

AUDIO RING-MODULATOR (ARM)

Parts List and Set-Up instructions:

RESISTORS:

All resistors are 0.25W 5% unless noted otherwise.

R1,R6,R9= 100k
R2,R4,R10,R11,R12,R13,R20 = 10k
R3 = 4.7k
R5,R22 = 1k
R7,R8 = 220k
R14,R18 = 1.2k
R15 = 47R
R16 = 47k
R17,R19 = 39k
R21 = 2M
R28,R29 = 100R/1W
R30,R31 = 10R/1W
R34 = 27k/2W
R33 = 470k
R35,R36 = 10k/1W
R37 = 56k/0.5W
R38 = 22k/0.5W
P1 = 50-100k pot.(A)udio taper
P2 = 10k pot.(A)udio taper or B
P3 = 100K trim-pot

CAPACITORS:

C1,C2 = 0.1uF/50V film
C3 = 100pF/50V ceramic
C4,C5 = 33uF/35V
C6 = 1uF/50V film
C7,C8 = 0.1uF/50V ceramic
C10,C11 = 10uF/16V tantalum
C12,C13 = 1000uF/25V

POWER SUPPLY:

TR1 = wall-wart 13-14VAC 100mA

MISCELLANEOUS:

SW = SPDT toggle switch
knob for P2 potentiometer
case
1/4" jacks

SEMICONDUCTORS:

Q1,Q2,Q3,Q4 = 2N3904 or similar NPN
U1 = MC3403, LM324 gen. purpose quad op-amp
U3 = 78L12 positive voltage regulator
U4 = 79L12 negative voltage regulator
D1,D2 = 1N4148
D3 = NA
D4,D5 = 1N4002

Description & Set-Up Procedure:

The four parts of U1 Ic re-assemble unity gain amplifiers and signal phase splitter. The four transistors make up the two switches for these signals.

One comparator of U2 is set-up as a multi-vibrator. The frequency (and the effects) can be changed with P2 potentiometer.

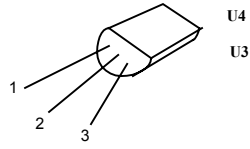
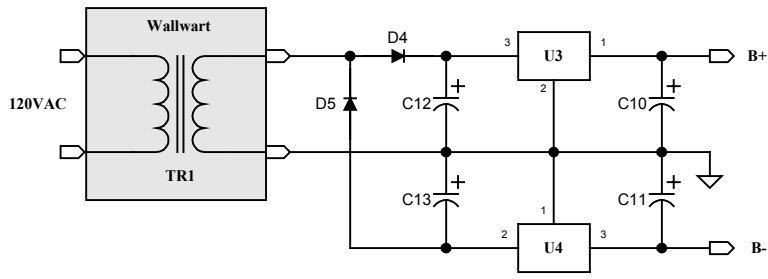
An input for external sync frequency, (like a second instrument) is provided.

The other comparator is inverting the signal. Both signals, the inverted and non-inverted are collected at R5.

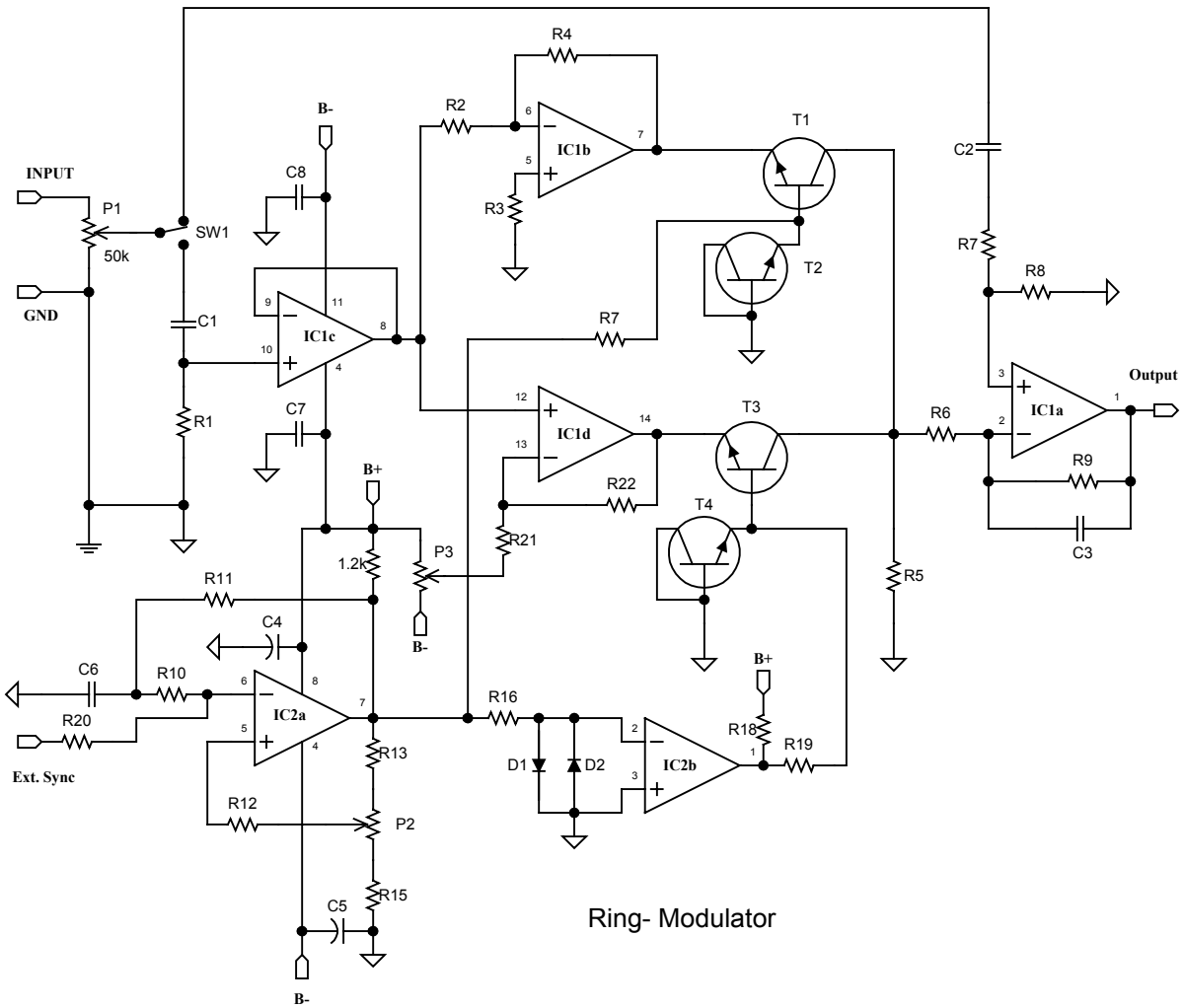
Changing the values of R7, R8 and R9 will increase or decrease the gain of the output amplifier. Gain with current values is 0.5

The ARM can be by-passed with the toggle switch SW.

Q1-Q4 transistors must be matched for equal gain. Use your DMM's Hfe setting (if available) to select transistors. Set the level pot P1 to fully CCW position (no signal). Connect the ARM to an audio amplifier and adjust the P2 trim pot for least noise.



Power Supply



Ring- Modulator