03:47 PM #14

RepublicaTim
Junior Member

Join Date: Apr 2015
Posts: 3

This is genius! I have an SX400 and will installing this as soon as I can, any other tips Peter??

Tim

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04-30-2015, 12:29 AM #15

John
Moderator

Join Date: Jan 2009
Posts: 3,007

Hi Tim, welcome to the forum. I hope you'll post your results!

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09-29-2015, 01:43 PM #16

Lackan110f
Junior Member

Join Date: Aug 2013
Posts: 10

Quote:

> Originally Posted by **RepublicaTim**
> *This is genius! I have an SX400 and will installing this as soon as I can, any other tips Peter??*
>
> *Tim*

Hi Tim

Besides from using flat cables (which I apparently did not) there is not much to say. A great midi kit and it is very reliable together with the SX400.

The soldering is of course a bit tedious, but sooo worth it in the end.

best of luck / Peter

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02-11-2016, 09:06 AM #17

RepublicaTim
Junior Member

Join Date: Apr 2015
Posts: 3

Hi again Peter,

Please forgive me as I'm a complete noob to this sort of thing but can I pick your brains again about the SX400 and the UMR2? I can't read schematics and have very little electronics knowledge but thanks to a bit of practicing my soldering chops are now up to the job! A couple of questions then.

1. Where did you run the DC power for it from?
2. Where and how did you connect the select and data lines to?

I probably won't bother with the LED's or midi out but will be getting in some flat cables!

Were you the chap on Facebook with 2 x S60f, S110f and SX400 that had the UMR2 fitted? You can also get me at timstudio@sky.com

Cheers

Tim

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03-10-2016, 11:57 AM #18

Lackan110f
Junior Member

Join Date: Aug 2013
Posts: 10

Hi Tim

Yes, I'm the bloke with all the Teiscos.

The +5 V and GND you can lift from anywhere, just use a multimeter and measure the lines. I thing I got it from the upper right corner of the OSC-board. But I don't remember exactly, it was a while ago, but there's a lot of places with +5V.

As for the different lines - just check my post #5. The illustration shows the top two most right-handed connectors of the CPU PCB. (upper right corner, lying down) these are the two connections between the KBD and the synth.

So from RIGHT to LEFT : 1-8 on the wide connector is Select 1-8. Then comes Data 1 & 2 (the last 2 lines on the wide connector). Then follows the remaining 5 lines on the smaller connector.

Really simple, but soldering is a chore... Best of luck.

/ Peter

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04-11-2016, 09:58 AM #19

RepublicaTim
Junior Member

Join Date: Apr 2015
Posts: 3

Many thanks Peter, I've elected not to risk doing it myself and it's off to Kent Spong today who's good at that sort of stuff. The keyboard matrix is playing up anyway, only getting the same note out of the bottom octave and nothing above that, she doesn't like being moved

Thanks for your help and being the guinea pig!

Tim

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