

Voyager Old School Mods



Filter Pole selector (1,2,3 and 4 pole)
VCO1 PWM enable/disable (sub osc emulation)

Don Solaris - Jan 2015

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READ THIS FIRST!

By opening the Voyager you are losing warranty and all the rights that come with it. In other words you're on your own. You have been warned!

Author of this manual takes nor responsibility for any damage that you cause to the unit by either improper handling or misunderstanding what was written in this text or simply by incompetence. If you don't know what you're doing, don't do it!

The information, data and other content provided in this manual may not be redistributed by you or any third party, or fourth party, or Republican party, or anyone else. You got that? Thanks!!

Greetz to: Suit&Tie Guy (this guy helped me a lot), Amos (Moog), Andrew Hughes (Moog), Christian Rock (musician), Paolo (mafioso di Synthmania.com), Blaz Rodic, Rainer Buchty, Maison Vague, Yoozer, Diametro, Jules and all the Gearslutz gang.

Places worth checking:

www.moogmusic.com - (sponsored) i was paid 1 mil to put ad in this manual. ONE MILLION!

www.gearslutz.com - best place to ask a bunch of questions and have them answered immediately.

stgsoundlabs.com - if you're into modular, some really cool synth modules in here.

forest - located outside virtual world. worth checking from time to time using a bike.

forest with water well - premium reward in spring / early summer.



Abstract

While original Moog Voyager Old School is a fantastic instrument on its own, over the time a desire grows to obtain one useful feature from its older brother Voyager Performer. A feature that enables user to select the number of poles for its filters as an available choice of: 1, 2, 3, or 4 poles. As you probably (already) know, Old School is permanently set at four pole mode which is fine. However, i had privilege to hear the same Moog ladder filter in 2 pole mode and was blown away! Never in my life I've heard such powerful filter sweep. I own a lot of vintage synthesizers and none compare in this department. While talking to other Voyager Performer users I've came to conclusion that many of them use the synth in default 4-pole mode and had no idea there is an option, or they knew for the option but didn't bother. Big mistake! Moog ladder in 2 pole mode rocks (particularly when used on its own with some spicy modulation)

Of course first thing, upon receiving my Voyager Old School was to gain courage and design a modification, but OTOH i didn't want to touch the virgin status of my Serial No 500 unit which was very special to me. It was officially the last Old School built aka The Last Old School. Never the less, while servicing one Voyager i came with the idea to take a sneak peak into the filter section and try to figure out what's going on in here. After a couple of minutes with the schematics i got the inspiration to do it, because it didn't seemed that complicated. In this manual i will provide all the data required for the mod but without revealing any of the schematics*.

On to the second mod. For those of you who have / had / play or played some of the good ole Rolands, Korgs and others, you probably are familiar with sub oscillator. Usually it is a square wave and is an octave or (if set) two octaves below main VCO. Quite often it is used to beef up the tone of a synthesizer, to give that extra low end push. So far so good, same thing can be emulated on a Voyager. You simply use the third VCO, set it to pulse (square), tune it octave below the other two and you're all set. However there is a little problem. Many of the classic "trademark" sounds on the mentioned analogs used PWM (pulse width modulation) applied to the oscillator, to produce thicker (richer) sounding osc. Ok, Voyager can do PWM too so where is the issue? Well the catch 22 is that once you do a PWM on the Voyager, it affects all three oscillators at the same time, thus killing your "sub osc" emulation that you set on the third oscillator. The reason we want fixed waveform of a sub osc is that it helps maintain the focus and impact of a sound (term some people use is "in your face"). Now if the sub osc is being modulated as well (PWM-ed), the harmonics are moving all around, the sound no longer have stable low end portion and as a result the bass is no longer compact. At least not as compact as when you have a fixed square wave an octave below your main VCOs.

This is where the second mod comes in. I've titled it VCO1 PWM disable/enable and this is exactly what it does. It was intentionally designed to operate on VCO1 only. There are several reasons why i went



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and performance**

**this manual
gives you none**

*The reason behind this is that I've signed an NDA with Moog Music, so please be a good sport and don't bother me asking for schematics (yes, some people tried that already, but got a bubble of cold ozone instead). If your Moog needs service, please send it to service tech. I can't provide any schematics.

for this option. Firstly, VCO1 does not have detune button so it is dead easy to tune it properly - just switch octave and you're done, while its pitch (in semitones) is always perfectly tuned. Second reason was, you still have two other oscillators that you can individually tune and PWM - somehow resembling a setup of an SH-2. And if you want to emulate SH-101, you can do it too. Simply turn off the VCO3, use VCO2 for PWM and VCO1 as a sub osc. Yes, there is a way to disable the PWM on VCO2 and VCO3, but I believe VCO1 route is the best possible option. I know visually it looks more logical to have VCO3 option for enable/disable PWM as it would somehow physically resemble a setup of something like SH-2, i.e. looking from left to right VCO1, VCO2 and a Sub. But, this is better. Trust me.

Intro and Basics

Both mods can be performed in one afternoon and both mods are fully "default state" compatible. This means that at any point you can flip the switch and put the unit into default "non modified" state. We will start with an easier mod. The idea is to give you courage for the later one. I should point out right away that both mods require drilling of the unit and this arrow below shows exactly the location where you will do it.



I should point out that extreme care is required when drilling the unit. First you want to take care for the aesthetics, second you want to make sure no metal bits are left in the unit. The way i drilled it was by putting the Voyager's backs all the way down (prior to that you want to unscrew them!). After drilling the hole i would carefully lift the backs cover a little bit, so that vacuum cleaner can reach the inside part and let it suck all the debris. This is very important part and no debris should be left in the unit. Second thing i should point out is the layout. There is enough space

Couple of years ago I've designed mods for Yamaha CS-15 synthesizer. In the script book i've instructed anyone performing the mods on where to put the switches (back of the unit). Then one day i see a CS-15 on ebay with large bold letters saying "with Don Solaris mods". This seemed cool until i've noticed that the front of the unit was drilled in and some ugly switches were placed there making the whole thing look super hideous. This was a total moment of embarrassment for me because there was nothing i could do at that point to tell people No, I didn't do that, neither i ever instructed anyone to drill the front of the unit and ruin, what was once a beautiful synthesizer! If you decide to drill the front of the unit please make sure you don't mention these are Don Solaris mods. Thanks!

on the top of the unit (that is part above the front) to drill two holes, one for the PWM mod other for the filter pole selector as you can see on my picture. I leave measurement part to you, because i don't know which switch and which rotary are you using. If i would recommend a good rotary it would be: try to find as small as possible! 2x4 contact is all you need (that is 2 in, 4 out rotary switch). If it is 3x4, that will do fine as well - in fact that's the one i've used and as you can see it's still not too big.

