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Byonics TDOA Antenna Switcher

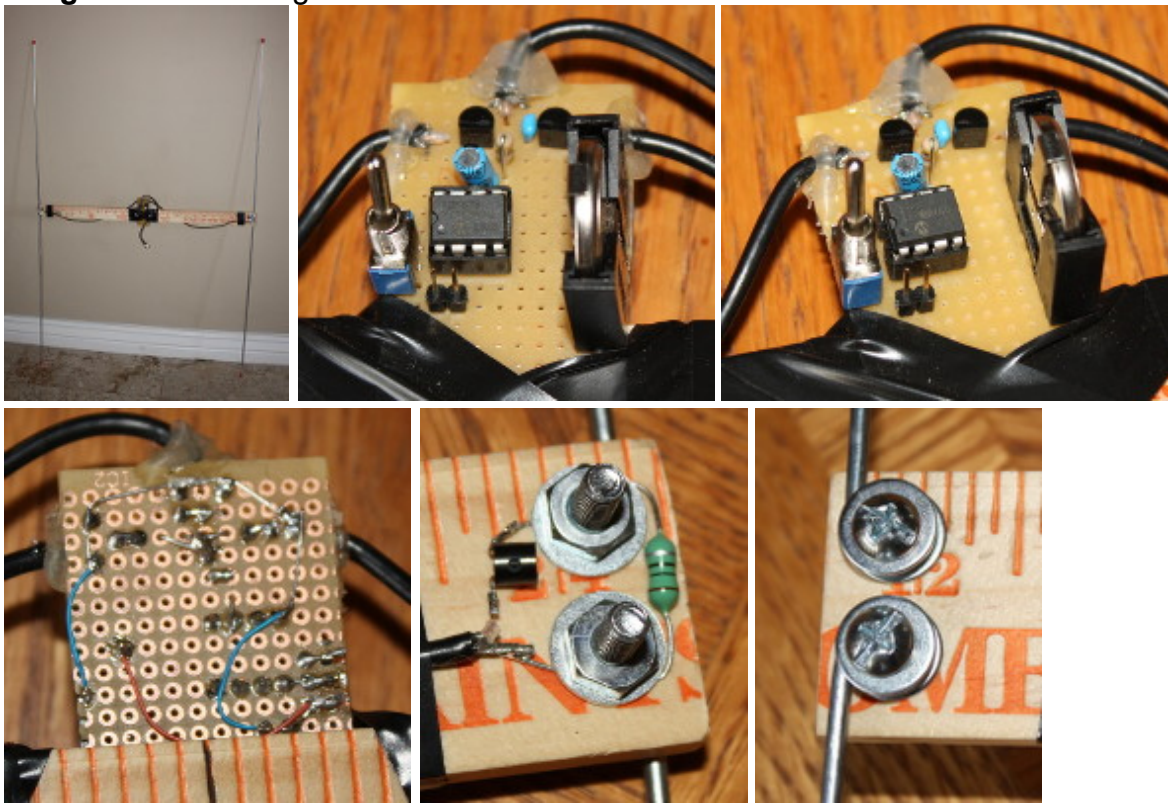
This is a functional prototype of a upcoming Byonics product in our T-Hunting / RDF product line, along with the [PicCon](#) and [Micro-Fox 15](#). It is an TDOA (Time Difference Of Arrival) antenna switcher that, when combined with a radio receiver, will tell the direction to a transmitter via LEDs. The initial prototype does not yet have the LEDs, but is still useful, in that it generates an audible tone on an 2-meter FM receiver when the two antennas are not the same distance from the transmitter, and thus receiving the signal out of phase from each other. That tone will fade away when the two antennas are rotated as they become equidistant from the transimtter, and fall into phase.

The way to use this antenna switcher is to turn on the power, connect to a radio receiver on the proper frequency, and hold with the antenna elements going up and down, and rotate the boom of the antenna left and right until the 640 Hz tone goes away. When it does, then the antennas should be equidistant from the transmitter, and if you were to draw a line between the antennas, the transmitter should be on the perpendicular to that line right through the midpoint of the antennas.

