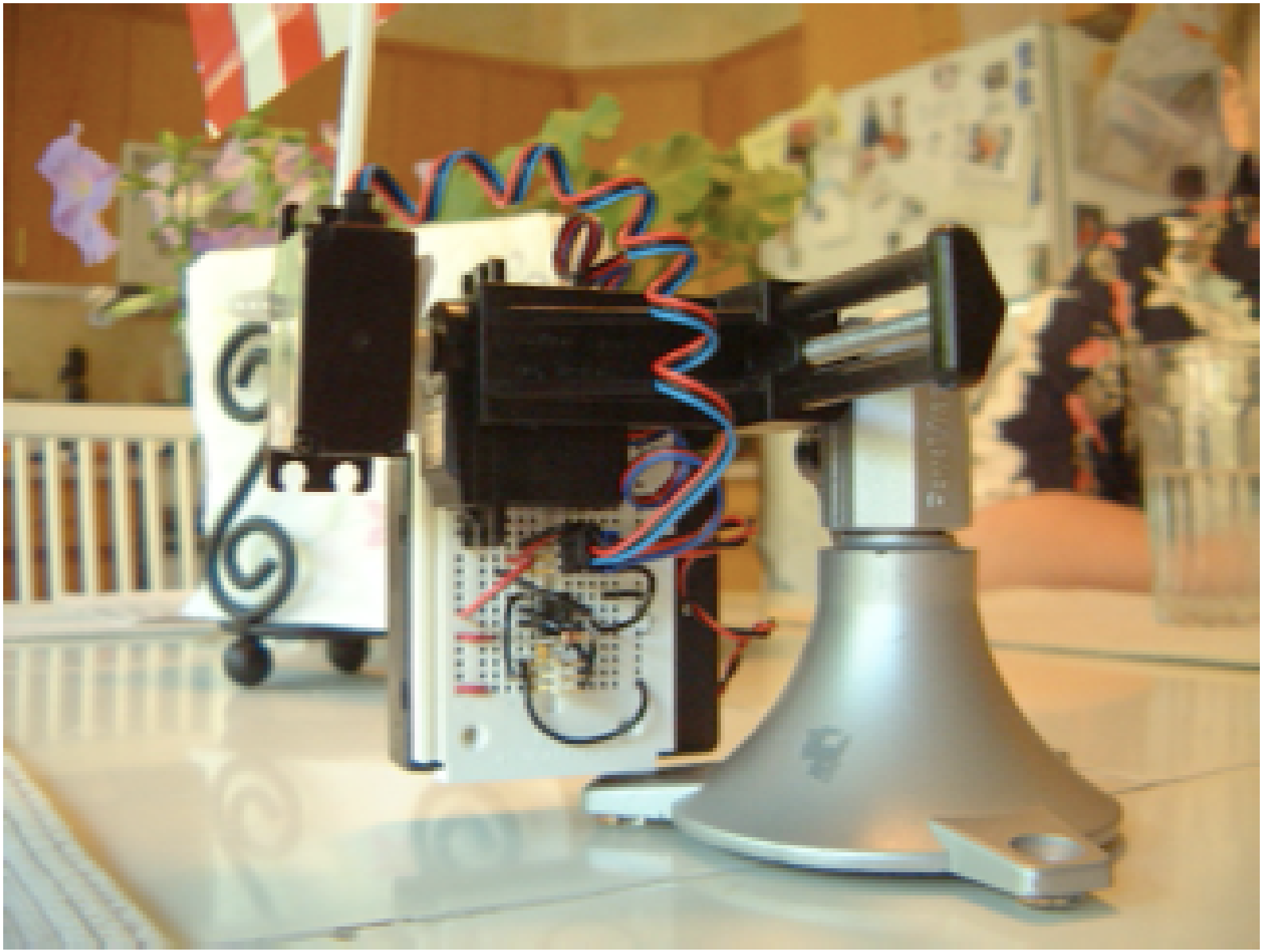
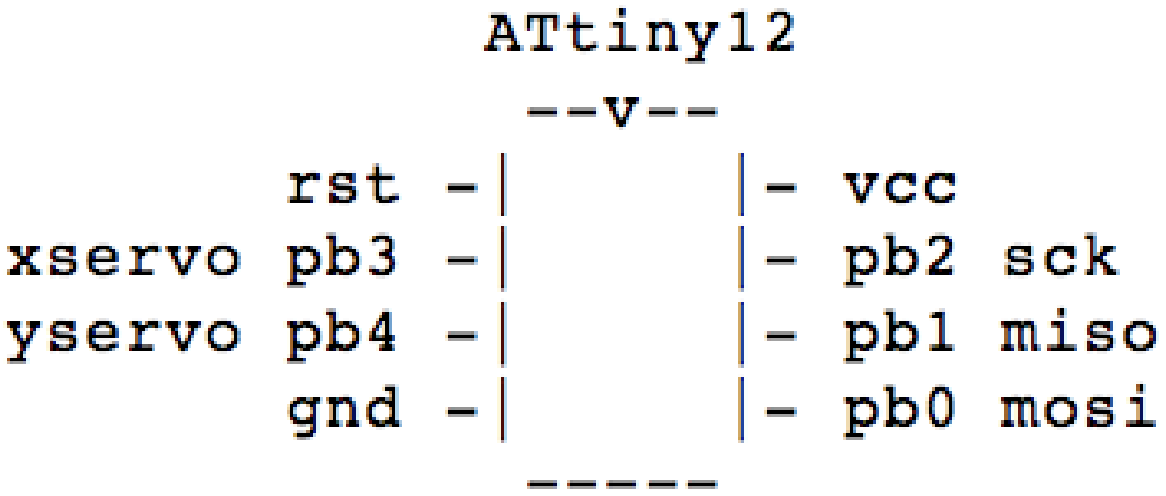
