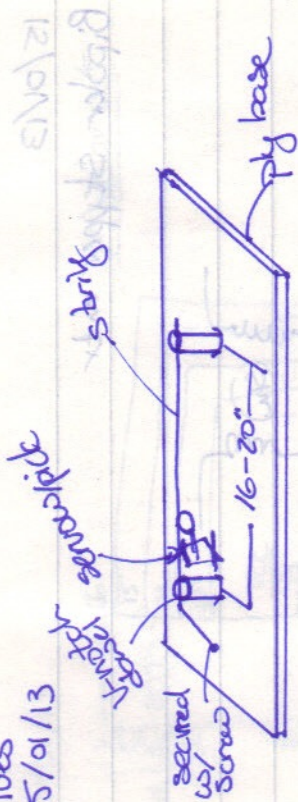


Tues
15/01/13

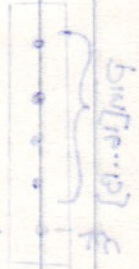
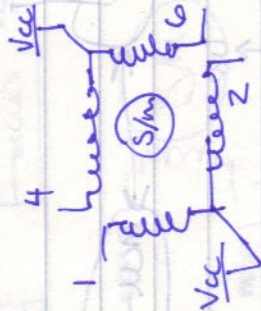


- Each open string will vibrate. @ Inatural SLU
 $f_{nat} \propto F_{string} \propto \frac{1}{\text{Diameter string}}$

$$D = \text{Const} \sqrt{F_{str} (kg)} \quad C = 49 \text{ gut}$$

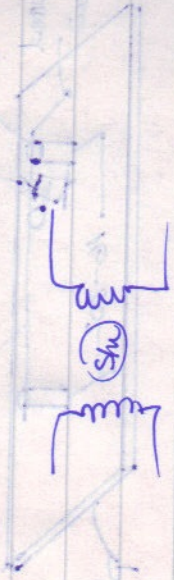
$$f (Hz) \propto \frac{1}{L (m)} \quad C = 54 \text{ nylon}$$

Unipolar motor (stepper)



