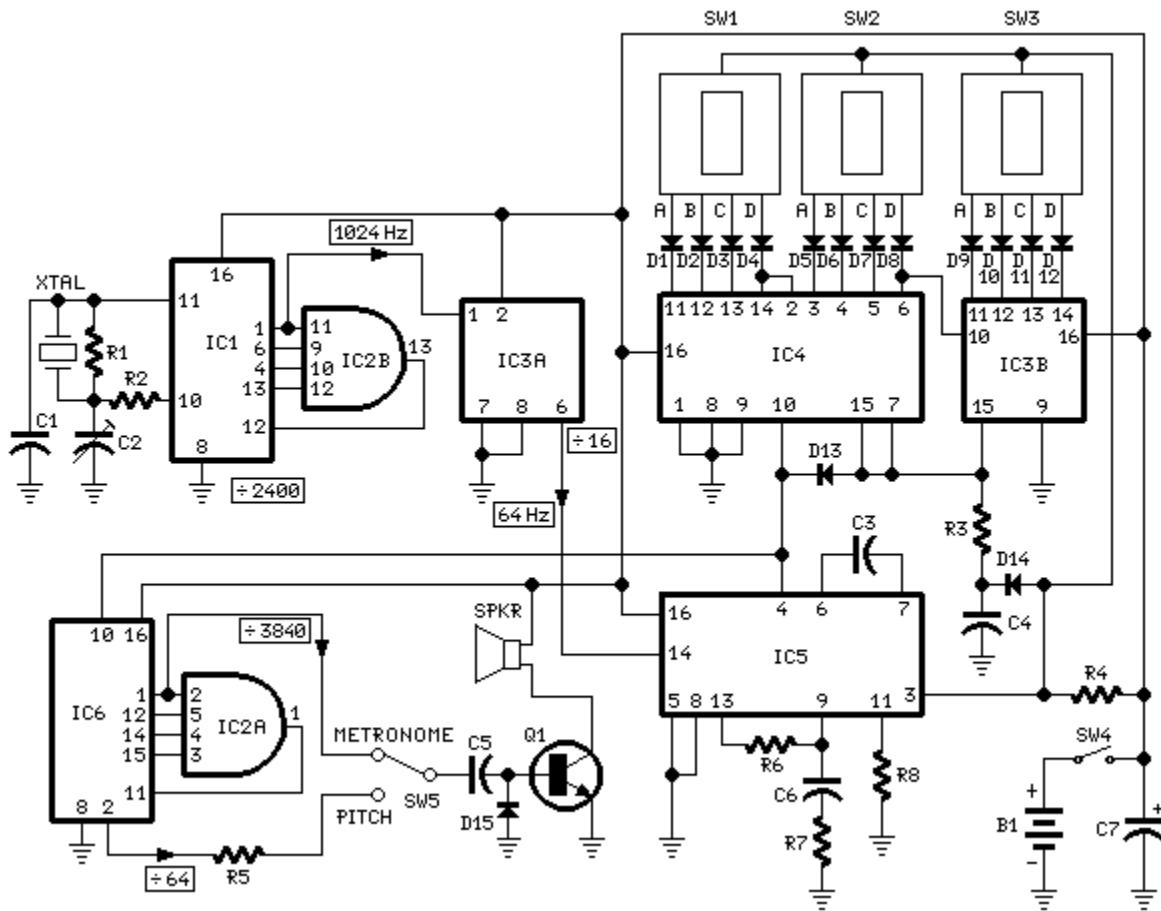


Precision Metronome and Pitch ge

Precision Frequency generator 1 to 999 Hz
Precision Metronome 1 to 999 beats per minute

Circuit diagram:



Parts:

R1	_____1M	1/4W Resistor
R2	_____22K	1/4W Resistor
R3	_____6K8	1/4W Resistor
R4	_____4K7	1/4W Resistor
R5	_____47K	1/4W Resistor
R6	_____100K	1/4W Resistor
R7	_____39K	1/4W Resistor
R8	_____12K	1/4W Resistor

C1_____47pF 63V Ceramic Capacitor
 C2_____2-22pF 63V Ceramic Trimmer
 C3_____470pF 63V Ceramic Capacitor
 C4_____10pF 63V Ceramic Capacitor
 C5_____100nF 63V Polyester Capacitor
 C6_____220nF 63V Polyester Capacitor
 C7_____22µF 25V Electrolytic Capacitor

 D1-D15___1N4148 75V 150mA Diodes

 IC1_____4060 14 stage ripple counter and oscillator IC
 IC2_____4082 Dual 4 input AND gate IC
 IC3_____4520 Dual binary up-counter IC
 IC4_____4518 Dual BCD up-counter IC
 IC5_____4046 Micropower Phase-locked Loop IC
 IC6_____4040 12 stage ripple counter IC

 Q1_____BC337 45V 800mA NPN Transistor

 XTAL_____2.4576 MHz Miniature Quartz crystal

 SW1_____BCD Miniature Thumbswheel Switch (units)
 SW2_____BCD Miniature Thumbswheel Switch (tens)
 SW3_____BCD Miniature Thumbswheel Switch (hundreds)
 SW4_____SPST Slider Switch (On-off)
 SW5_____SPDT Slider Switch (Metronome-Pitch)

 SPKR_____8 Ohm, 50 mm. Loudspeaker

 B1_____9V PP3 Battery

 Clip for 9V PP3 Battery

Circuit operation:

CMos IC1 and IC2B quad AND gate form a 2.4576 MHz crystal oscillator plus a 2400 times divider. IC3A provides further division by 16, obtaining a 64 Hz stable frequency square wave. This frequency is multiplied by operation of Phase Locked Loop IC5, double decade divider IC4 and IC3B 4 bit binary divider, by the number set by three miniature BCD thumbswheel switches SW1, SW2 and SW3: units, tens and hundreds respectively.

Connecting, by means of SW5, Q1 base to pin 2 of IC6, we obtain after a 64 times division, the same frequency set by thumbswheel switches with quartz precision, and no need for a scale indicator.

Volume regulation of the pitch generator is obtained trimming resistor R5. In the same manner, with SW5 set to metronome, the small speaker reproduces the frequency set by thumbswheel switches but divided by 3840, thus obtaining beats per minute ratio.