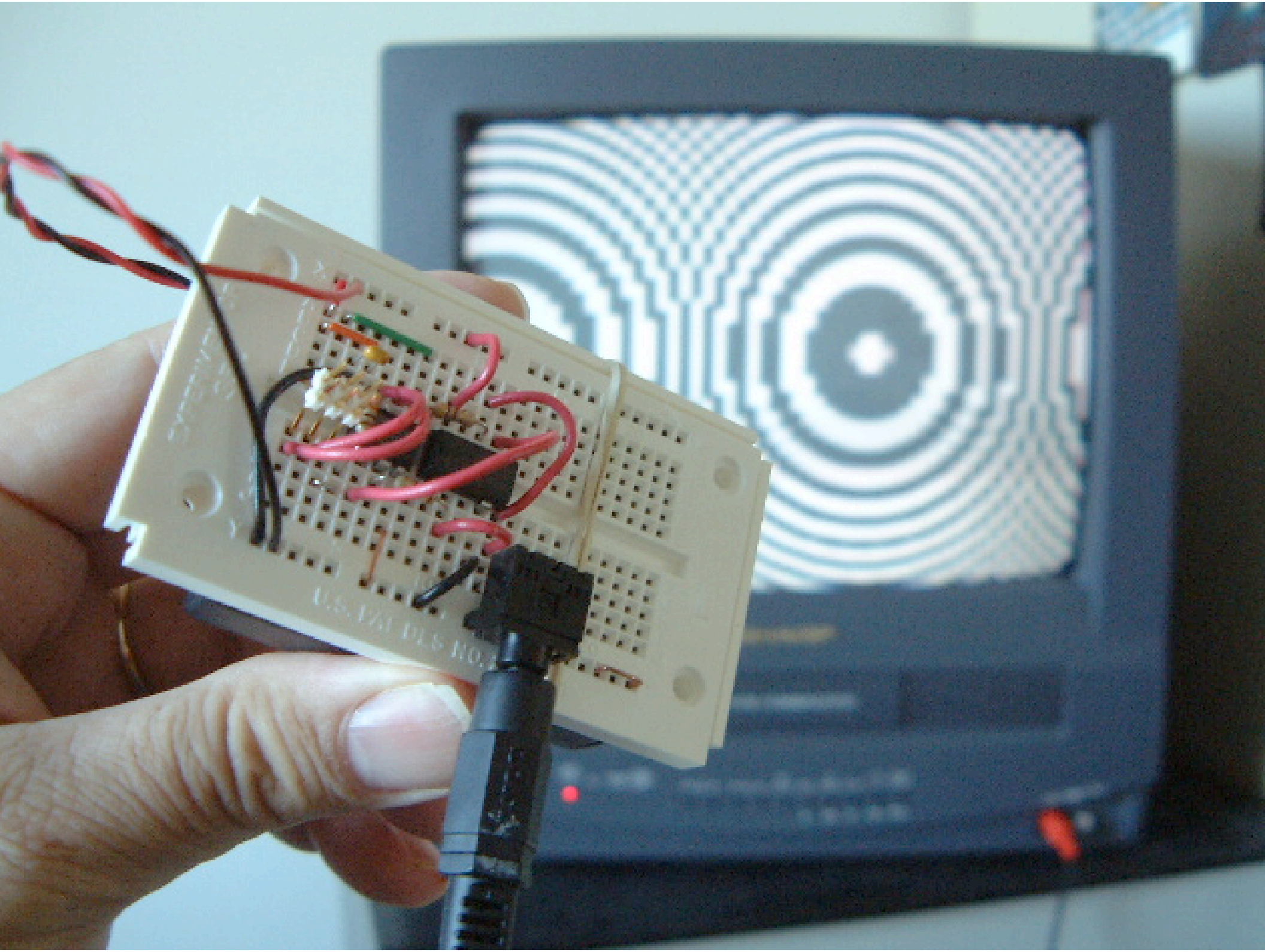
robotics

