

# SUBSPACE TRANSMISSION FUZZ

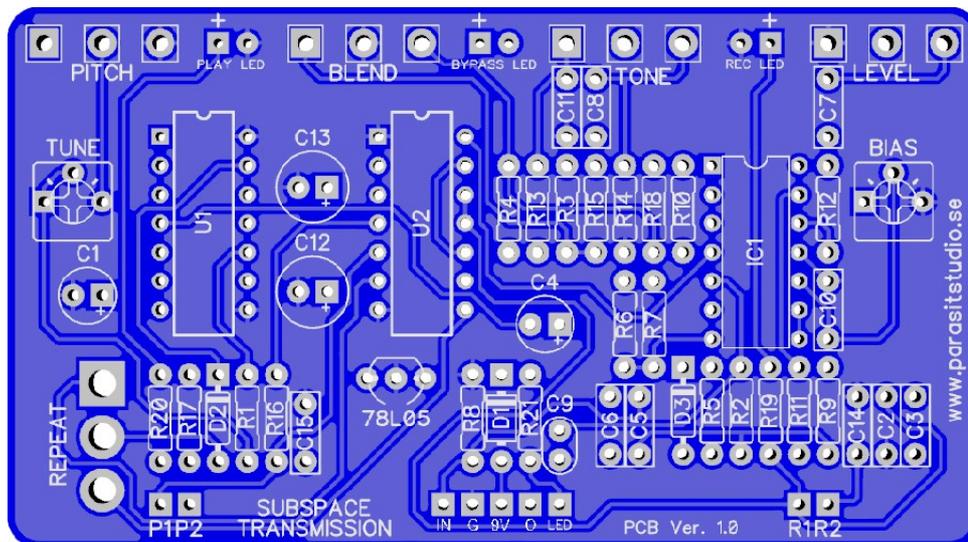
**Build Document last updated may 2016**

for PCB version 1.0

Subspace Transmission is a comparator fuzz with a recording and playback feature based around the ISD1820 voice recording chip. It lets you record up to 20 seconds and the playback can be repeated and pitched up and down.

This can't be used as a looper because of the limitations of the recording chip, but it's perfect for playing along to your riffs to come up with harmonies or just play around with the pitch feature to create new sounds.

Happy building and playing!



*The ISD1820 is a single message chip so you can't use playback and record at the same time to do overdubs. Another drawback is that it always powers down into a powersaving state before starting playback again (even when set to repeat) so fluid repeats that are in cue is hard to achieve. But for a 14-pin DIP chip it's still pretty amazing what it can do!*

## **Controls**

### **POTS**

LEVEL – Controls the overall output volume

TONE – A simple tone control placed before the output

BLEND – Blends between straight fuzz and playback signal

PITCH – Pitches the playback up or down

The pitch pot actually controls the recording and playback sample rate, from around 8Khz down to around 3,2Khz (with bandwidth of 3,4Khz to 1,3Khz). This also effects the max recording time from 8 to 20 seconds.

The possible playback pitch range is determined by the pitch pot position before recording:

- Set the pitch fully CW before recording to be able to pitch down the playback
- Set it fully CCW to be able to pitch up the playback
- Set it in the middle to be able to pitch the playback both up or down (but with less range)

### **SWITCHES**

REPEAT – Sets the chip playback to repeat

REC – Starts the recording

Press it again to stop the recording or let it record until it has reached the max recording time

PLAY – Starts playback

Plays until it has reached the end of the recording. If you press it during playback it stops the playback. Press it again and it starts the playback from the beginning of the recording