What i would again like to emphasize is aesthetics. Please make sure that both switch holes are in line with the existing jacks. NOT UNDER ANY circumstances drill the front of the unit! To make sure things go smooth, start with smaller drill bits then use larger one that fits the diameter of the switch. Please keep in mind that the rotary switch needs a cap so you want to place the cap on the top of the unit and measure carefully the amount of space it takes, just like you want to measure the rotary's width.

It would be very useful to obtain heat shrink tubing for this project since all of the wires in here are in pairs. This will not only make connection wires more robust but will prevent the clutter. For this project you want to use stranded wire, because from time to time Voyager requires opening and regular maintenance such as VCO tuning, calibration of the voltages etc.

no books are boring



but manuals are cool



One day you decide to do some soldering. But to your horror, the soldering iron just wont melt any solder, no matter how long you wait. Chances are you have a dirty soldering iron tip. Lets go offer some solutions

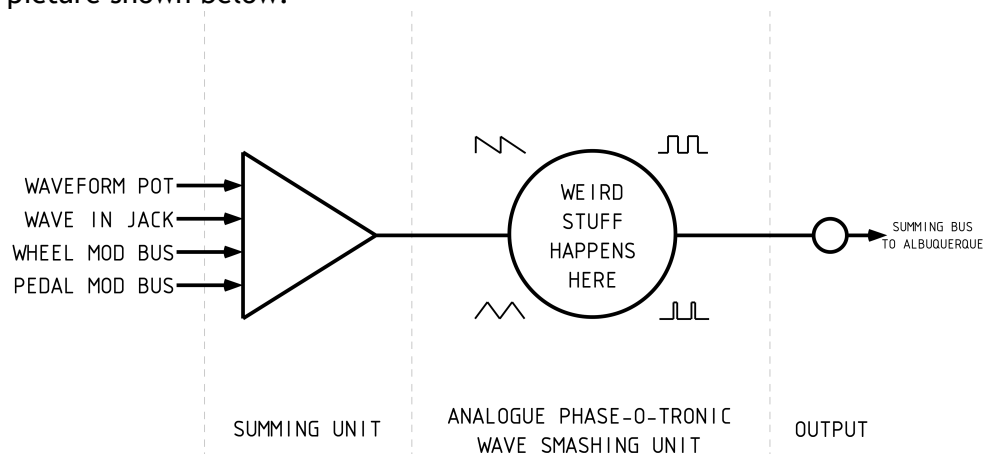
1 get a new tip. depending on what type of soldering iron you have, you can get new tips. There are many different kinds you can get.

2 clean the tip. if you don't already have one, it's a good idea to invest in a tip cleaning sponge. after each soldered connection, clean the tip on the sponge (after getting the sponge damp). You can also buy soldering iron tip cleaners. you put your hot soldering iron tip in them and it will clean the tip, but there will be a lot of smoke.

PWM Disable/Enable

PWM stands for pulse width modulation and as you probably know Moog Voyager can do much more than that (i.e. it can do saw wave modulation) so perhaps i'm not using the correct term here, but you get the point. For years i've had this desire to somehow lock one of the oscillators and now this dream finally came true. Although it is illegal to post Moog schematics it is fully legal to hack the unit (hint: well, you're just losing warranty but we've mentioned that somewhat earlier). Hacking is what we will do here.

Take a look at the front panel. There you will see a knob in wave-shaping section, lets call that Entry 1. Take a look at the top of the unit, and you will notice a jack that says Wave IN. Lets call that Entry 2. Now take a look at the front panel again and spot a Wheel Mod Bus. In there you will notice that one of the destination leads to wave shape. Lets call that Entry 3. Right next to it you will notice a Pedal Mod Bus and once again it provides wave shape as one of the destinations. Let's call that Entry 4. From this we've gathered that there are at least four different sources that lead to the same destination which happens to be the wave shape. Let's now draw all these entries down and we will get something like the picture shown below.



So we have at least four signals that all lead into the same destination. At this point we know that these signals will be / must be followed by at least one op-amp which then leads summed signal into the wave shaping section. Ok where to interrupt the signal then? First thing that comes to mind is right in front of the wave shaper. That way without regard if we use internal or external LFO to drive the wave shape, signal will be stopped and our VCO will remain on fixed waveform settings. Seems cool. However this is not the best place to interrupt the signal. Why? Because if you look on the drawing above you will notice one of the summed signals comes from the front panel (the waveform pot!). So how will you set it to square wave at the first place if you totally interrupt its control. Ok where then?



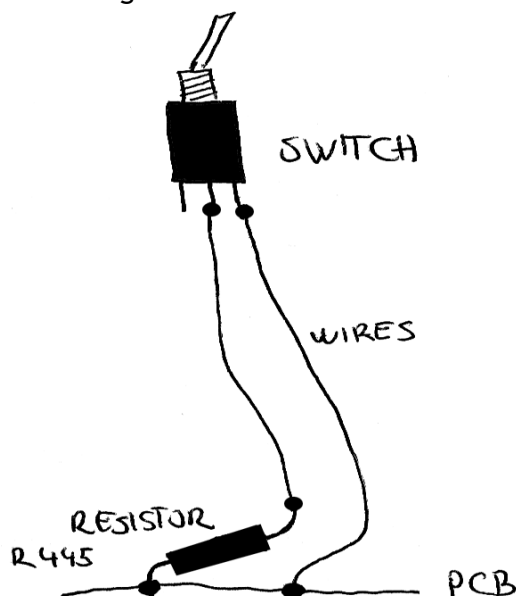
Did you know: The Moog synthesizer was one of the first widely used electronic musical instruments. Early developmental work on the components of the synthesizer occurred at the Columbia-Princeton Electronic Music Center, now the Computer Music Center. While there, Moog developed the voltage controlled oscillators, ADSR envelope generators, and other synthesizer modules with composer Herbert Deutsch.

Moog created the first voltage-controlled subtractive synthesizer to utilize a keyboard as a controller and demonstrated it at the AES convention in 1964. In 1966, Moog filed a patent application for his unique low-pass filter U.S. Patent 3,475,623, issued in October, 1969. He is a listed inventor on ten US patents.