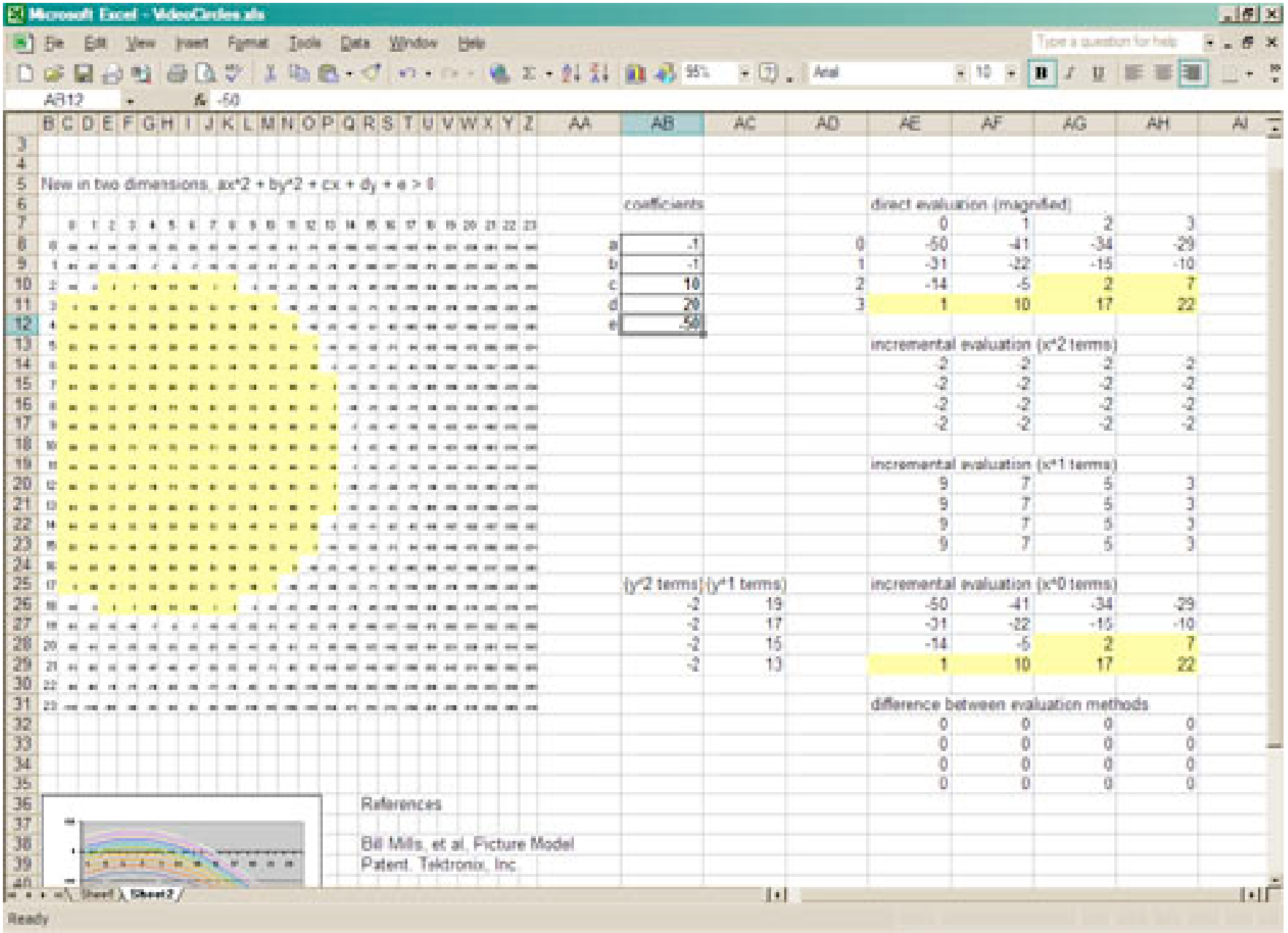



ATtiny12
rst
xservo pb3
yservo pb4
gnd
vcc
pb2 sck
pb1 miso
pb0 mosi

```
spiral:   ldi     t,0
          ldi     r,0
          ldi     v,-3
spi1:     ldi     p,10
spi2:     rcall   polar
          add     t,v
          dec     p
          brne    spi2
          inc     r
          cpi     r,120
          brne    spi1
```

video




Microsoft Excel - VideoCircles.xls
File Edit View Insert Format Tools Data Window Help
AR12
-50
New in two dimensions, ax^2 + by^2 + cx + dy + e > 0
coefficients
a -1
b -1
c 10
d 20
e -50
direct evaluation (magnified)
0 1 2 3
0 -50 -41 -34 -29
1 -31 -22 -15 -10
2 -14 -5 2 7
3 1 10 17 22
incremental evaluation (x^2 terms)
2 2 2 2
-2 -2 -2 -2
-2 -2 -2 -2
-2 -2 -2 -2
incremental evaluation (x^1 terms)
9 7 5 3
9 7 5 3
9 7 5 3
9 7 5 3
(y^2 terms) (y^1 terms)
-2 19
-2 17
-2 15
-2 13
incremental evaluation (x^0 terms)
-50 -41 -34 -29
-31 -22 -15 -10
-14 -5 2 7
1 10 17 22
difference between evaluation methods
0 0 0 0
0 0 0 0
0 0 0 0
0 0 0 0
References
Bill Mills, et al, Picture Model
Patent, Tektronix, Inc
Sheet1 Sheet2
Ready

