



AC SOUND

PI-3141 Dual Channel Compressor

Build Reference Manual

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Introduction

The PI-3141 (PYE) is based on a design that is a favorite of many top engineers and producers. They love it for its creamy smooth sound and flexibility. The PI-3141 has such a unique and sought after sound because of the way it implements the gain reduction. Namely using a “Pulse-Width-Modulation” circuit. AC Sound has spent countless man hours painstakingly recreating this design and making sure the unit behaves like the original.

This build is recommended for intermediate to advanced builders.

Features

Ratio

1:1, 1:2, 1:3, 1:5 or Limiting

Attack

Compression 0.5ms, Limiting 1ms +/-0.5ms

Release

100ms, 200ms, 400ms, 800ms, 1600ms, 3200ms

Manual Make-up Gain

Stereo Link/Dual Mono

Bill of Materials

<u>TYPE</u>	<u>VALUE</u>	<u>SIZE/extra info</u>	<u>QTY</u>
<u>CERAMIC CAPACITOR</u>			
C24	82pF/(1nf for TLC555)		1
C4, C5	100pF		2
C21	120pf		1
C22	220pF		1
C28	390pf		1
<u>POLY CAPACITOR</u>			
C1, C3, C9, C31, C33	1nF		5
C23	0.01uF		1
C11, C13	100nF		2
C38	0.1uF		1
C20	0.15uF		1
<u>ELECTROLYTIC CAPACITOR</u>			
C6	1uf 50v		1
C14, C15	2.2uf 25V		2
C7	4.7uf		1
C12	6.8uF		1
C17	22uF 25v		1
C10, C35	47uF 50V		2
C19	68uF		1
C2, C16, C26, C29, C32, C34, C41	150uF 50v	2 of these can be 16v	7
C18	470uF 25v		1
C8	1000uF 50V		1
<u>TANTALUM CAPACITOR</u>			
C27	22uF TANTALUM		1
<u>VOLTAGE REGULATOR</u>			
U3	LM337	LM337T	1
<u>DIODES</u>			
D2, D9, D10, D11, D12, D13, D14	1N4007	1N4001	7
D1, D3	1N4148		2
D4, D5, D6, D7	1N5817		4
D8	BZX55B12	12v ZENER	1

<u>TRANSISTORS</u>			
TR11	PN3640		1
TR18	2N3906	REVERSE FOOTPRINT	1
TR16	2N3906	REVERSE FOOTPRINT	1
TR12	2N4124	REVERSE FOOTPRINT	1
TR17	BC550C		1
TR6	BC550C		1
TR4	BC550C		1
TR1	BC560C		1
TR10	BC560C		1
TR13	BC560C		1
TR15	BC560C		1
TR5	BC560C		1
TR20	BC560C		1
TR7	BC560C		1
TR8	BC560C		1
TR9	BC560C		1
<u>INDUCTORS</u>			
R38	12uH		1
L1	50mH		1
<u>METER</u>			
HAIRBALL 1MA DC MODEL	1mA DC METER	8027-WF 1mA Meter	1
<u>RESISTORS</u>			
R33	8R2		1
R22, R36, R37	56R		3
R32	100R		1
R1, R2, R68	120R		3
R12	180R		1
R5	220R		1
R46	360R		1
R50	390R		1
R80	470R		1
R24	750R		1
R4	910R		1
R31, R59, R67	1K		3
R15, R63	1K2		2
R17, R18, R25, R65	1K5		4
R35, R43, R58	1K8		3
R79	2K2		1
R26, R39, R66	2K7		3
R21, R45, R60, R73	3K3		4
R69	3K6		1
R57	4K7		1

R20	5K6		1
R3	6K2		1
R62, R70	6K8		2
R71	8K2		1
R30, R56	10K		2
R27	13K		1
R41	15K		1
R72	16K		1
R81	20K		1
R13, R14, R29, R55	22K		4
R16	27K		1
R34, R51	39K		2
R54	47K		1
R61	56K		1
R19	75K		1
R28	110K		1
R53	120K		1
METER Illumination	1.5K 2Watt or better		1
<u>TRIM POTS</u>			
R23	100R TRIM POT	22R	1
R52	1K TRIM POT	RELEASE TRIM	1
VR1	5K TRIM POT	POWER SUPPLY	1
R42	10K TRIM POT	5K1 METER TRIM	1
R44	500K TRIM POT	220K	1
R48	5M TRIM POT	1M8 (USE RESISTOR)	1
<u>FRONT PANEL CONTROLS</u>			
INPUT/OUTPUT CONTROL	10K LOG POT		2
DECAY	2P6T ROTARY SWITCH		1
RATIO	3P4T ROTARY SWITCH		1
LIMIT	4P1T ROTARY	BUY 4P3T AND CHANGE TO	1
<u>IRON</u>			
T1	CMLI-15/15BPC	CINEMAG 15/15B INPUT	1
T4(1:4)	1:4 SIDECHAIN	EDCOR XSM600/10K	1
OUTPUT TX	1:2, OR 1:4 TX	EDCOR WSM600/15K	1
T2	18-22V	POWER XFMR	1