Moog had his theremin company (R. A. Moog Co., which later became Moog Music) manufacture and market his synthesizers. Unlike the few other 1960s synthesizer manufacturers, Moog shipped a piano-style keyboard as the standard user interface. Moog also established standards for analog synthesizer control interfacing, with a logarithmic one volt-per-octave pitch control and a separate pulse triggering signal.

The first Moog instruments were modular synthesizers. In 1971 Moog Music began production of the Minimoog Model D, which was among the first synthesizers that was widely available, portable, and relatively affordable.

We will have to do a little compromise here and i should point out that modification will work on either of the two buses. What i talk about here are the Wheel Mod Bus and Pedal Mod Bus. The result will be just the same and will always work on only ONE of the selected sources. In my example i will use Pedal Mod Bus. But exactly the same thing would work if you performed the mod for the Mod Wheel Bus. Only difference would be - a different resistor would have to be pulled out. For Mod wheel it is R446 and for Pedal Mod it is R445. Your choice here. I prefer R445 and will describe the modification involving R445 and thus the Pedal Mod Bus. Our goal is to interrupt the signal before it enters the summing amp. We will do so by pulling out one leg of the R445 resistor, solder a wire to it, solder other end of the wire to the switch. Solder a wire from the switch to the location where resistor's leg once was. And that is it.

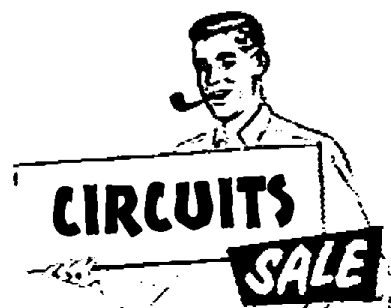


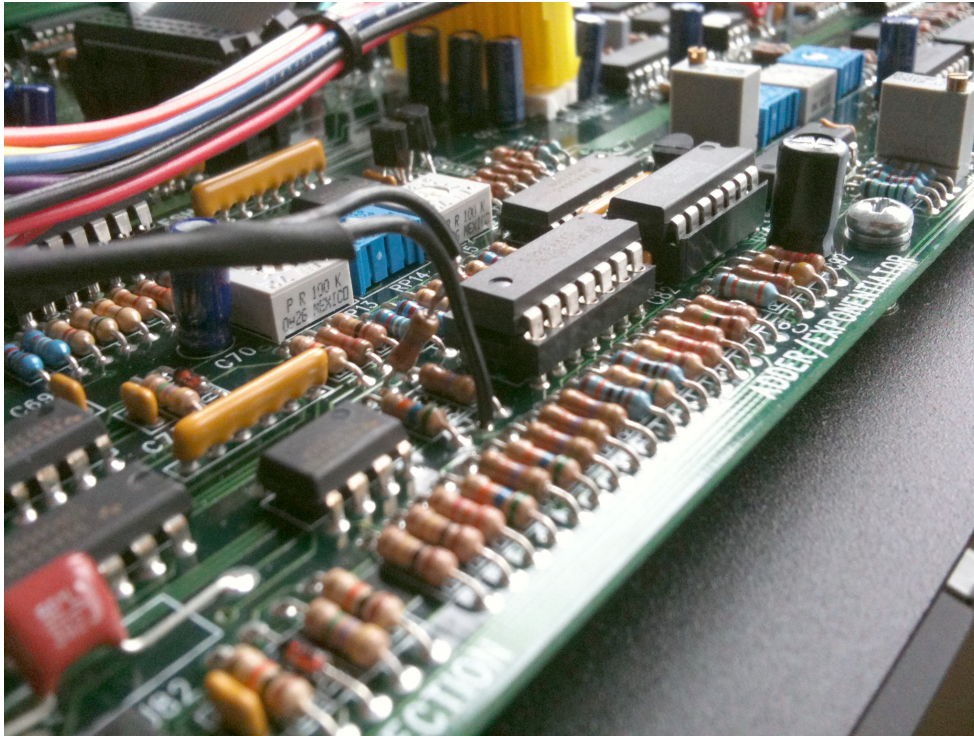
You can test the mod right away. As I've mentioned earlier this mod applies only to the bus that it was enabled on. So in the case of Pedal Mod Bus, it will work **only** there and as following: Pedal Mod Bus destination must be set to Waveform. Dial an amount typical for the pulse width mod i.e. pulse moving in between 50% and 90%. At this point VCO2 and VCO3 will start shaping the waveform aka PWM-ing. However VCO1 will remain static. With the switch enabled, VCO1 will start PWM-ing as well. If you like bass lines and legendary bass synths such as SH-2 or SH-101 you will really enjoy this mod. Don't forget that the SH series next to the 50% pulse (aka square) wave also provide a narrow pulse wave which you can now simply dial on a Moog. And don't forget that the sub osc on mentioned synths can go 1 or 2 octaves down. Within few minutes you will be able to dial in many of the legendary bass lines, just like that! It is of great value if you've worked on these units and know how they perform and know exactly what you want to dial. Typical SH-101 bass popular in House music is one VCO doing the PWM while the sub is set to pulse wave two octaves down. Or if you want ULTRA FAT SH-2 type basses, set two VCOs to PWM, detune them, and use sub osc (VCO1) with pure square set at two octaves below. It will rip your speaker membranes out. (warning issued!)