Video Circles on TinyTv

startVert = c, startHorz = y1+y0

TinyTv.Values	y0
	-50
	-31
	-14
	1

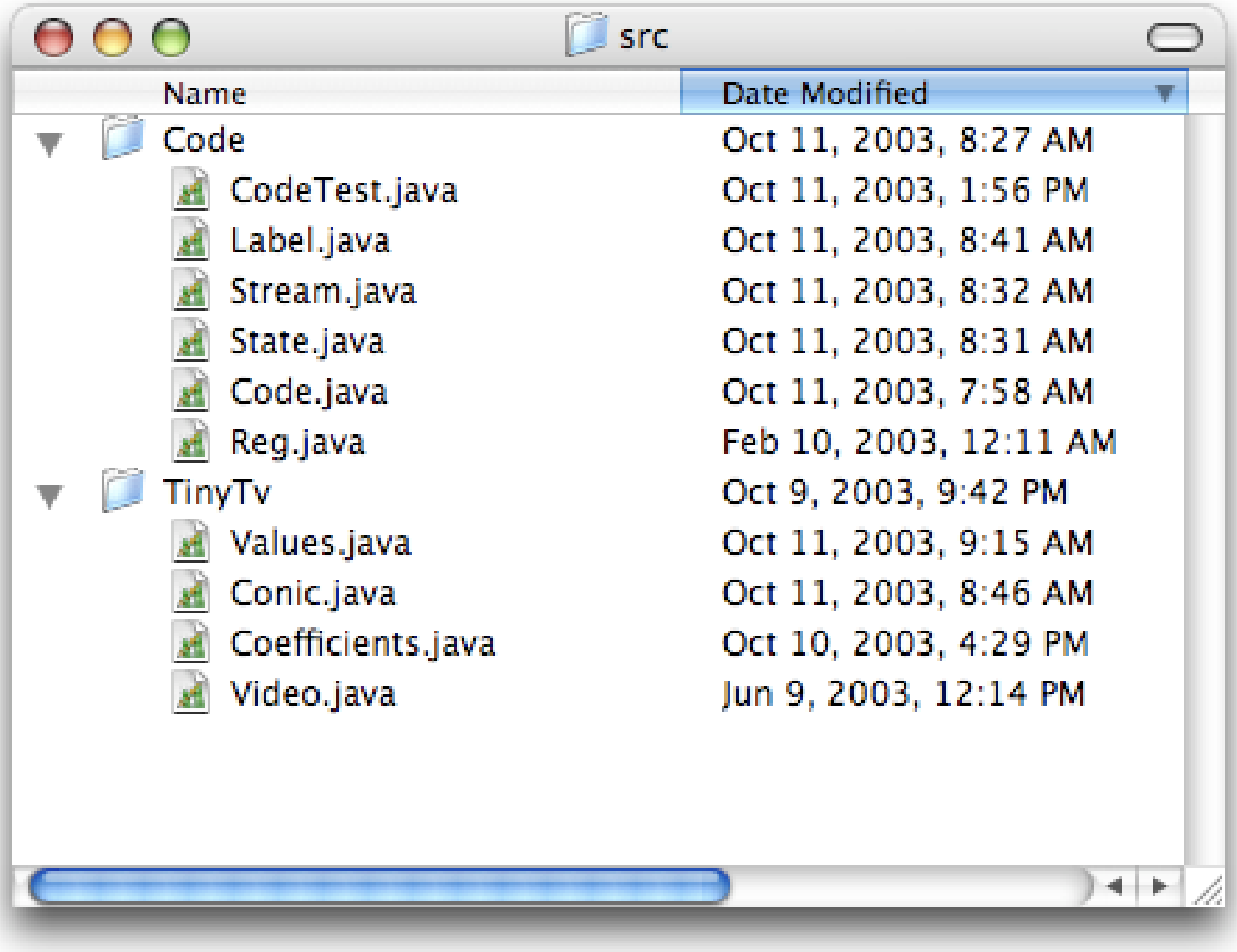
The x coefficients are computed throughout the horizontal scan. Note x0 depends on y0 which is assumed to be already computed for the current row. Other references (x2, x1 and x0) are to values from the previous horizontal increment.

startHorz = 2a, incHorz = x2

TinyTv.Values			x2
-2	-2	-2	-2
-2	-2	-2	-2
-2	-2	-2	-2
-2	-2	-2	-2

startHorz = a+c, incHorz = x2+x1

TinyTv.Values			x1
9	7 expected 9 actual	5 expected 9 actual	3 expected 9 actual
9 expected 5 actual	7 expected 3 actual	5 expected 1 actual	3 expected -1 actual
9 expected -5 actual	7 expected -7 actual	5 expected -9 actual	3 expected -9 actual
9 expected -13 actual	7 expected -15 actual	5 expected -17 actual	3 expected -17 actual


src
Name
Date Modified
Code
Oct 11, 2003, 8:27 AM
CodeTest.java
Oct 11, 2003, 1:56 PM
Label.java
Oct 11, 2003, 8:41 AM
Stream.java
Oct 11, 2003, 8:32 AM
State.java
Oct 11, 2003, 8:31 AM
Code.java
Oct 11, 2003, 7:58 AM
Reg.java
Feb 10, 2003, 12:11 AM
TinyTv
Oct 9, 2003, 9:42 PM
Values.java
Oct 11, 2003, 9:15 AM
Conic.java
Oct 11, 2003, 8:46 AM
Coefficients.java
Oct 10, 2003, 4:29 PM
Video.java
Jun 9, 2003, 12:14 PM

```
static public Code add(final Reg reg, final byte literal) {
    return new Code () {
        public void run(State state) {
            reg.value += literal;
            state.result(reg.value);
            state.ticks += 1;
        }
        public void emit() {
            emit("addi", reg, literal);
        }
    };
}
```

