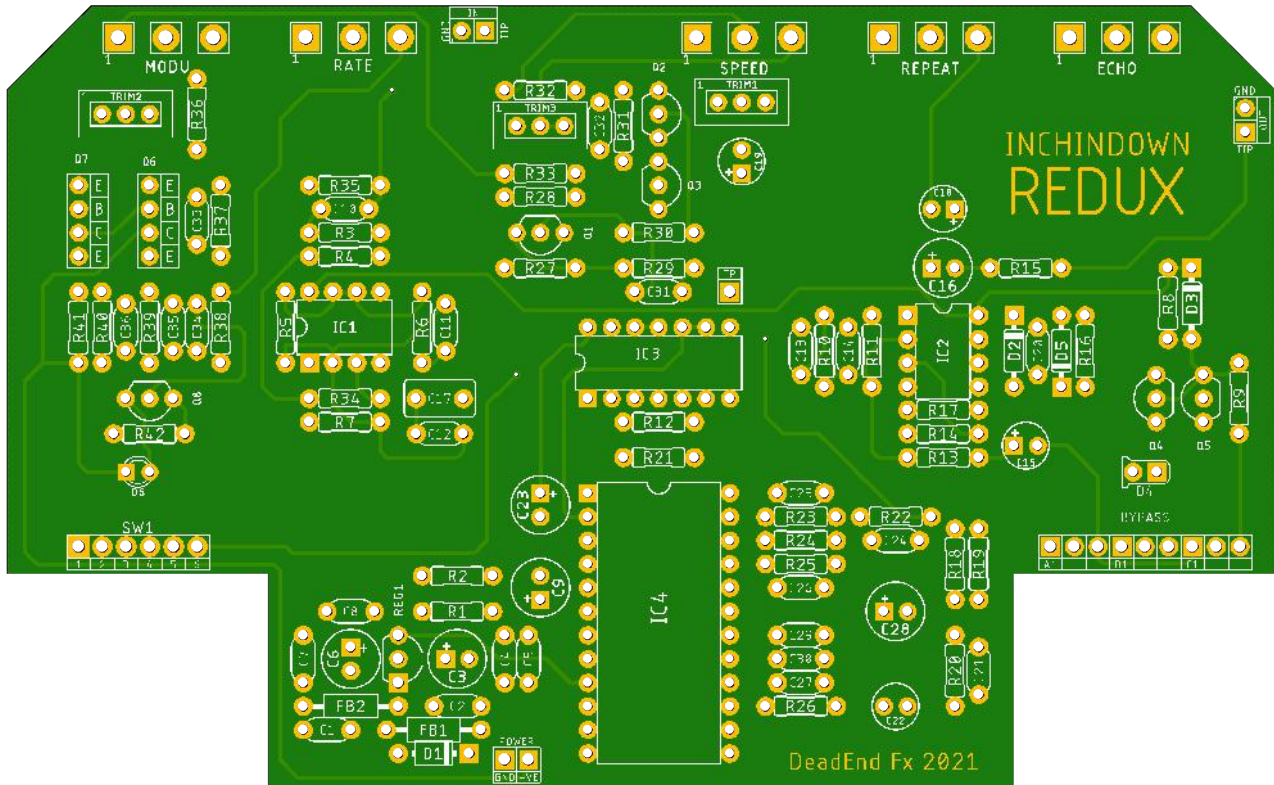




DEFX Inchindown Redux build document - Ibanez EM5+ clone



Board size	
Supply	+9V DC (Negative GND)
Enclosure	1590J or similar
1/4" Jacks	
Power Jack	
LED	
LED Bezel	
Knobs	

Inchindown is a clone of the Ibanez EM5 Echo Machine. While digital, it's known to be a very "warm" sounding echo, giving a sound that reminds one of the older tape delays. This new REDUX version adds modulation to the echo, with depth and rate controls. It also sports an additional footswitch, which acts as a repeats hold. Use of a momentary or latching type switch for this function is the builders choice.

For this project, a DMM (digital multi meter) with frequency counting capability is highly recommended for setting the clock frequency trimmers. Tuning by ear is possible, though not as accurate. Refer to the tuning instructions for further details.

C1	10n
C2	100n
C3	100u 16V
C4	270p
C5	270p
C6	47u 16V
C7	100n
C8	100n
C9	10u 16V
C10	47n
C11	4n7
C12	47p
C13	4n7
C14	47p
C15	1u 50V
C16	10u 16V
C17	1u (Film)
C18	1u 50V
C19	1u 50v
C20	680p
C21	3n3
C22	1u 50V BIPOLAR
C23	47u 16V
C24	3n3
C25	470p
C26	100n
C27	100n
C28	47u 16V
C29	100n
C30	100n
C31	5p
C32	10n
C33	4u7 - MLCC
C34	680n - MLCC
C35	680n - MLCC
C36	680n - MLCC