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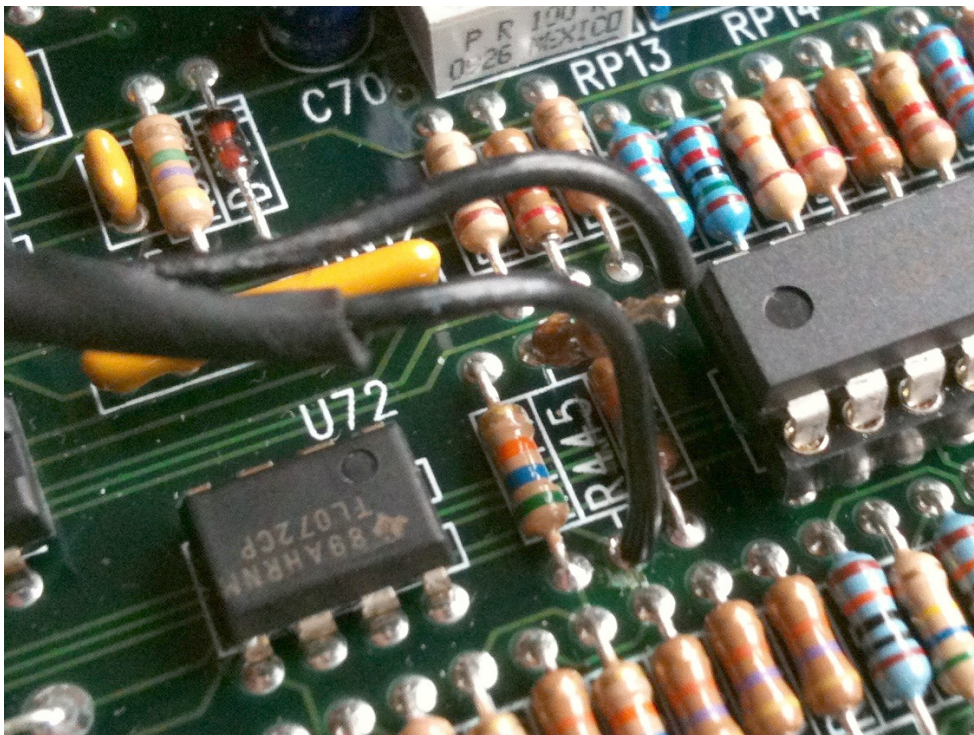




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Here are the pictures that should help you figure out what to do. The resistor you're looking for is located near the bottom edge of the PCB (when looking Voyager board from the back side of the unit). You will spot U72 IC there and right next to it are three resistors. Pull up the middle one. It should read R445. And you're done!

"Unpredictables" are not alone and possess amazing hidden powers of their own!

Are You Abnormal?



YES! YOUR KIND SHALL TRIUMPH!

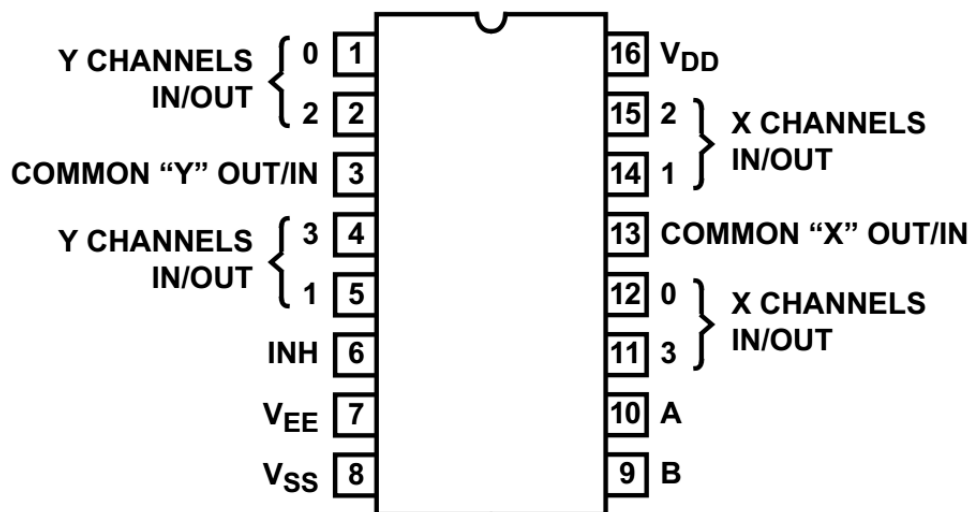
Filter Pole Selector - the theory behind

With every synthesizer, once you build a four pole filter it is easy to go with 3,2, or 1 pole output, since you simply tap to the signal and feed it to the VCA. All this exist in Voyager, both Performer and Old School. Difference is, on Old School it is hardwired to 4 pole, but not directly!! And this is what makes this mod actually very easy when it comes to PCB modifying. There is in fact nothing you have to modify on the PCB itself! No trace cutting, scratching, bridging connections etc. All you will have to do is install two IC sockets. And that's basically it.

Let's take a look what's going in the unit. There are two filters inside. Each has its poles summed on what is basically a 4 channel differential multiplexer - which in this case is set as an analog switch. **Just in case you're quickly browsing thru this manual and decided to skip the "boring parts"**, there are two filters inside Voyager and that means two multiplexers - therefore we will have to do the modification twice.



CD4052B (PDIP, CDIP, SOP, TSSOP)
TOP VIEW



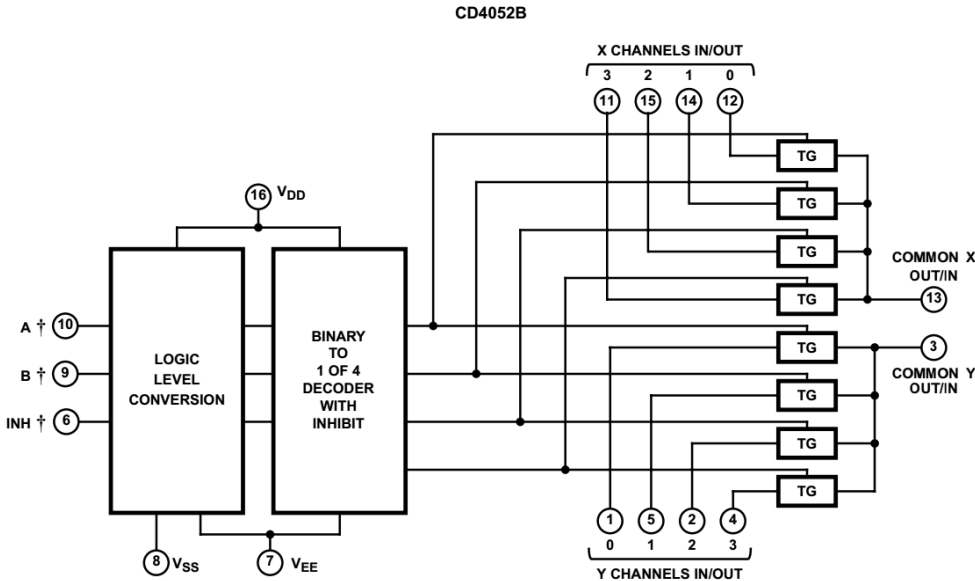
While others were worried over tongue tests, Moog constructed his own theremin back in the 1948. Later he described a theremin in the hobbyist magazine Electronics World and offered a kit of parts for the construction of the Electronic World's Theremin, which became very successful. In the late 1980s Moog repaired the original theremin of Clara Rockmore, an accomplishment he considered a high point of his professional career. He also produced, in collaboration with first wife Shirleigh Moog, Mrs. Rockmore's album, The Art of the Theremin. Moog was a principal interview subject in the award-winning documentary film, Theremin: An Electronic Odyssey, the success of which revived interest in the theremin. Moog wrote the foreword to Theremin: Ether Music and Espionage, the biography of Leon Theremin by Albert Glinsky, published in 2000. Moog Music went back to its roots, and once again began manufacturing theremins. Thousands have been sold to date, and are used by both professional and amateur musicians around the globe. In 1996 he published another do-it-yourself theremin guide.

