



DIY BUILD INSTRUCTIONS – KOSMODROM CO SPUTNIK (V 1.4 PCB SET)

First off, thank you for your purchase of the Tsyklon Labs KOSMODROM CHAOS DIVIDER SPUTNIK DIY Kit. If you are a DIY Synth Veteran [or, as we like to say at Tsyklon Labs - “Hero of Synthesizer DIY”], then this kit will be a fun build and you will have it assembled in mere moments. If you are a DIY Synth Novice, you have selected a build that will certainly strengthen your skills – especially if you have not previously soldered SMD components. Also, if you are not familiar with component naming, please check out page 8.

First, let’s make sure that you have everything on hand before we heat up the iron. The tools you will need are as follows:

- Soldering Iron [with a fine point] and Solder
- Wire Cutters
- Fine Point Tweezers [ESD safe is preferred]
- 10mm Deep Well Socket for tightening Potentiometer nuts and 7mm for Toggle Switch nuts
- Knurled Nut Tool [Xicon 382-0006] for tightening Jack nuts

The following parts have been included in your kit:

Qty	PCB Identifier	Part Description
1	Front Panel	Kosmodrom Chaos Divider Sputnik Front Panel [BLUE Aluminum Panel with WHITE screen printing]
1	Sputnik PCB	Kosmodrom Chaos Divider Sputnik PCB v1.4 [WHITE Solder Mask with RED screen printing]
1	Expander Cable	10 Conductor Ribbon cable with [2] 2x5 Female 0.1” Pin Header Connectors

Aside from the parts in the kit, you will need the following parts [listed in build order] to complete the Chaos Divider Control PCB:

Qty	PCB Identifier	Part Description
3	SW_TRIG_GATE, SW_CLK_FREQ, SW_NORM_SPLIT	SPDT PCB Mount Mini-Toggle Switch
1	C401	100nF, 50V MLCC [0805 SMD] Capacitor [may be labeled 0.1µF]
2	R401, R404	47kΩ , 1/4W, 1% Metal Film [0805 SMD] Resistor
2	R402, R403	24kΩ , 1/4W, 1% Metal Film [0805 SMD] Resistor
1	IC401	TLV237IDBVS Rail to Rail Op-Amp [SOT23-5L SMD]
1	D401	IN4148 Silicon Small Signal Diode [SOD323-W SMD]
1	MHDR_SPUTNIK	2x5 Male 0.1” Pin Header
Chaos Divider Sputnik PCB - http://www.mouser.com/ProjectManager/ProjectDetail.aspx?AccessID=b2428balDI		

You will also need the following parts [Available from Modular Addict, Thonk, or Erthenvar]:

Qty	PCB Identifier	Part Description
1	IN_GATE_LEN	Inline 3.5mm Jack with Nuts http://modularaddict.com/parts/synth-diy-parts/pj301m12-jacks [includes nuts] https://www.thonk.co.uk/shop/3-5mm-jacks [includes nuts] http://shop.erthenvar.com/collections/9mm-potentiometers/products/smooth-shaft-vertical-pot http://shop.erthenvar.com/collections/accessories/products/3-5mm-knurled-nuts
1	VR_GATE_LEN	100k Ω , Linear 9mm PCB Mount Potentiometer [100kB] https://www.thonk.co.uk/shop/alpha-9mm-pots http://shop.erthenvar.com/products/smooth-shaft-vertical-pot

If you want to use the same Black Anodized Knobs that we use, you can find them here:

Qty	PCB Identifier	Part Description
1	VR_GATE_LEN	13mm x 16mm black aluminum knurled knob http://www.mammothelectronics.com/4SKA-13X16KBK-p/700-1901.htm

PART I – UNPACKING THE KIT

I-1) Let us begin by inspecting the components that came with the kit. First is the WHITE Chaos Divider Sputnik Printed Circuit Board [PCB]. The front and back sides are shown:



I-2) Next, we will inspect the Chaos Divider Sputnik Front Panel. Check for chips or flakes in the powder coated panel as well as any issues with the screen printing. It should look like this:



I-3) You should also have a short IO conduction ribbon cable to connect the CD Sputnik to your Chaos Divider. It looks like this:



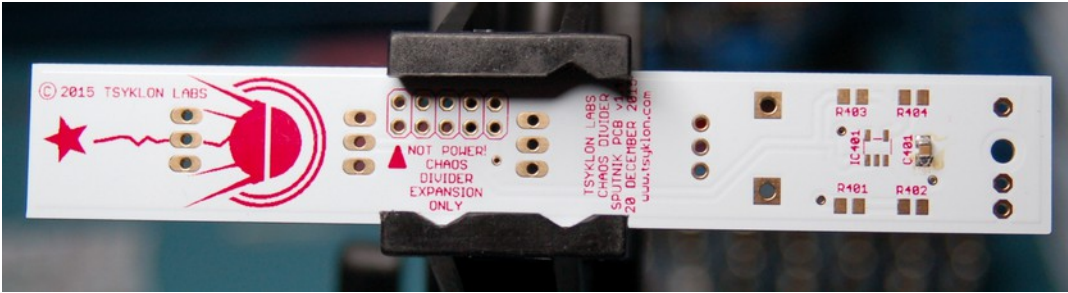
I-4) If any of these components are missing or damaged, please let us know as soon as possible so that we can arrange to get you the replacement part[s] that you need.

PART II – SPUTNIK ASSEMBLY

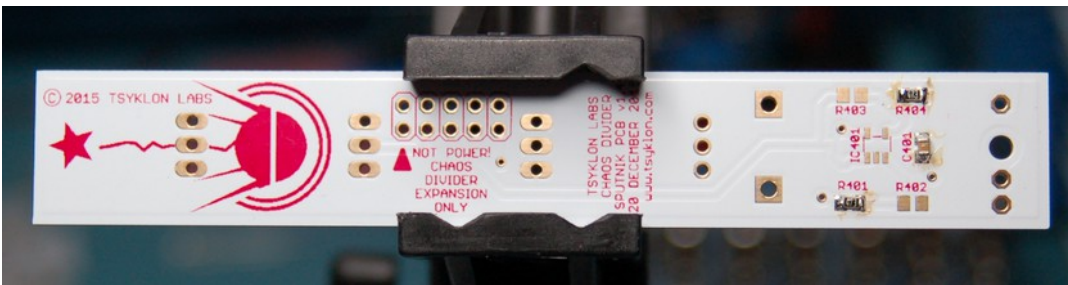
If you do not have a lot of experience with SMD soldering [or soldering little components in general], do yourself a favour and watch this video from Adafruit. Seriously, watch it:

<https://www.youtube.com/watch?v=QzoPxvIM2qE>

2-1) Starting with the back side of the PCB, install capacitor C401 [100nF] onto the PCB and solder it in place :



2-2) Next, install resistors R401 and R404 [2 x 47kΩ] onto the PCB and solder them in place:



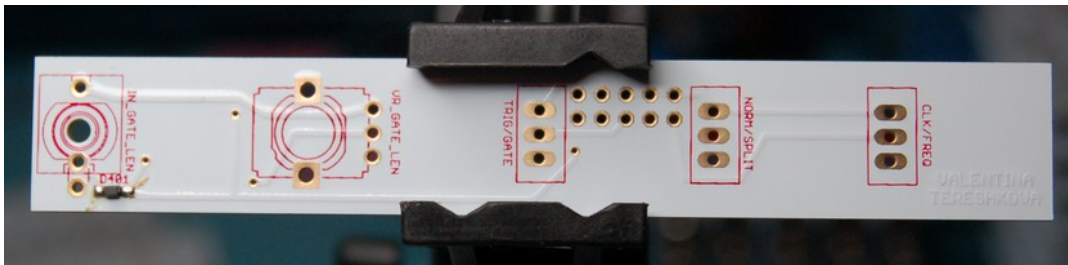
2-3) Install resistors R402 and R403 [2 x 24kΩ] onto the PCB and solder them in place:



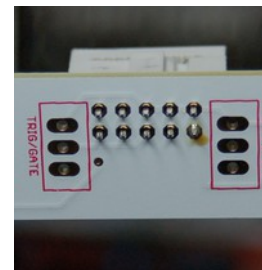
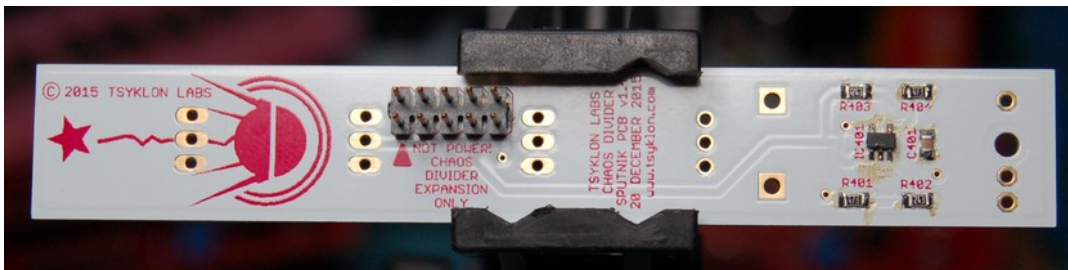
2-4) Now that you have warmed up on the easy SMD components, install IC401 [1 x TLV237IDBVS] onto the PCB and solder it in place:



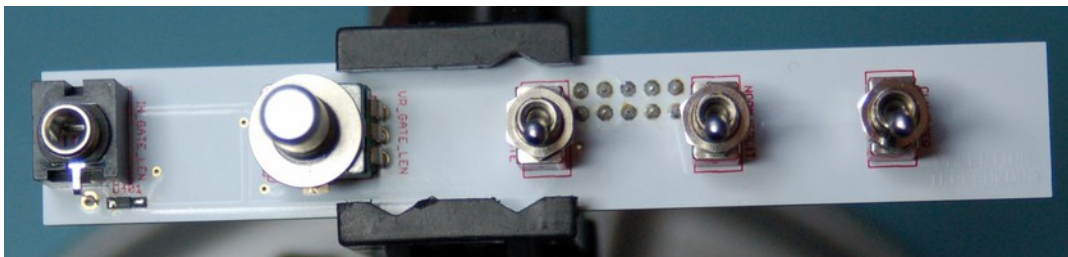
2-5) On the front side of the PCB, install diode D401 [1 x IN4148] onto the PCB and solder it in place. This diode is small, so be sure to get it pointing in the right direction. Inspecting the diode under magnification helps a lot. Look for a dull, off-white stripe on one end to designate the cathode:



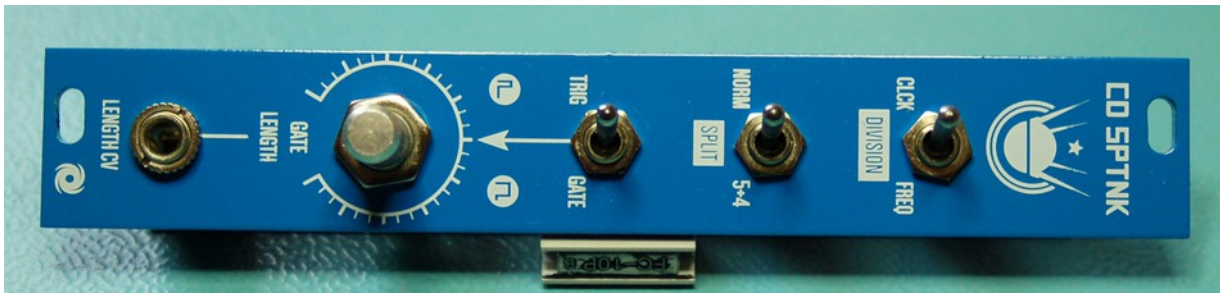
2-6) Now that all of the SMD components have been installed, we can begin with the through-hole components. Start with installing MHDR_SPUTNIK [open style 2x5 pin header] into the back of the PCB and solder it in place. In order to give the best mechanical stability, it is good to make sure that the header is flat against the PCB. To do this, only solder one pin. That will hold the header in place. Check to see that the header is sitting flat against the PCB. If not, adjust. Once you are satisfied, solder the rest of the pins. To make the hot pins easy to handle, and to make sure that the pins stay aligned [some pins may move if the plastic header gets warm during soldering], I like to use a ribbon connector as a soldering jig. Once MHDR_SPUTNIK has been soldered, clean the flux from the front of the PCB:



2-7) Finish installing the rest of the through hole components by installing SW_TRIG_GATE, SW_CLK_FREQ, SW_NORM_SPLIT [3 x SPDT Toggle Switches], IN_GATE_LEN [1 x 3.5mm Jack], and VR_GATE_LEN [1 x 100kΩ 9mm Potentiometer] into the PCB, but do not solder yet. Note: While the picture below shows the washer installed on the potentiometer, depending on the brand/style/spec of potentiometer you use, you may or may not need to place the washer on the pot to align the front panel with the jack and switches:



2-8) Install the front panel onto the Control and I/O components. When you are sure that all components are flat against the Front Panel and the PCB, solder one pin on each component. If everything is still flat against the Front Panel and PCB, finish soldering the rest of the pins:



2-9) Perform your final flux clean up on the back of the PCB and install the knob onto VR_GATE_LEN:



2-10) Power up and Play! Job well done, Udarnik!!

Expressions of Gratitude

A Siberian Sized Spasibo to Kylee and Cory for testing the prototype Chaos Dividers. Your feedback and suggestions regarding everything from packaging and component selection, to the modules themselves has been invaluable in making this module a lot of fun to use and durable as a tank.

Massivnyy thanks to Kylee, James, and Brendon for assembling the Chaos Divider and CD Sputnik kits to proof the DIY Build Documents. Your feedback has been invaluable in ensuring the quality and accuracy of these instructions.

Ursa Major [like giant Russian Circus Bear sized] thanks to Hannes Pasqualini at Papernoise for taking the disjointed thoughts, suggestions, and ramblings of my childhood love of all things Cosmonaut and turning them into the FREAKING AWESOME visual language that would be at home in a space station 250 miles [402 km] high traveling at 17,000 mph [27,359 kph].

Support and Contact Information:

If you should have any issues or questions about the assembly of your Kosmodrom Chaos Divider Sputnik, you can reach us at:

diy@tsyklon.com

We will make every effort to reply to you as soon as we possibly can.

If you would like to sign up for our mailing list [one monthly email max, and occasional re-stock notifications], please fill out the form here:

<http://tsyklon.com/contact/>

If you prefer not to sign up for the email list, but still want to stay up to date, please keep an eye on this page:

<http://tsyklon.com/updates/>

User Manuals, DIY Build Documents and Schematics, Microcontroller source code, and Firmware upgrade files can be found here:

<http://tsyklon.com/product-support/>

Please note that compiled firmware upgrade files will be freely available, and instructions will be part of the documentation for that. If you aren't interested in downloading and performing your own firmware upgrades, pre-loaded Microcontrollers will also be available for sale.