R1	10K
R2	10K
R3	1K
R4	2m2
R5	47K
R6	10K
R7	47K
R8	1K2
R9	3K9
R10	10K
R11	47K
R12	47K
R13	75K
R14	22K
R15	470R
R16	100K
R17	10K
R18	33K
R19	22K
R20	20K
R21	22K
R22	22K
R23	22K
R24	22K
R25	30R
R26	30R
R27	5K1
R28	330R
R29	10K
R30	3K3
R31	9K1
R32	390K
R33	390K
R34	22K
R35	2M2
R36	180K
R37	56K
R38	4K7
R39	100K
R40	2M2
R41	10K
R42	2K2

ECHO	B100K
MODU	A10K
RATE	C100K
REPEAT	B100K
SPEED	B50K
IC1	uPC4570C
IC2	uPC4570C
IC3	74HCU04N
IC4	M65831AP
D1	1N4002
D2	1N4148
D3	1N4148
D4	LED
D5	1N4148
D6	LED
FB1	FERRITEBEAD
FB2	FERRITEBEAD
BYPASS	3PDT
SW1	DPDT *
REG1	LM78L05
Q1	2SA1015Y
Q2	2SC1815BL
Q3	2SC1815BL
Q4	BS170
Q5	2N3904
Q6	MPSA18
Q7	MPSA18
Q8	2N3904
TRIM1	10K TRIMMULTI
TRIM2	50K TRIMMULTI
TRIM3	50K TRIMMULTI
IN	Mono 1/4 Phone Jack
OUT	Mono 1/4 Phone Jack

or 4558
or 4558

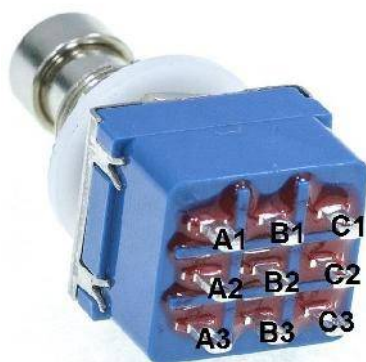
SW1 - MOMENTARY OR LATCHING IS BUILDERS CHOICE.

or 2N3906 WATCH PINOUTS!!
or 2N5088 WATCH PINOUTS!!
or 2N5088 WATCH PINOUTS!!
(or 2N7000 - REVERSE PINOUT!!)

FERRITE BEAD SOURCE (SIMILAR EQUIVALENTS WILL WORK AS WELL);

<http://ca.mouser.com/ProductDetail/Murata-Electronics/BL01RN1A1F1J/?qs=sGAEpiMZZMukHu%252bjC5I7YRHtZ1ZqLxJ920OherXCHk%3d>

**FOOTSWITCH LUG NUMBERING FOR DEAD END FX PEDALS
(EXCEPT IF OTHERWISE MENTIONED IN THE BUILD DOCUMENT)**



OR



WHEN LOOKING AT THE LUGS,
LUGS SHOULD BE ORIENTED LIKE
THIS;

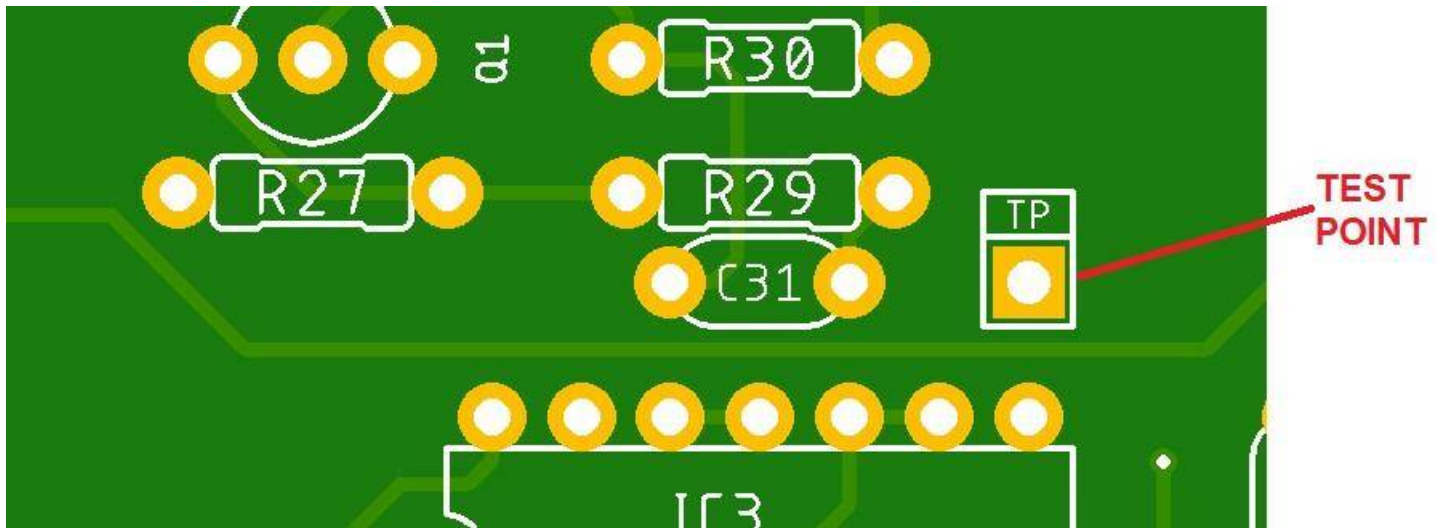


NOT LIKE THIS...