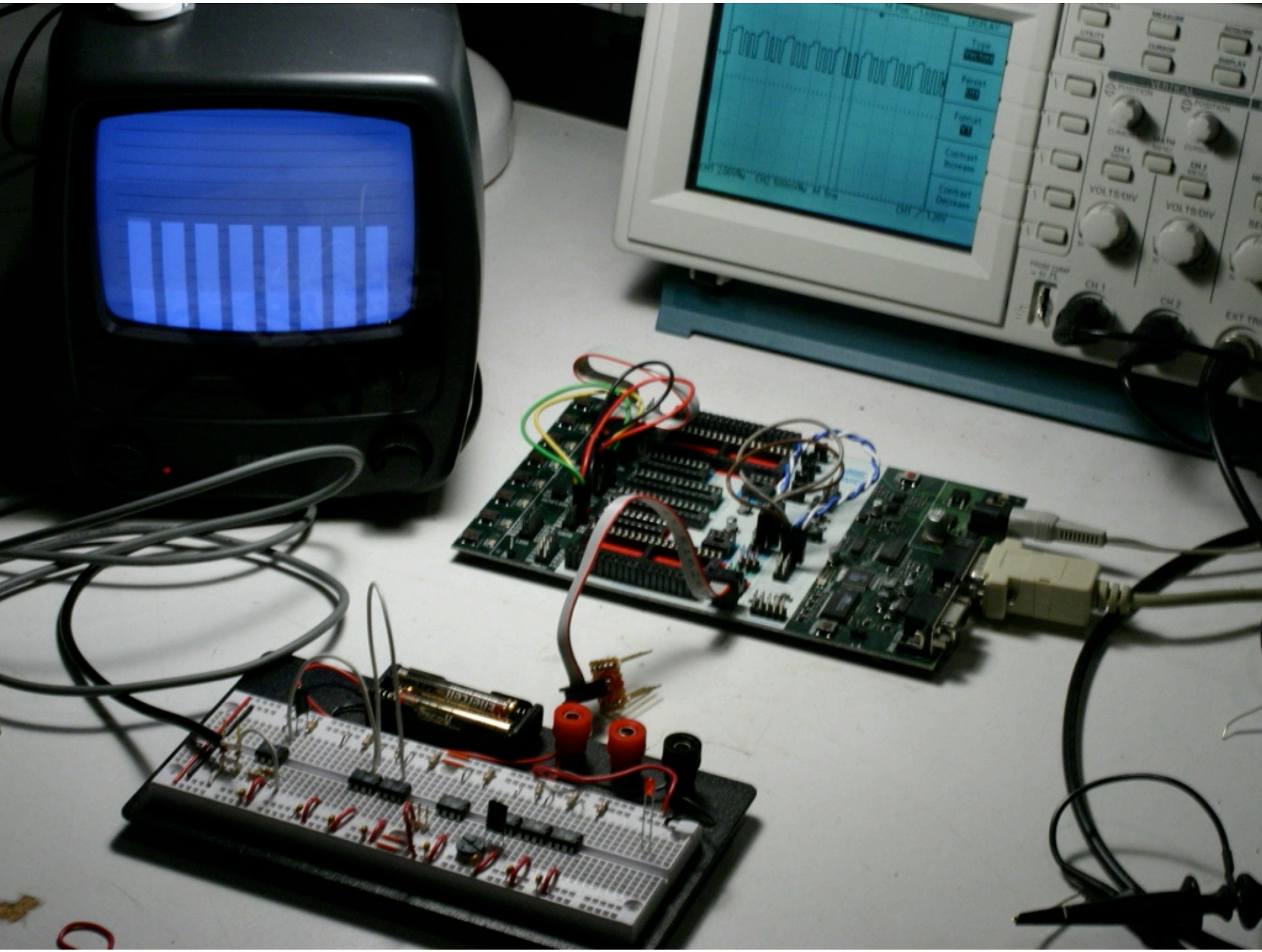
```
static public Code seq (final Code a, final Code b) {
    return new Code () {
        public void run(State state) {
            state.queue(b); // will run this after a completes
            a.run(state);
        }
        public void emit() {
            a.emit();
            emit("\n");
            b.emit();
        }
        public Code op() {
            return a;
        }
    };
}
```