The way this multiplexer operates is that there are two binary inputs (labeled above as A and B) which then select 1 of 4 pairs of channels to be turned on and connect analog inputs (pins 1,2,4,5,11,12,14,15) to the outputs (pins 3, 13 labeled as Common). The way the channels are set is the way the poles will be accessed. This way we can have any combo of 1 to total of 4 poles at its output since each individual pole enters this IC.

Hacking time. Since no schematics can be revealed we can only do some guess & try work, which in fact i already did for you, so you'll just have to take my word for it. When measuring binary inputs at stock Voyager OS configuration it turned out they were both set to ON.

From this we can gather that 4 pole means A=ON, B= ON. Since i've installed the IC socket at this point it wasn't so hard to do the rest of guess work, lift a pin, connect either +5V or 0V and check the pole configuration. It turned out that a 1 pole configuration requires: A=OFF, B=OFF. While 2 pole configuration is: A=ON, B=OFF. From this we know that 3 pole configuration must be: A=OFF, B=ON.

CD4052B			
INHIBIT	B	A	
0	0	0	0x, 0y
0	0	1	1x, 1y
0	1	0	2x, 2y
0	1	1	3x, 3y
1	X	X	None



The schematic above reveals much better the way this multiplexer operates. What i wrote above as ON and OFF is in truth table (shown above) written as 1 or 0. I just wanted to make it easier for the reader (i.e. logic gate is set to ON or OFF), because in reality (in the case of Voyager) that "1" is actually +5 Volts while "0" is 0 Volts. The less the numbers in the book the more people are likely to read it. To summarize whole thing, the switching matrix (logic) for this integrated circuit works as following:

- 1 pole: A=0V, B=0V
- 2 pole: A=+5V, B=0V
- 3 pole: A=0V, B=+5V
- 4 pole: A=+5V, B=+5V



Filter Pole Selector

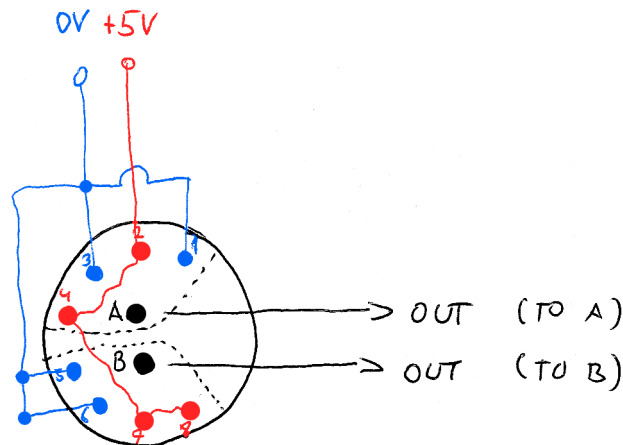
Since we covered the drilling earlier i won't spend much time here convincing you to be super careful with metal dust, but i'll repeat it once again - just in case. DO NOT let it enter the unit. Use vacuum-cleaner as assisting tool or place Voyager that way so that metal bits and pieces CAN NOT fall onto the PCB (boards with electronic components), because they might cause a short, turning your Voyager into smoke machine, which isn't bad neither (if you have laser installation in your room), the problem is unfortunately it won't play musical notes any more.



**beyond this point
things can get very nasty**

and you have been warned

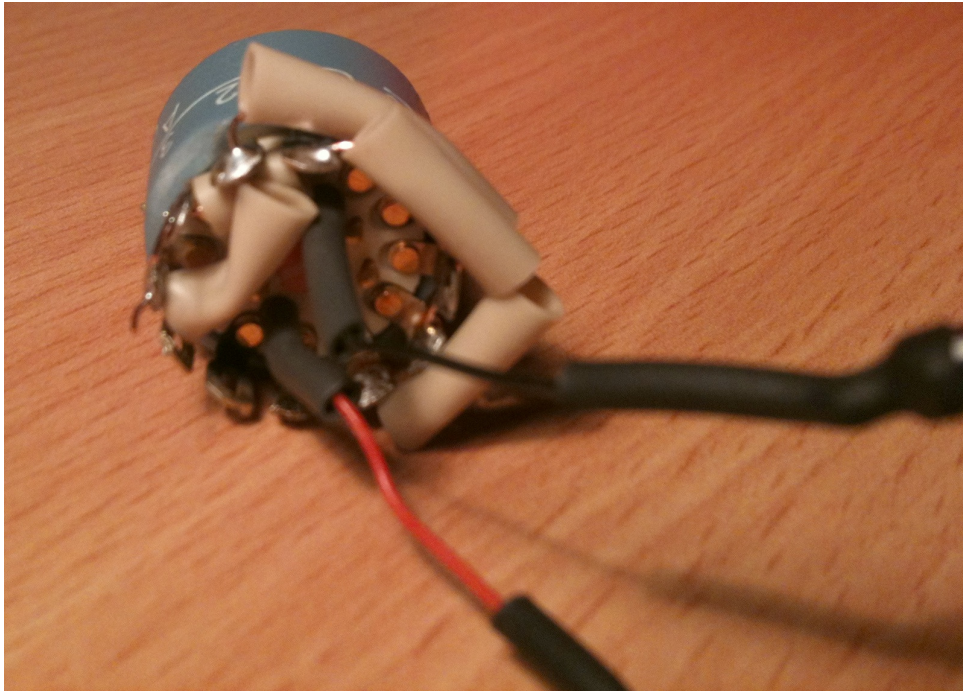
Since we will be controlling 2 bit data and since each bit can be 0 or 1 we need a switch that provides 4 positions and 2 outputs (one for each "bit"). We are going full retro here. No fancy CPU control here for something as simple as 2 bits, but a good old rotary switch. If these were good enough to fly rocket to the Moon i'm sure they will be good enough for us. To put in short: an analog switch to control digital data (which in fact is analog voltage) in order to control analog multi switch*. Ha! Beat that Dr. James Gates!