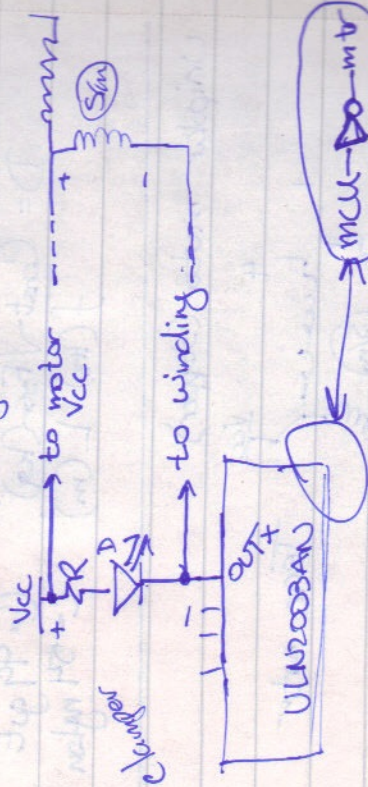
15/01/13

Bipolar stepper mtr

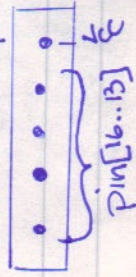


ULN2003AN mtr drive cct Board

- ↳ jumper if 5V mtr
- ↳ else use 12V and +5V
- ↳ common gnd

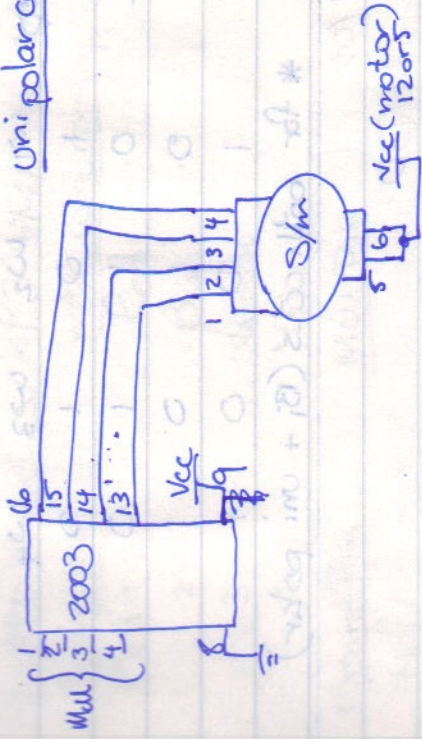


white connector

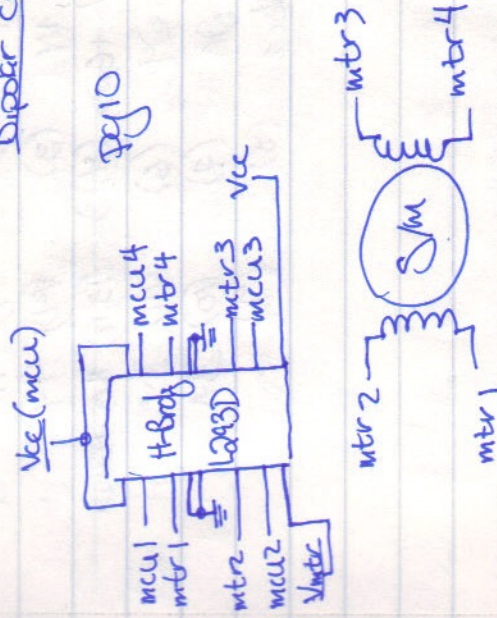


15/01/13

unipolar cct



Bipolar cct



15/01/13

Step w1 w2 w3 w4

1	1	0	1	0
2	0	1	1	0
3	0	1	0	1
4	1	0	0	1

* for both ccts (B1 + uni polar)

16/01/13

74L093D

- 1, 2 EN (1) (16) Vcc1
- 1A (2) (15) 4A
- 1Y (3) (14) 4V
- H/S + GND (4, 5) (13, 12) 1/5 + GND
- 2Y (6) (11) 3V
- 2A (7) (10) 3A
- Vcc2 (8) (9)



16/01/13

LS98D Board vs KP39HMY-016 s/m

Board Pin with wire color

Out 1	Red
2	Blue
3	White
4	Yellow

Board Pin Mcu Pin

IN 1 expanded w bridge

2 Vcc

3 Vcc

4 Vcc = (pinout bridge) 700

Vcc = (pinout bridge) 700

(Note:!) too at dupli frequency = 417

belongs to message stage

highly for comparison

check (pin) tag mutation

too fast for test

17/01/13

Stepper mtr

100 steps = 360°
↳ 3.6°/step

Arduino: stepper.h
step()

Microphone Board w/ Bandpass filter

GND →
Vcc +5V

FOUT (expected frequency) = 0V }
FOUT (no or incorrect freq) = 3.6V }
FIN = frequency input to cct (filtered)
FOUT = outputs squarewave of expected frequency for calibration
RAST = ?

↳ multimeter pot (10x) selects
precis frequency

Pins 2 input for test cct.

17/01/13

Stepper mtr interface

written on bottom brd

IN1 → OUT1 — white
IN2 → OUT2 — Yellow/gmt
IN3 → OUT3 — Red
IN4 → OUT4 — Blue

Board (Dremiboard) pins [8-11]

Servo mtr SG90 (blue)

3V - 6.0V
stall 5.2kg/cm

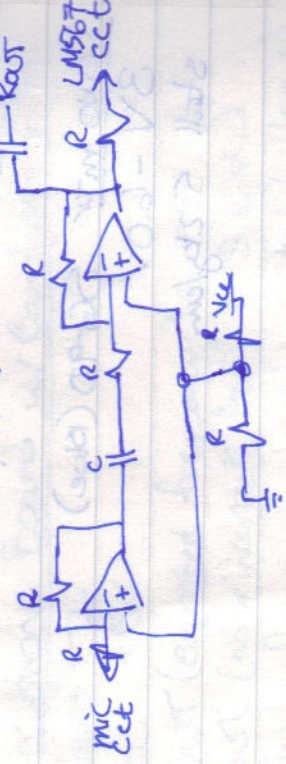
3.5V - 7.2V
9.0kg/cm

Basic library Servo.h
myservo.write(position) 10-180°

18/01/13

Microphone Board w/ Bandpass Filter
 F_{cal} = calibration freq output
 F_{in} = test signal in put?
 R_{out} = Amplified, unfiltered microphone input?

R_{out} is an output of second amplifier

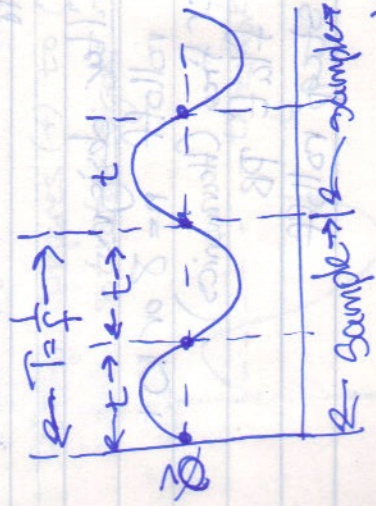
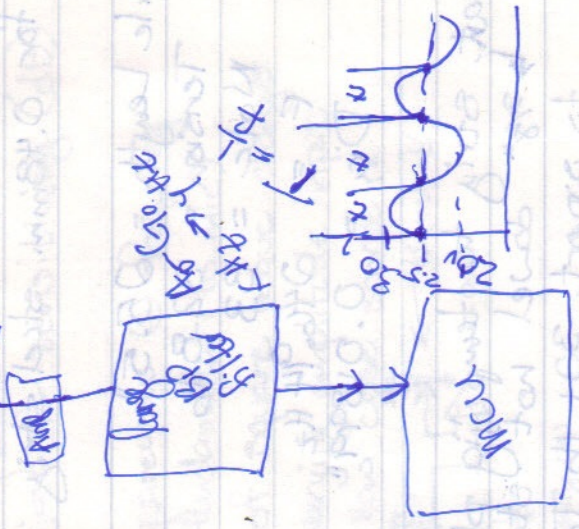
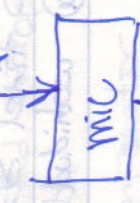


OUT(PIN) = 1 or 0 → no feedback

can not be used as guitar tuner c.t.