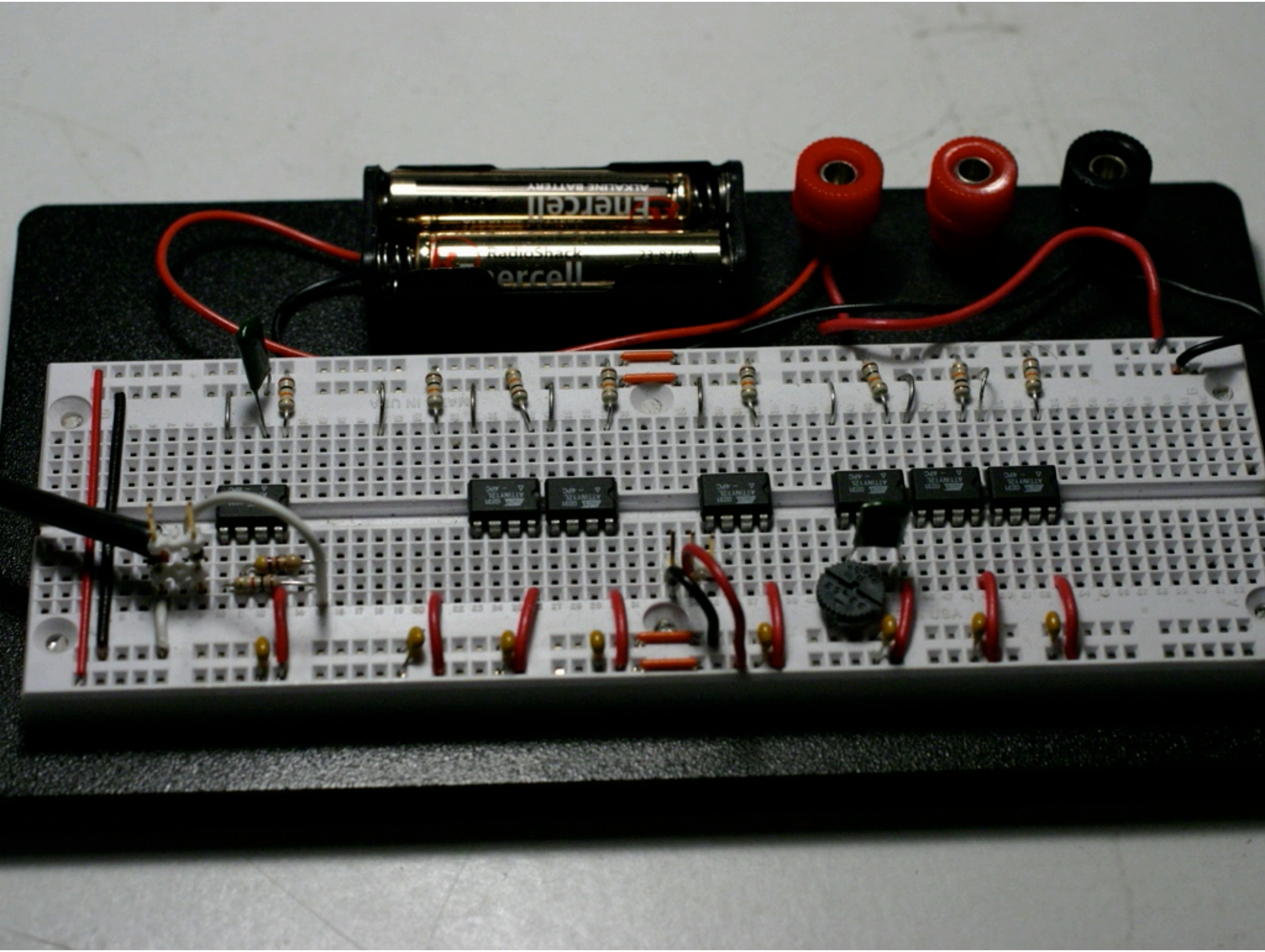
```
Code setAndDiv (Reg temp, Reg source, int scale) {
    // divide by power of two only now, but could do more
    Code asm = Code.set (temp, source);
    while (scale > 1) {
        asm = Code.seq (asm, Code.asr(temp));
        scale /= 2;
    }
    return asm;
}
```