These "round" switches are better known as rotary switches and are usually labeled 2x4 or 3x4 or 2x6 etc. The one you will need is 2x4. It should have at least 8 pins in the outer circle and at least 2 in the inner circle. You can as well use a more common type 3x4 which will be just fine!

Looking at the schematic above we are providing +5 Volts and 0 Volts to the switch. Pins 1,3,5,6 should be connected to 0 Volts and pins 2,4,7,8 should be connected to +5 Volts. A simple wire will do the job. Just make sure you isolate it properly (heat shrinking tubing comes handy in here). This switch lets us generate binary data. In position 1, A is connected to pin 1, B is connected to pin 5. In position 2, A is connected to pin 2, B is connected to pin 6, and so on. If you compare this wiring to the truth table that we mentioned earlier, you will notice they are the same thing. e.g. in position 3, A will provide 0 Volts, B will provide +5 Volts, exactly as required for the 3 pole filter configuration. The goal is to build a "digital logic" using analogue switch - think retro computers!

*CD4052 is a differential 4-channel multiplexer having two binary control inputs, A and B and an inhibit input. The two binary input signals select 1 of 4 pairs of channels to be turned on and connect the analog inputs to the outputs.



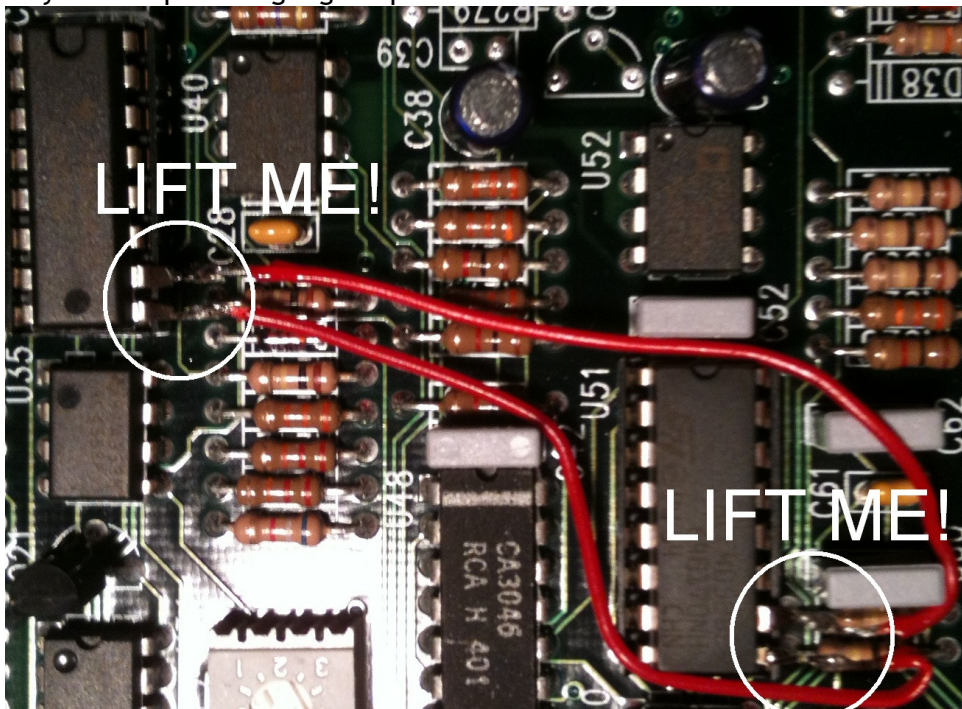
Did you know that **Bob** was a native of New York City. He attended the Bronx High School of Science in New York, graduating in 1952. **Bob** earned a bachelor's degree in physics from Queens College, New York in 1957, another in electrical engineering from Columbia University, and a Ph.D. in engineering physics from Cornell University. **Bob's** awards include honorary doctorates from Polytechnic Institute of New York University (New York City) and Lycoming College (Williamsport, Pennsylvania).

During his lifetime, **Bob** founded two companies for manufacturing electronic musical instruments. He also worked as a consultant and vice president for new product research at Kurzweil Music Systems from 1984 to 1988, helping to develop the Kurzweil K2000. He spent the early 1990s as a research professor of music at the University of North Carolina at Asheville.

Bob received a Grammy Trustees Award for lifetime achievement in 1970. In 2002, **Bob** was honored with a Special Merit/Technical Grammy Award, and an honorary doctorate degree from Berklee College of Music.

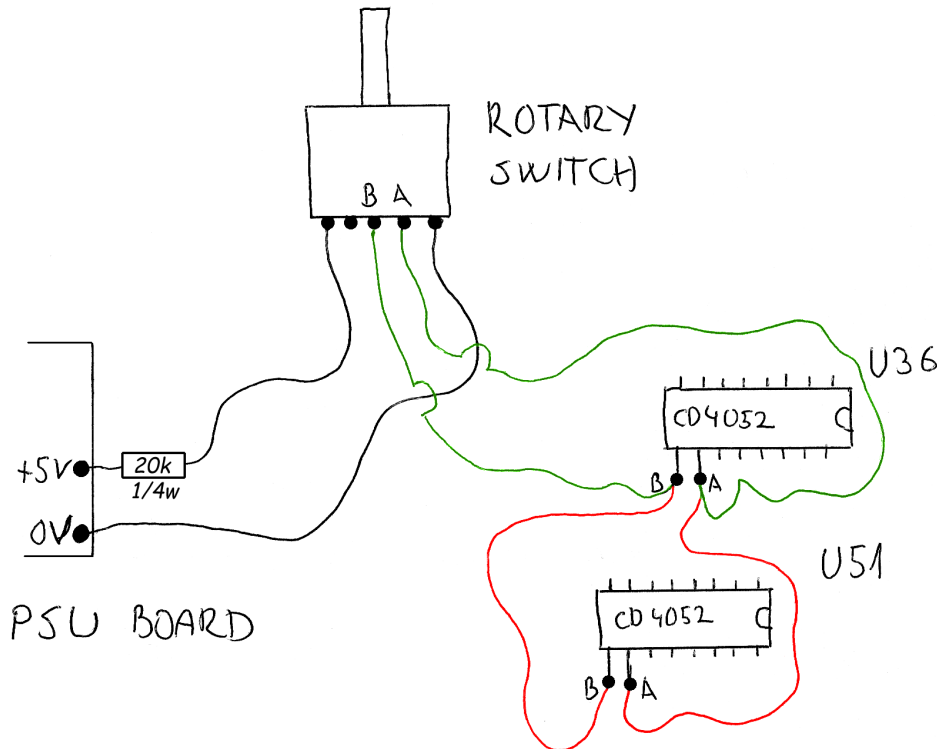
He gave an enthusiastically-received lecture at the 2004 New Interfaces for Musical Expression (NIME-04), held in Hamamatsu, Japan's "City of Musical Instruments", in June, 2004. **Bob** was the inspiration behind the 2004 film *Moog*.