*Tip: always stop playback before making a new recording*

## General builds tips

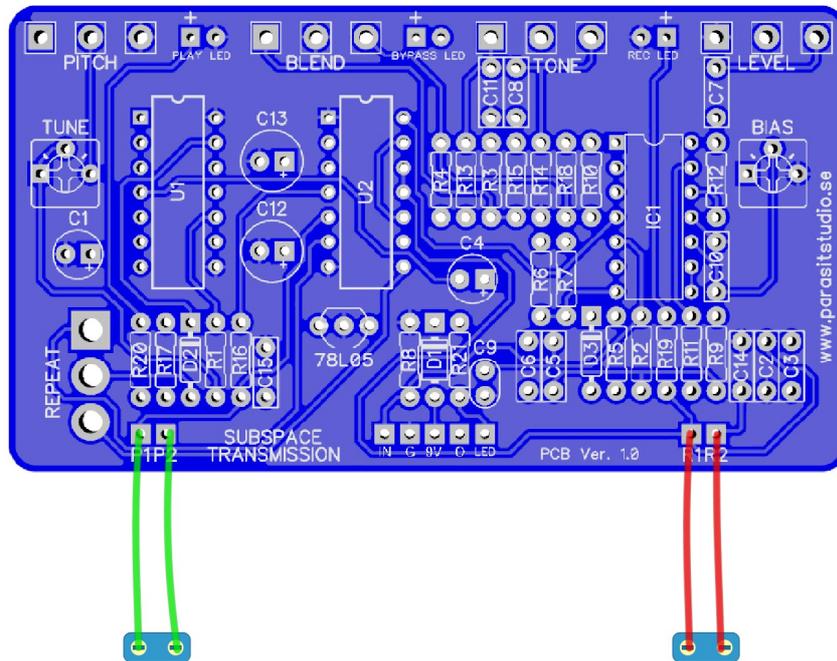
- Solder the low profile components first, from short to tall height. Recommended order: resistors, diodes, IC socket, film-caps, electrolytics, pots and switches
- CMOS chips are very sensitive to static charges and can be easily damaged. It's a good idea to wear an anti-static wristband or at least avoid wearing a wool jumper and petting your cat/dog while building...
- Always use sockets for IC chips and transistors to avoid heating them directly. It also makes it much easier to swap them out if needed.
- Pay special attention to the orientation of the diodes and electrolytics.
- There are a LOT of switches and pots on this PCB. Be sure to place them in the PCB without soldering first, THEN place them in your drilled enclosure. Gently tighten the nuts to the enclosure, then solder LAST. Otherwise, it will be really hard to get this in your enclosure.
- This PCB's is designed for 16mm Alpha PCB mounted angled pots. You could also use solder lug type and just tack some "legs" with short pieces of wire to each pot to mimic a PCB mount type.
- The pots and the switch are meant to be mounted on the bottom (solder side) of the board, and soldered on the top (component side).
- The square pad represents pin 1 of each pot.

## Subspace Transmission Bill Of Materials (BOM)

Resistors		Capacitors		IC's	
R1	82K	C1	4.7uF	IC1	TL074
R2	10K	C2	1nF	U1	ISD1820
R3	47K	C3	100nF	U2	CD4069UBE
R4	47K	C4	2.2uF	<b>Transistor(s)</b>	
R5	1M	C5	100nF	1x 78L05 voltage regulator	
R6	100K	C6	100nF	<b>Potentiometers</b>	
R7	10K	C7	100nF	LEVEL	B100K
R8	1M	C8	10nF	TONE	B100K
R9	1M	C9	220pF	PITCH	B100K
R10	10K	C10	100nF	BLEND	B50K
R11	1M	C11	5.6nF	TUNE (trimmer)	100K
R12	1M	C12	100uF	BIAS (trimmer)	100K
R13	33K	C13	100uF	<b>Switches</b>	
R14	22K	C14	100nF	REPEAT	SPDT on/on
R15	10K	C15	100nF	REC	SPST momentary
R16	10K			PLAY	SPST momentary
R17	100K			<b>Diodes</b>	
R18	10K			D1	1N4001
R19	4.7K*			D2	1N4148
R20	4.7K*			D3	1N4148
R21	15K**			3x LED's	

- \* These are two current limiting resistors for the play and rec indicator LED's. Use the appropriate value for your LED type. *Attention! Please note that these two LED's are fed by only 5 volts so a low value (like 4.7K for example) is usually ok even for superbright LED's.*
- \*\* This is a current limiting resistor for the bypass LED.
- *This one is fed by 9 volts, so use the CLR value you normally would use for bypass.*
- I recommend using a red LED for REC, a green LED for PLAY and the colour of your choice for the bypass LED.
- Not included in the BOM but also good to have: enclosure, input and output jacks, DC jack, 3PDT bypass switch, knobs.