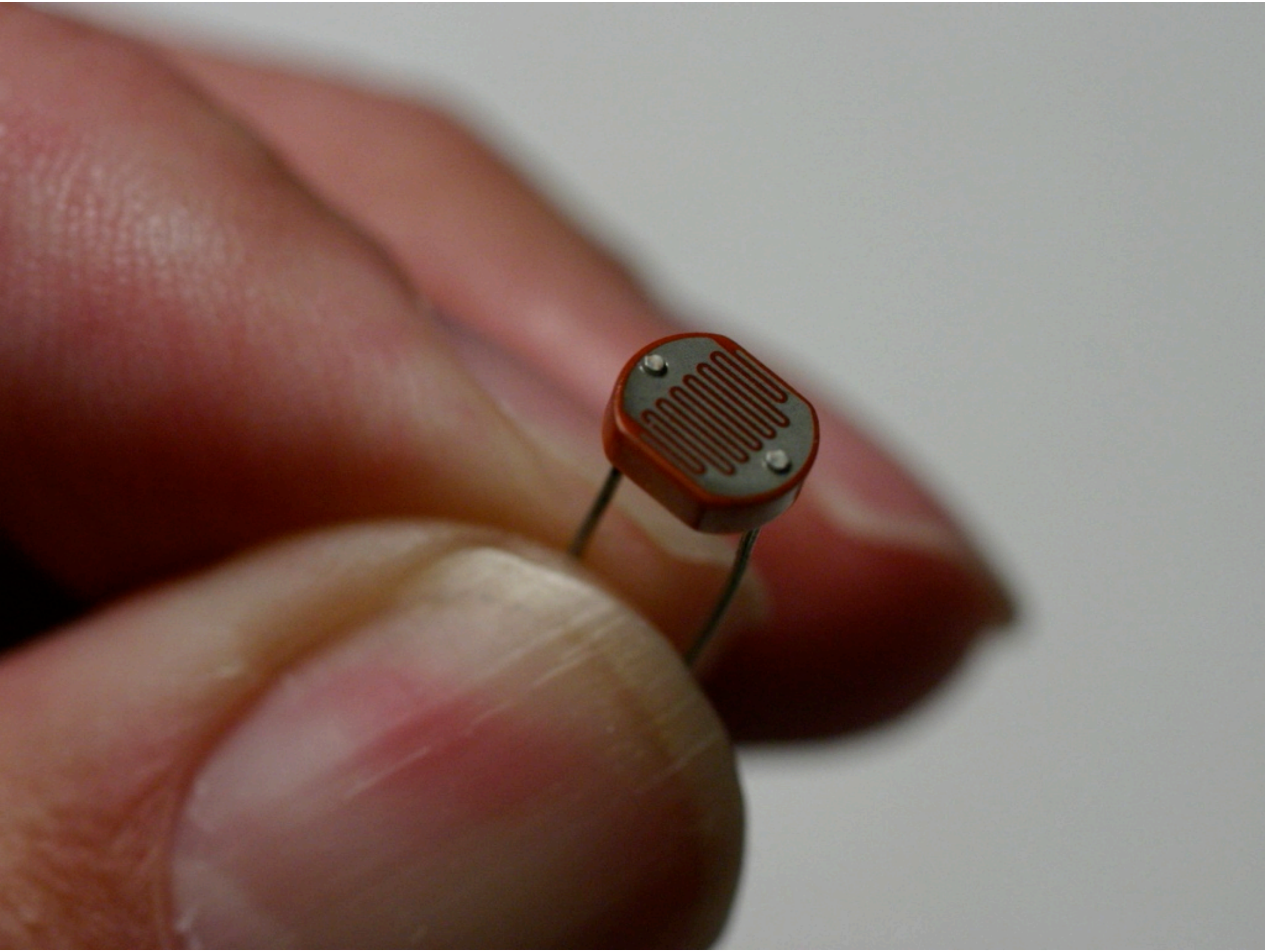
```
Code tailLoop(Code body, Code plus, Code minus) {

    Label tl1 = new Label("tl1");
    Label tl2 = new Label("tl2");

    tl1.next = Code.seq(
            tl1,
            body,
            Code.brpl(tl2),
            minus,
            Code.nop(),       // to tick-balance branches
            Code.rjmp(tl1));

    tl2.next = Code.seq(
            tl2,
            plus,
            Code.rjmp(tl1));

    return Code.seq(
            tl1.next,
            tl2.next);
}
```