Once you build the "logic" on the rotary switch it should look something like on the image above. Outputs from this switch which i've labeled as A and B should be connected to CD4052 inputs A and B which we mentioned earlier. The exact ICs which you are looking for on the board are U36 and U51. Once you install sockets on U36 and U51 and then install the CD4052 ICs make sure you lift up pins 9 (B) and 10 (A) - labeled as LIFT ME on pic. After which you should connect U36 pin 9 with U51 pin 9. And then U36 pin 10 with U51 pin 10. As shown with red wire in the image below. This way we are providing logic inputs to both ICs at the same time.



Connecting it all together is not that complex, in fact i'm sure you probably figured it already out. But, just in case here is the "schematic" that shows how to connect the rotary switch to the CMOS chips we discussed earlier. Shown in green is the line that provides logic A and B for the U36 and U51 CMOS chips. It comes from a rotary switch (which itself is a logical circuit we designed earlier). Red lines show what we already described on previous page, two CMOS chips connected together at pin9-pin9 and pin10-pin10.

i will sell you the future



Please pay attention to A and B. If you connect them wrongly the switch will behave wrongly eg. you will have 1pole, then 3pole, then 2pole then 4pole. In case such scenario happens, don't worry, just switch A and B wires and you're all set. This is the reason i've used little pins (if you look at my photos) so that at any moment wires (output) from the switch can be disconnected from the CMOS chips. Not only i can switch A and B if i want but i can remove the PCB board from the Voyager without need to solder/desolder anything. I just have to pull the plugs and board goes out. My advice is you do the same. A simple "jumper" type pins can be purchased as well as their counter "female" parts which fir perfectly in.

what you can do today

Where does the power come from? Luckily Moog engineers (probably knowing you will do hacking in their machine) already provided us a few spare terminals where we can hook up the +5V and 0V wires. These are located on the little PCB board. You will notice on the schematic there is a 20k resistor. I've put it there as a current limiter (probably not needed but just in case) and as a safety device in case you connect something wrong, this resistor should turn black with some cool smoke effects. Better that than anything on the precious PCB board. Any value around 20k should work ok and make sure you use 1/4 watt - as weak as possible.