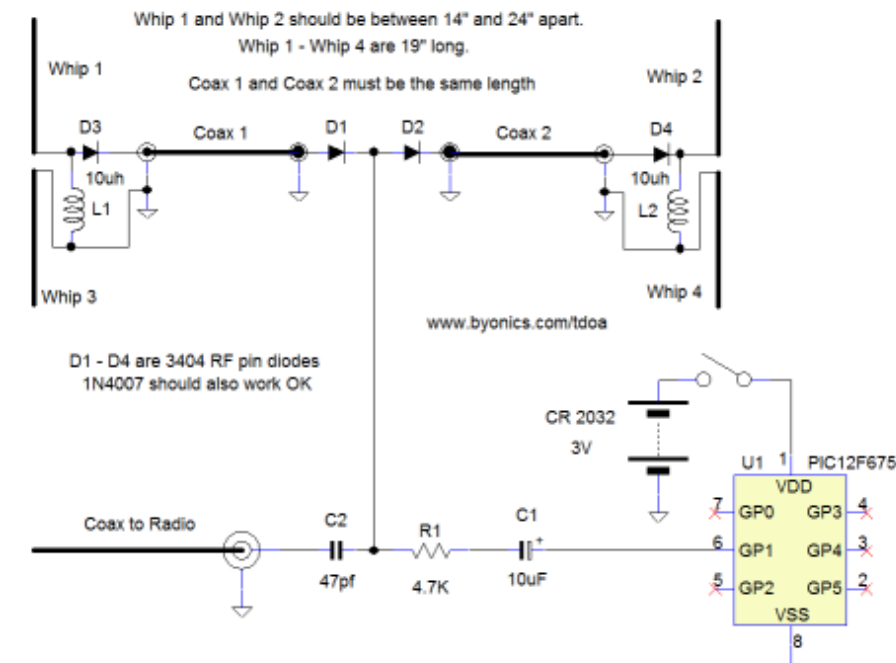
Note that the transmitter being on that perpendicular line means that it could either be directly ahead, or directly behind. You would need to move some distance along the line of the antennas and take another bearing to determine which direction the transmitter actually was. In the next version, when the audio from the receiver is fed back into the chip and analysed, it will be able to tell if the signal is coming from the left or right when the tone is present, and light the appropriate LED.

This prototype used steel suspended ceiling rods as the 19" whip elements to make 2 2-meter dipoles. They can be folded down when not in use. Check back at this site in a few weeks, when we hope to have kits available.

Images - click for larger.



Schematic - click for larger.



Code - for a Microchip PIC12F675

```
;
;
;
;          T D O A 0 . A S M
;
;
; Byonics / Byon Garrabrant  N6BG  byon@byonincs.com  Feb 20 2014
;

LIST      P=PIC12F675
include "P12F675.INC"
__CONFIG _INTRC_OSC_NOCLKOUT & _CP_OFF & _PWRTE_ON & _WDT_OFF & _MCLRE_OFF

;

        cblock      H'07'                ; system variables
        delay1
        endc

        ORG         0                    ; start code

        call        H'3FF'
        bsf         STATUS, RP0          ; Select Bank 1
        movwf       OSCCAL
        bcf         STATUS, RP0          ; Select Bank 1
        goto        main

;

delay
        decfsz      delay1, F             ; delay 256*3+3 ins
        goto        $-1                  ; about 780 us
        return

#define            OUT_PIN                GPIO, 1

main
        movlw       H'07'
        movwf       CMCON
        bsf         STATUS, RP0          ; Select Bank 1
        clrf        ANSEL
        bcf         OUT_PIN              ; make an output
        bcf         STATUS, RP0          ; Select Bank 0

mainLoop
        bsf         OUT_PIN              ; output high
        call        delay                ; delay about 780 us
        goto        $+1                  ; to match goto below
        bcf         OUT_PIN              ; output low
        call        delay                ; delay about 780 us
        goto        mainLoop

        END
```