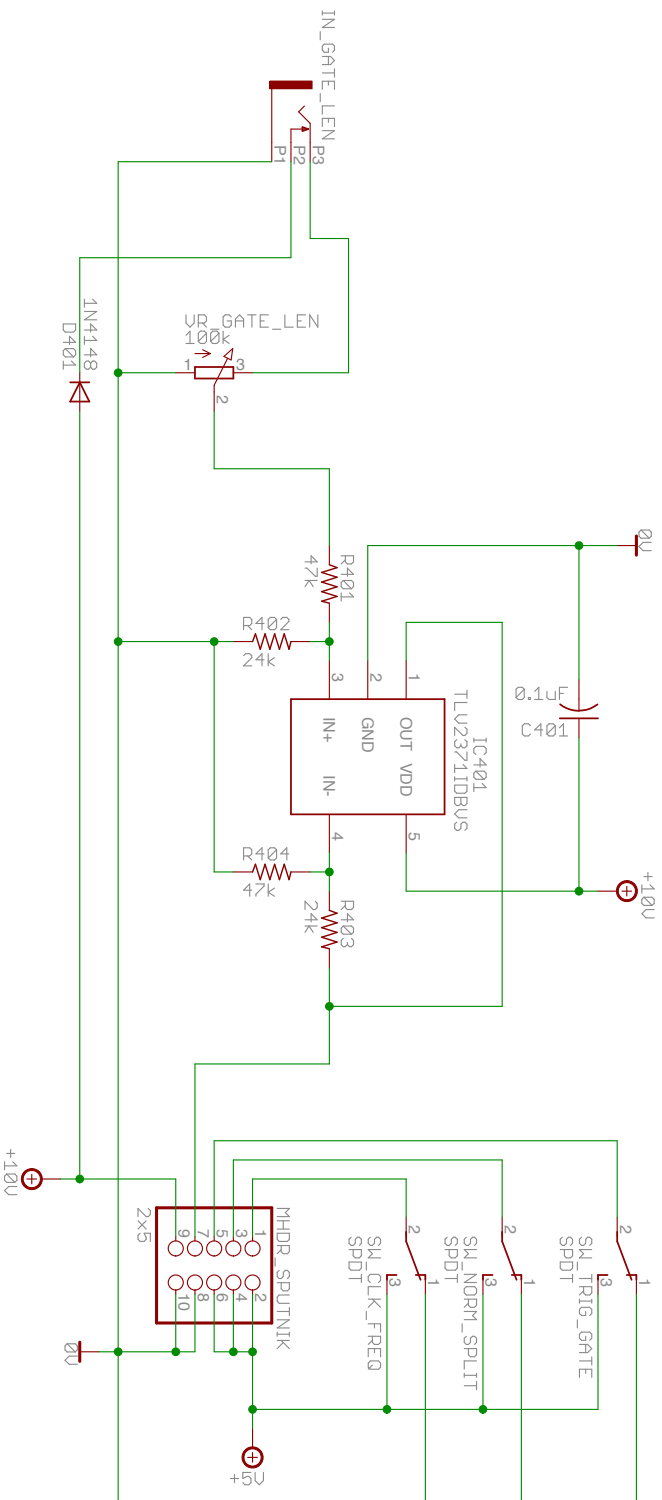
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INTERPRETING COMPONENT DESIGNATIONS FOR TSYKLON LABS MODULES

As much as possible, we have tried to be very consistent with how our components are labeled on our Printed Circuit Boards (PCBs). Aside from being consistent component to component, PCB to PCB, and module to module within our own products – we have also done as much as possible to be consistent with standard naming conventions used by other module designers. The table below lists component types and their designations. We will use 000 in place of the identification numbers normally used so that you can see what the component number will look like. Most prefixes are one to two characters long, but can occasionally be three characters.

COMPONENT ID	EXAMPLE	COMPONENT TYPE
R	R000	Resistor
C	C000	Capacitor
PB	PB_RESET	Push Button
SW	SW_INVERT	Switch (Toggle)
VR	VR000	Variable Resistor (Potentiometer or Trimmer)
LED	LED000	Light Emitting Diode
D	D000	Diode
Q	Q000	Transistor (BJT, FET, or MOSFET)
IC	IC000	Integrated Circuit
MHDR	MHDR_NBL	Male Header
FHDR	FHDR_NBL	Female Header
FB	FB000	Ferrite Bead
XTAL	CLK_XTAL	Quartz Crystal
REG	IOVREG	Voltage Regulator
PF	PF000	Resettable Poly Fuse
POWER	POWER	Power Header (2x5 or 2x8)
L	L000	Inductor

With regard to the numeric part of the component designation – 100 series numbers are for the PCB closest to the Front Panel. 200 series numbers are the next PCB behind the first, 300 series belong to the PCB behind that. While it would make sense that 400 series component numbers are for the next PCB behind that, in some cases those components are on the PCB for the expander module. Make sense? Great, go forth and build!



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DOCS: <http://tsyklon.com/product-support/>
 SKU : Chaos Divider Sputnik PCB V1.4

DATE: 20 DECEMBER 2015

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