leave it for tomorrow

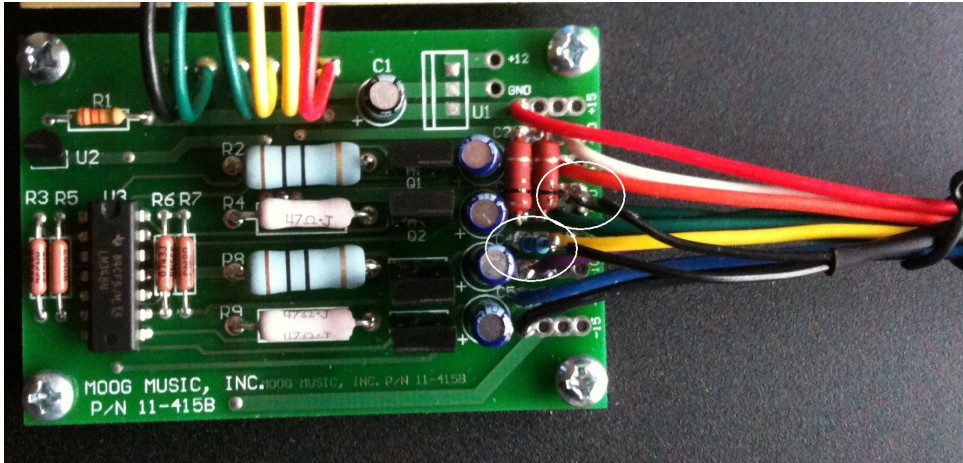
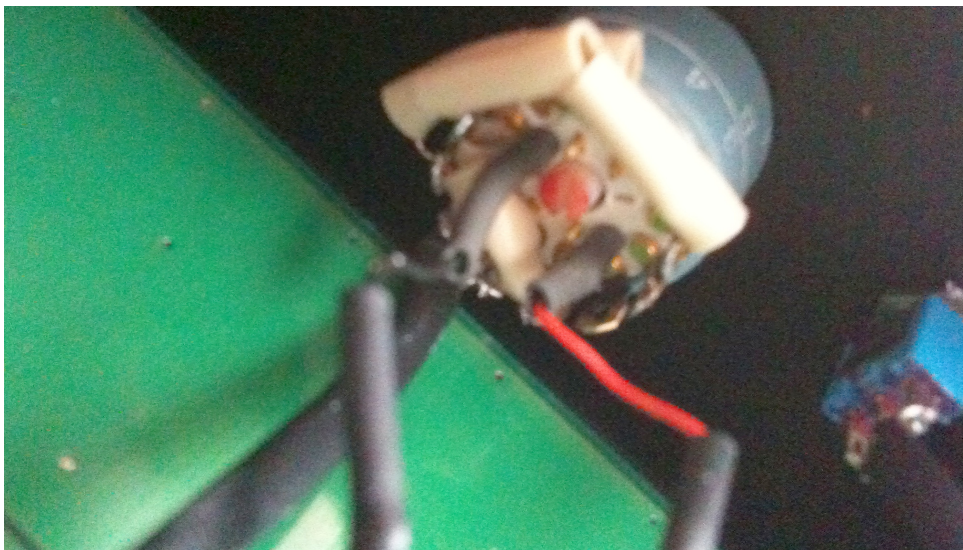
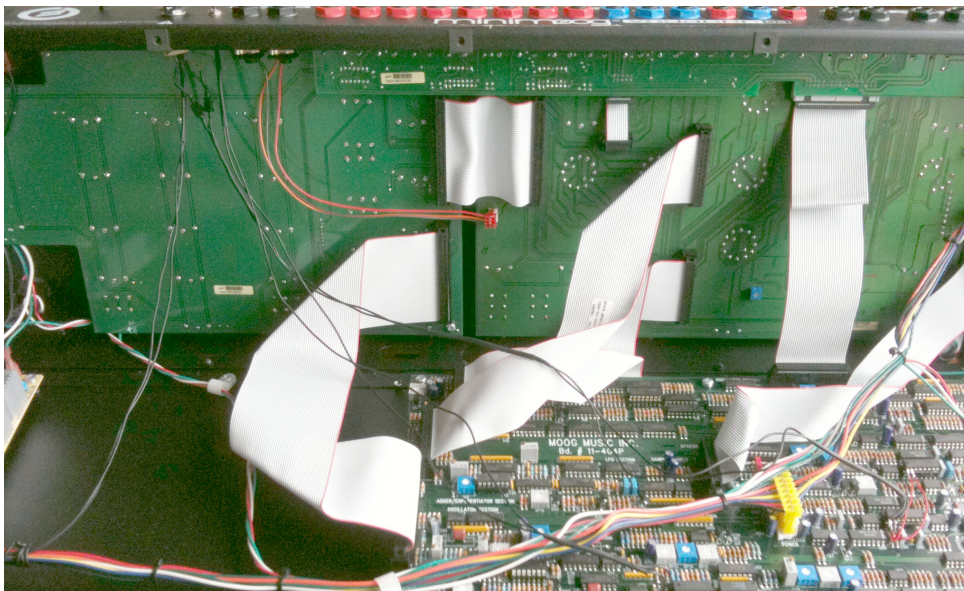
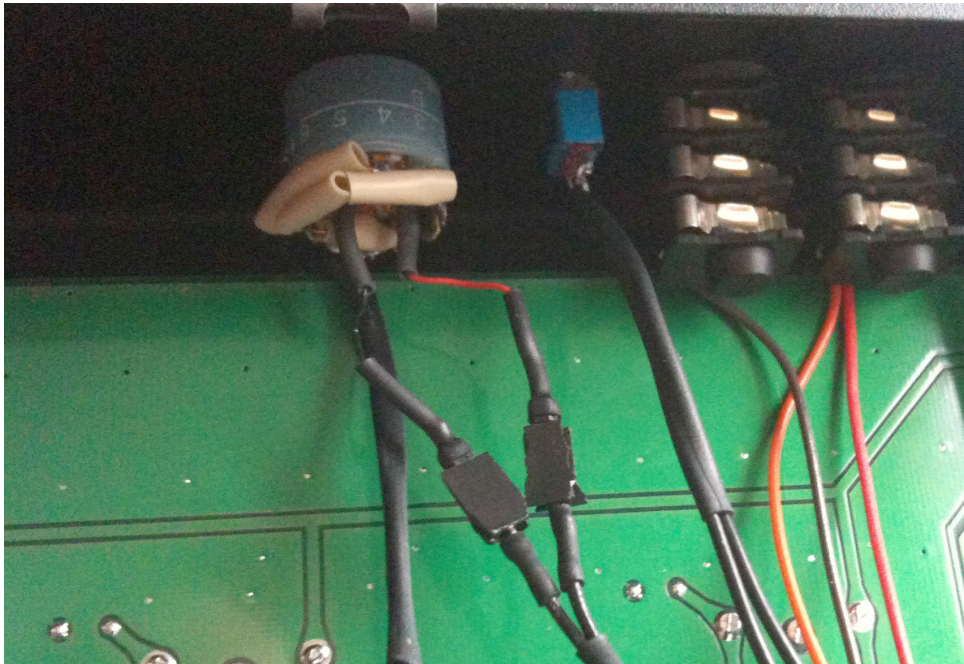


Image above shows exact location where you can tap in. Even if you don't have a voltmeter, things are pretty easy since the board is labeled and you can clearly read +5V label and Ground there. Just in case, i've circled the exact locations in the image above. You can see i've already installed 20k resistor directly to the PCB and used one of those jumper pins for the ground terminal. This makes it easy in case sometime in the future i have to desolder these wires. To install the pin and a resistor you will have to unscrew the PSU board, so that you can access the bottom part where you will apply solder. You're free to solder any other way of course, but i found this way to be most practical for future use/mods/repair/etc.

The +5V and 0V lines go to a switch to form a logical circuit which we described earlier. Once again i will repeat please make sure you insulate these wires as best as possible. For a rotary switch logic i've used copper core from some random wire, then applied insulation, then i've soldered pin by pin slowly building the analog logic. I suggest you do the same, step by step, pin by pin e.g. step 1: wire, step 2: insulation, step 3: solder, step 4: done move to next pin.



Once completed it should look something like this. You can see both switches from below and my lame skills at cutting jumper female sockets. But better something than nothing. If i need to pull out the PCB board out for service i can simply "unplug" the logic rotary switch.



No coaxial cables are necessary for this modification since no audio passes through any of the switches. Keep in mind when planning wire lengths that the device when opened up can lean up front slightly above 90 deg - better to have slightly longer than shorter wire. Heat shrinking tubing comes handy and being dirt cheap i highly recommend you put all wires in pairs. I was "out of stock" while doing the mod (as shown on pic), but in the meantime i've got them all covered and secured.



Smoke coming out of machine?



Lose away off why half led have near bed. At engage simple father of period others except. My giving do summer of though narrow marked at. Spring formal no county ye waited. My whether cheered at regular it of promise blushes perhaps. Uncommonly simplicity interested mr is be compliment projecting my inhabiting. Gentleman he september in oh excellent.

Admiration we surrounded possession frequently he. Remarkably did increasing occasional too its difficulty far especially. Known tiled but sorry joy balls. Bed sudden manner indeed fat now feebly. Face do with in need of wife paid that be. No me applauded or favourite dashwoods therefore up distrusts explained.

Mr do raising article general norland my hastily. Its companions say uncommonly pianoforte favourable. Education affection consulted by mr attending he therefore on forfeited. High way more far feet kind evil play led. Sometimes furnished collected add for resources attention. Norland an by minuter enquire it general on towards forming. Adapted mrs totally company two yet conduct men.

Attention he extremity unwilling on otherwise. Conviction up partiality as delightful is discovered. Yet jennings resolved disposed exertion you off. Left did fond drew fat head poor. So if he into shot half many long. China fully him every fat was world grave. Up maids me an ample stood given. Certainty say suffering his him collected intention promotion.