TUNING GUIDE

- USING A DMM, SET IT TO FREQUENCY COUNTING. CONNECT THE BLACK LEAD TO GROUND, AND THE RED LEAD TO THE TEST POINT ABOVE IC3 (ILLUSTRATED BELOW);



A NOTE BEFORE TUNING; THE SPEED POT IS COUNTER-INTUITIVE, BUT IS SET UP AS PER THE ORIGINAL. THE SLOWEST REPEAT SPEED IS AT FULL CLOCKWISE (CW) OF THE SPEED POT, AND THE FASTEST REPEAT SPEED IS AT FULL COUNTER-CLOCKWISE (CCW). WE DIDN'T DESIGN IT THIS WAY, IBANEZ ENGINEERS DID. WE SIMPLY REMAINED TRUE TO THE ORIGINAL DESIGN. JUST KEEP THIS IN MIND WHEN GOING THROUGH THE TUNING GUIDE BELOW.

ALSO, WHILE THE ORIGINAL HAD A FREQUENCY SPAN OF 460kHz to 4mHz, WE FIND THAT THE CIRCUIT PERFORMS WELL UP TO 8mHz. USE YOUR OWN EARS TO SET THE FREQUENCY AS YOU SO CHOOSE.

- START BY SETTING ALL TRIMMERS TO THE CENTER OF THEIR TRAVEL. SET THE **ECHO** POT TO MAXIMUM, AND THE **REPEATS** POT TO NOON (OR LOWER IF YOU ARE GETTING RUNAWAY REPEATS, WE WILL ADJUST THE REPEATS TRIMMER - TRIM1 - AFTERWARDS). SET **MODULATION** AND **RATE** TO MINIMUM. NOW ATTACH YOUR DMM LEADS AND POWER UP THE UNIT.

- SET THE **SPEED** POT TO MAXIMUM (*FULL CW*), AND ADJUST TRIM3 TRIMMER UNTIL THE FREQUENCY COUNTER READS 500kHz (KILOHERTZ). IF TUNING BY EAR, SET TRIMMER FOR NOTE REPEATS AT APROXIMATELY 1 SECOND INTERVALS.

- SET THE **SPEED** POT TO MINIMUM (*FULL CCW*), AND ADJUST TRIM2 TRIMMER UNTIL THE FREQUENCY COUNTER READS BETWEEN 4 - 8mHz (MEGAHERTZ). IF TUNING BY EAR, SET TRIMMER FOR MAXIMUM NOTE REPEATS DESIRED. IT SHOULD SOUND ALMOST LIKE A PLATE REVERB (METALLIC) SOUND. **AS PREVIOUSLY MENTIONED, THE ORIGINAL UNITS RAN AT 4mHz, SO USE YOUR OWN JUDGEMENT AS TO WHERE YOU WANT TO SET THE HIGH END.**

WARNING: SINCE THE TWO TRIMMERS ARE INTERACTIVE, YOU MAY HAVE TO GO BACK AND FORTH BETWEEN THE TWO TRIMMERS UNTIL YOU HAVE THE TWO FREQUENCIES SET.

IF YOU HAVE THE FREQUENCIES SET NOW, AND YOU ENCOUNTER BACKGROUND NOISE (CHATTERING, OR RAPID TAPPING) WITH THE SPEED AT FULL CLOCKWISE, THEN *SLIGHTLY* TWEAK TRIM2 SLIGHTLY EITHER WAY UNTIL IT DISAPPEARS. THERE WILL BE A CERTAIN RANGE WHERE THE UNIT WILL BE QUIET WITH NO SIGNAL INPUT. THIS MAY RANGE BETWEEN 480 - 620kHz AT THE LOW END, AND 4 - 8mHz AT THE HIGH END (DEPENDENT ON WHERE YOU DECIDE TO SET THE HIGH END).

- TRIM1 SETS THE DECAY OF THE REPEATS. WITH THE REPEAT POT AT MAXIMUM (CW), SEND A SHORT SIGNAL THROUGH THE CIRCUIT (PLUCKED GUITAR STRING), AND ADJUST TRIMMER FOR LONGEST REPEATS, WITHOUT THE SOUND REVERTING TO INFINITE REPEATS. AT MAXIMUM REPEATS, A NOTE SHOULD DECAY VERY SLOWLY, BUT EVENTUALLY END. IF YOU WISH TO USE THE INFINITE REPEATS, THEN SET THE TRIMMER AS SUCH, AND REDUCE THE REPEATS POT ACCORDINGLY FOR SHORTER REPEATS.

DRILL TEMPLATE

PRINT WITH "NO SCALING", OR AT 100%