## Wiring



- P1/P2 connects to the SPST momentary switch for PLAY
- R1/R2 connects to the SPST momentary switch for REC

*For more info on how to wire up the stomp switch, jacks ect, please visit the Parasit Studio website and download "offboardwiring.pdf"*  
<http://www.parasitstudio.se/build-docs.html>

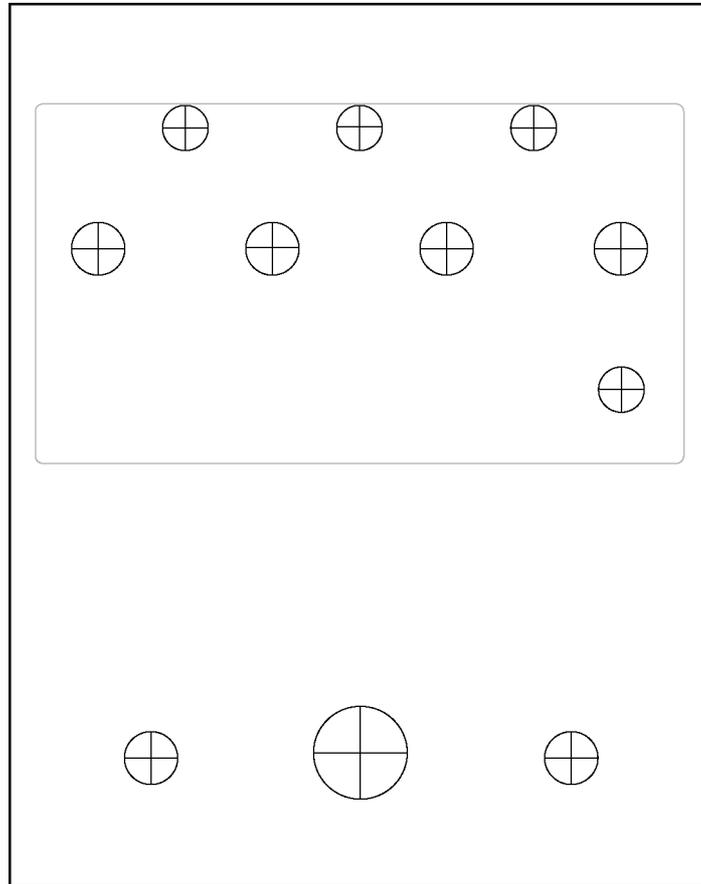
## Setup

**BIAS** – This trimmer sets voltage reference to the comparators. Adjust it for sensitivity and sustain for the fuzz and to gate out noise (the ISD chip is very noisy).

The easiest way to adjust it is to put it about halfway, record a clip with a few chords with pauses in between. Listen to the playback and adjust the bias trimmer to the point when the noise inbetween the chords (in the pauses) is reduced but the fuzz still sounds good.