<u>DISCRETE DAUGHTER BOARD</u>			
TR14	2N4124		1
D15	1N4148		1
R6	100R		1
R49	27K		1
C36	0.001uF		1
T3	CUSTOM RF	DETAILS TO COME..	1
<u>MONOLITHIC DAUGHTER</u>			
U10	TLC555	NE555 WONT WORK	1
C30	1nF		1
R64	10K TRIM POT	FREQ. TUNE	1
R47	20K		1
C25	100pF		1
<u>HEADERS 2.5MM PITCH</u>			
U8	STEREO LINK	Molex KK .100 2"	1
U4	OUPUT XLR	Molex KK .100 2"	1
U1		Molex KK .100 2"	1
U2	OUTPUT POT	MOLEX KK .100 3"	1
U5	INPUT POT	MOLEX KK .100 3"	1
U6	INPUT	MOLEX KK .100 3"	1
TO_SWTCHBOARD		MOLEX KK .100 7"	1

NOTE: The transformers can be swapped for a trade off between THD and output level

Board Errata & Build Notes

- **Trimmer Pots** – The Rev 3.14 board does NOT have connections to the vertical center trim pot pads. This means if you have a trim pot that uses any of the vertical pads in the center, you need to solder a lead to the bottom most center pin. A piece of a resistor or cap lead will work fine.
- **Side Chain and Output Transformers** – EDCOR XSM600/10K and EDCOR WSM600/15K can be swapped depending on your desire for output level vs THD. Either will work in any position.
- **Side Chain Transformer Connections** – The Rev 3.14 board does not have markings for primary/secondary connections for the side chain. While holding the board so that the AC logo is horizontal and correct orientation, the 4 pads on the right. The top 2 pins are PRIMARY and the bottom 2 are SECONDARY.
- **Transistor Orientation** – TR16, TR18, TR12 when using the 2n3906 and 2n4124 substitution parts need to be reversed according to the silkscreen on the board.
- **Meter Illumination** – On the left side of the board is a B+/B- connection that can be used to test voltage from the power supply section of the board. This connection can also be used as a DC power source to illuminate the meter lamps. The 1.5k 2watt (or greater) resistor can be hooked up to the B- and the “-” lamp connection and the “+” lamp connection connected to the B+.
- **Meter Connection** – the meter connection on the board noted by a “1” is connected to the right side of the meter while looking at the meter from behind. The other wire goes to the other meter connection.
- **Capacitor Orientation** – C10 has 2 “+” markings on the board. Correct orientation, “+” is to the right. C8 doesn’t leave much room for mounting. This cap may be added to the underside of the board if you have large standoffs for board mounting or sat up high above C11 and C10 for shorter standoffs.
- **Pre-Trimmed Trim Pots** – Pots that require pre-trimming should be trimmed from center pin to the pin below the trim screw (or to the left if looking straight on from the front).
- **Rotary Switch Orientation** – Before soldering rotary switches, be sure that the flat notch on the switch and the knobs you selected work together. Improper orientation may result in the set screw for the knob being in a less than ideal place.
- **Bypass (from the front panel)** - This feature is NOT currently available stock. Hook up the power switch as a 2 position rotary switch or standard DPST.
- **Oscillator Plugin** – you have a choice of “choppers” either transformer based or IC based. (the 2 little daughter boards on the bottom right of the board assembly when you receive it). Either way, the 4 pins can be connected using pins or thick cut leads from diodes or capacitors. Be sure to seat the daughter boards a little above the main board to prevent potential shorting issues.
- **Ground** – Ground is connected to the chassis via PIN1 on the input XLR or TRS. **BE SURE TO GROUND YOUR IEC TO CHASSIS!**
- **Power Transformer** – 18-22v secondary recommended for 18-24v operation.
- **Stereo Link** – Pin 1 gets married to pin 1 and pin 2 to pin 2 (this only sums the side chain audio so you still have to set the knobs accordingly... similar to linking 1176’s)

Power Supply Build

Populate the bottom right hand of the board first to get your power supply going. From D9 up to the VR1. Place a heatsink on U3. Trim VR1 for proper voltage (18-22v recommended).

If you choose to populate the entire board (so there is load on the circuit) first, use a variac to slowly bring the mains voltage up and trim VR1 as you approach line level appropriately.

“Chopper” Calibration

After the power supply is properly set and the circuit is completely built, using a DMM in freq. mode or an oscilloscope, use R64 on the monolithic daughter board to trim the oscillator to 250khz (or as close as possible). Place your test lead on the bottom left pin connection of the daughter board for calibration. Without performing this calibration, the compressor will not function properly and may go into self-oscillation.