18/01/13

Great "input" !!



sample + average
 1/5

19/01/13

Used calculator to find string tension for temp jig @ [www.hiddin.net/...](http://www.hiddin.net/)

for 0.48mm steel string

Scale Length = 25.5"

Tension = 32.8 lb

Note = B3

F = 246.94 Hz

Dia = 0.01899"

made string to temp jig plywood
↳ 3/8" davel not stray enough
to support 30+ lb Tension.

BandPass Filter design

↳ need rolloff $n = 8$ or $10+$
to filter freq (harmonics)

Butterworth = flat PB

cheby = steep rolloff

Jan 24 2013

Design of (2nd) Microphone board

IN: 3-5V

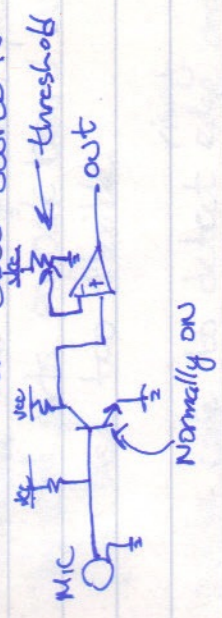
OUT: Comparator

POT: Adjust for sensitivity (dB)

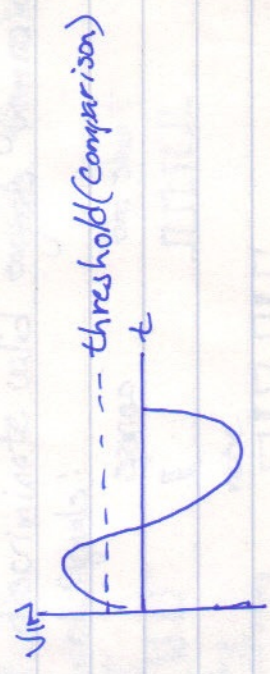
outputs squarewave @ frequency of input fundamental (to mic)

↳ duty of square wave changes for varying amplitude input

↳ How close source is



OP Amp compares (+) to (-) and outputs saturated signal



Jan 25 2013

Decided to remove microphone (desolder) and use pickup coil attached to mic board.

Microphone much too noisy to get signal ~~can't~~ without proper conditioning.

Pickup coil very clean signal
Screenshots taken

Jan 29

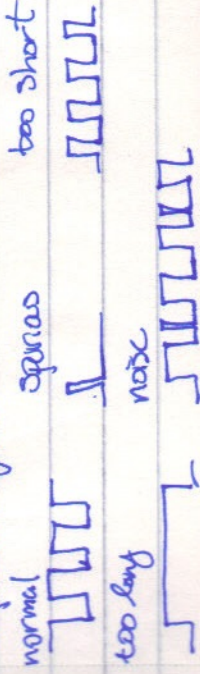
Jan 29 2013

- Removed mic + replaced w/ pickup
- Replaced parts on oak board as ply base too flexible

Write code to detect edge and interrupt (Bravo)

write code to determine frequency and discriminate valid signals from noise

Expected Signals:



8106 16 pin
 and bracket mounting (ind) for signal
 for temp 16 pin 12-8:1:11
 - character: 1700
 (ab) identification of height: 100

could be further part @ character: 1700
 - Temp (min) at bottom of temp 16
 - 16 pin 12-8:1:11
 - character: 1700
 - 16 pin 12-8:1:11
 - character: 1700
 - 16 pin 12-8:1:11
 - character: 1700

16 pin 12-8:1:11
 - character: 1700
 - 16 pin 12-8:1:11
 - character: 1700
 - 16 pin 12-8:1:11
 - character: 1700

Feb 12 2013

I²C LCD interface

Arduino D... Board

A4 (SDA)

A5 (SCL)

YD1602A-4 LCD

13 (SDA)

14 (SCL)

15 (LED A)

16 (LED K)

1 ~~+~~ GND

2 VSS (+5)

3 Pot → LCD Backlight Contrast

^{I²C} Address = 0X3C
(0111 100x)

5000 25000

(Subscribed) write program in memory of Arduino

→ hardware LCD interfacing with Arduino board

board in

language of I²C and I²C interface with Arduino

pin headers using function keys

language code from I²C protocol

not a programmer

Header

ELKS PB.NET

getting in headers + sim hardware -

→ based on no other Arduino -

sketch and send data

write code to Arduino

(control) program

write code to Arduino program

and disassemble the program

change hardware

control program

write code

control

write code