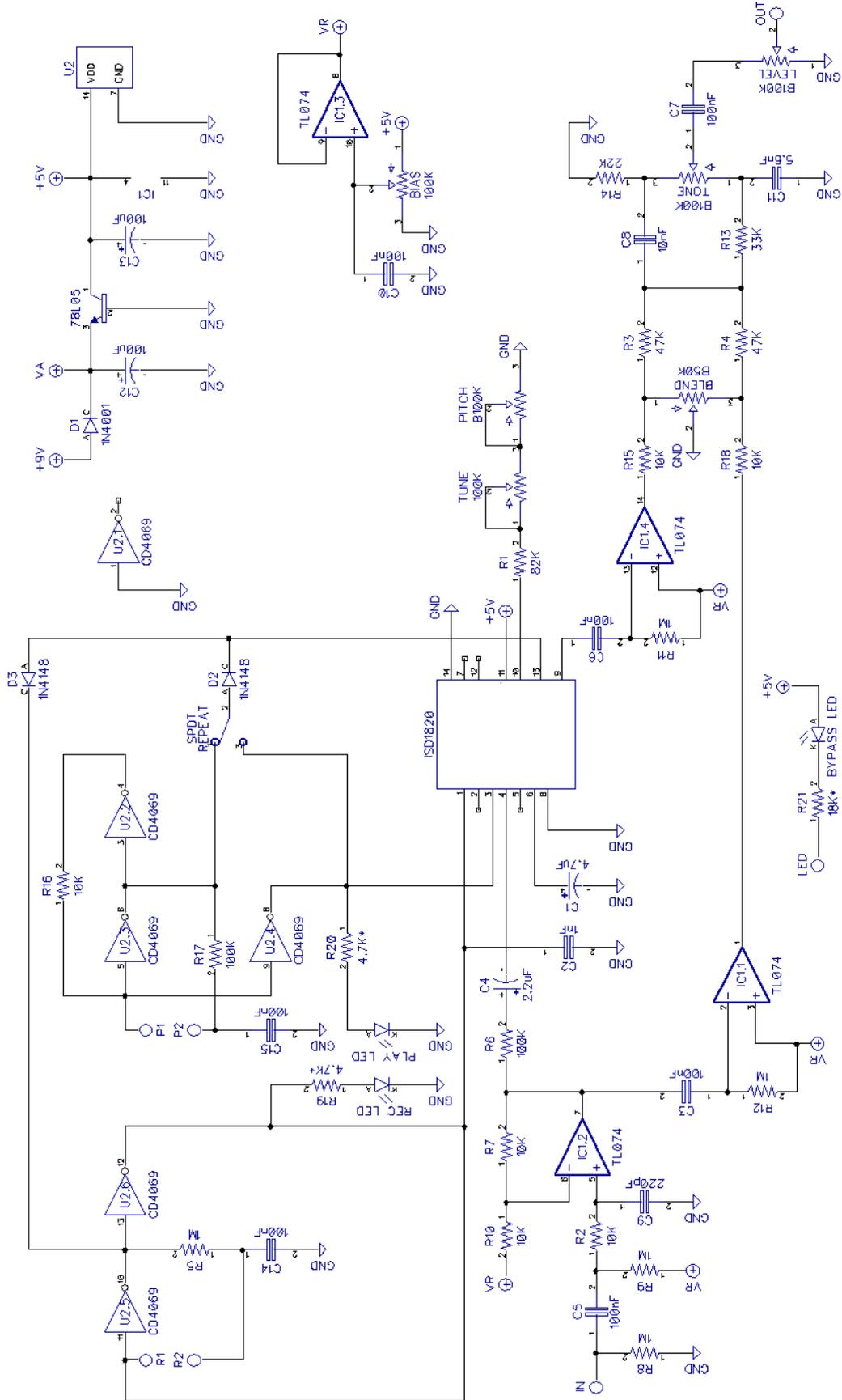
**TUNE** – Adjust this trimmer if your playback is out of tune. To adjust it, record a note (for example the open A-string) and listen to the playback when tuning it against the direct signal for your guitar. When doing this, put the pitch knob fully CW or fully CCW.

## Drilling template (1590BB)



- Use at your own risk! This template is approximate.
- Make sure your printer isn't doing any scaling / is set to 100% print size.
- The two bottom side holes are just suggestions for where to place the rec and play switches.
- Drill footswitch, rec and play switches, DC jack and input/output jacks to your own preference. There is room for the DC jack at the top side.
- **Measure and confirm before drilling!**

# Schematic



## **Troubleshooting**

There's always a chance of running into trouble. To minimize error, follow the BOM and general building tips carefully. Take your time and don't rush. Take a break now and then. Use good solder, and it helps to have a decent soldering station instead of a cheap iron.

If you are still having trouble, please visit the madbean forum Parasit Studio subforum section and ask for help there.

<http://www.madbeanpedals.com/forum/index.php?board=84.0>

If you have bought the Musikding kit and have received a faulty or missing component, please contact musikding directly.

<https://www.musikding.de/kontakt.php?lang=eng>

## **Terms of use**

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