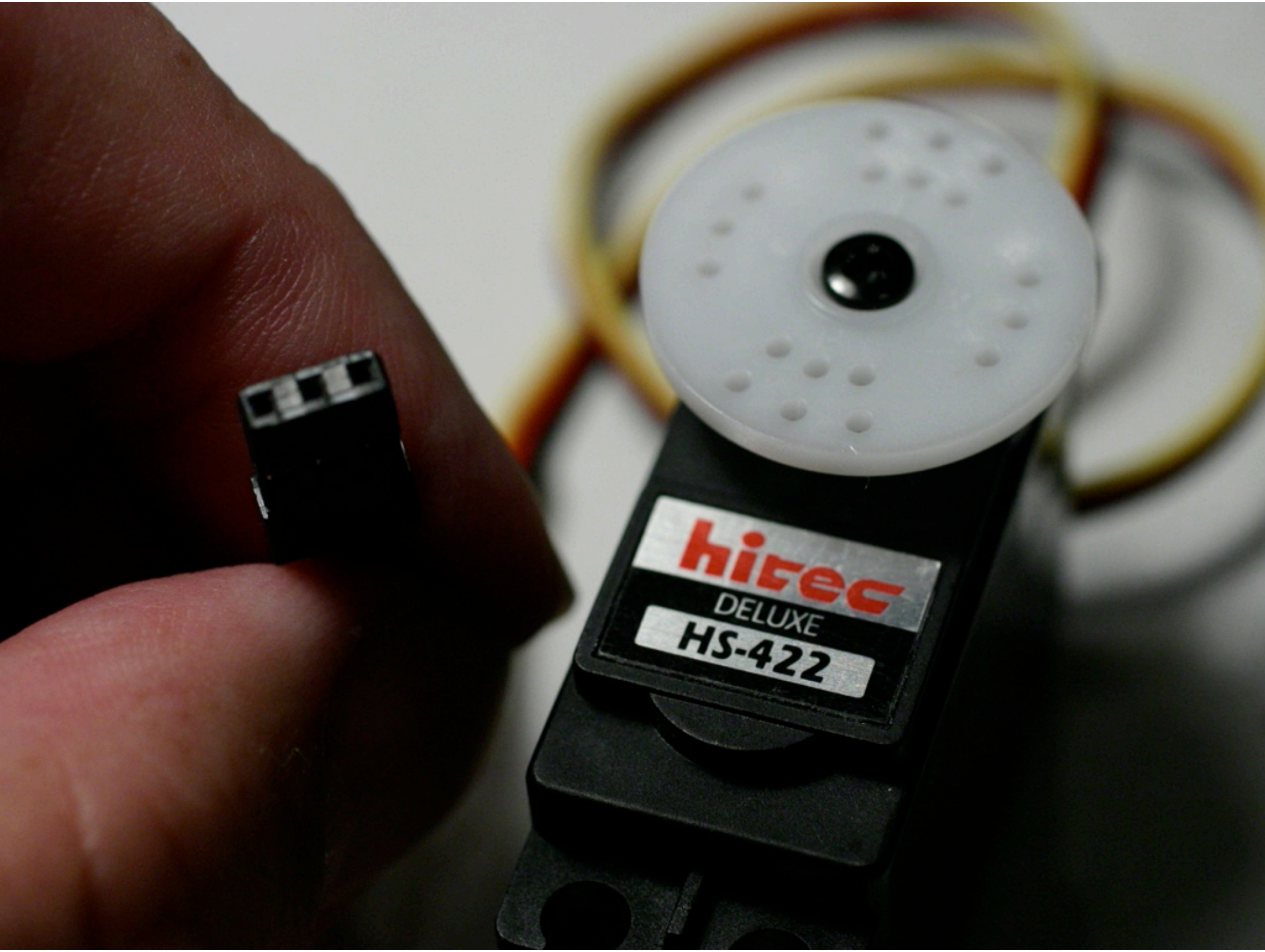
```
public void doTable(Parse table) {
    var = table.leaf().more.text();
    Coefficients.reset();
    super.doTable(table);
}

public void doRow(Parse row) {
    conic = Coefficients.conic;
    state = conic.state;
    super.doRow(row);
    state.jump(conic.horz);
    state.run(10);
}

public void doCell(Parse cell, int column) {
    state.run(5);
    Reg reg =
        var.equals("x0") ? conic.px0 :
        var.equals("x1") ? conic.px1 :
        var.equals("x2") ? conic.px2 :
        var.equals("y0") ? conic.py0 :
        var.equals("y1") ? conic.py1 :
        var.equals("y2") ? conic.py2 :
        null;
    check(cell, reg.value);
    System.out.println(state.pc);
}
```

multi-processors



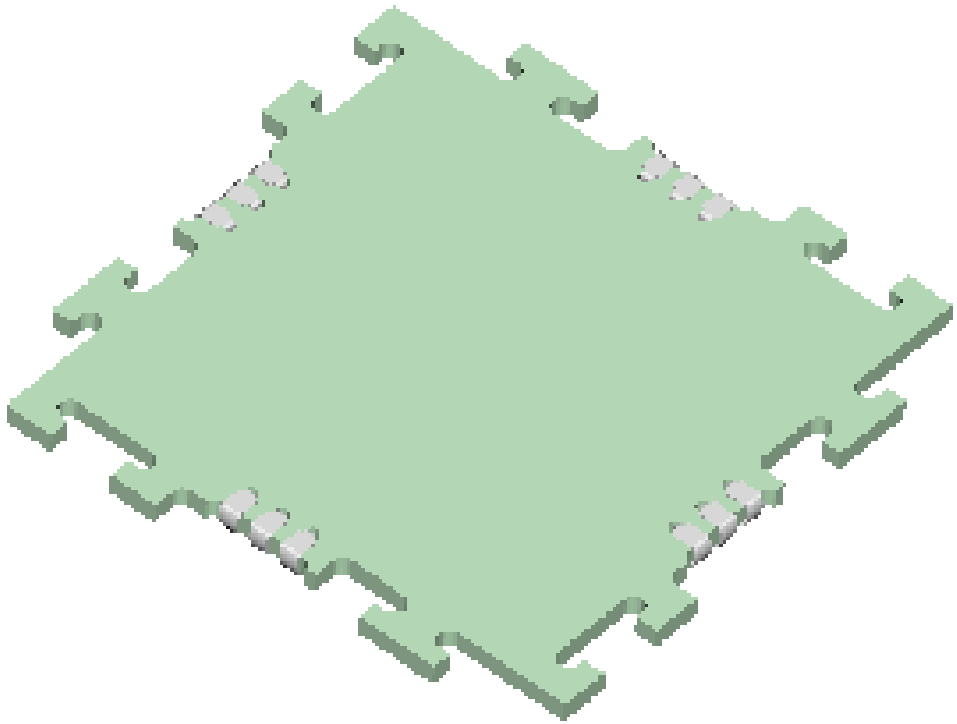

ALKALINE BATTERY
RadioShack

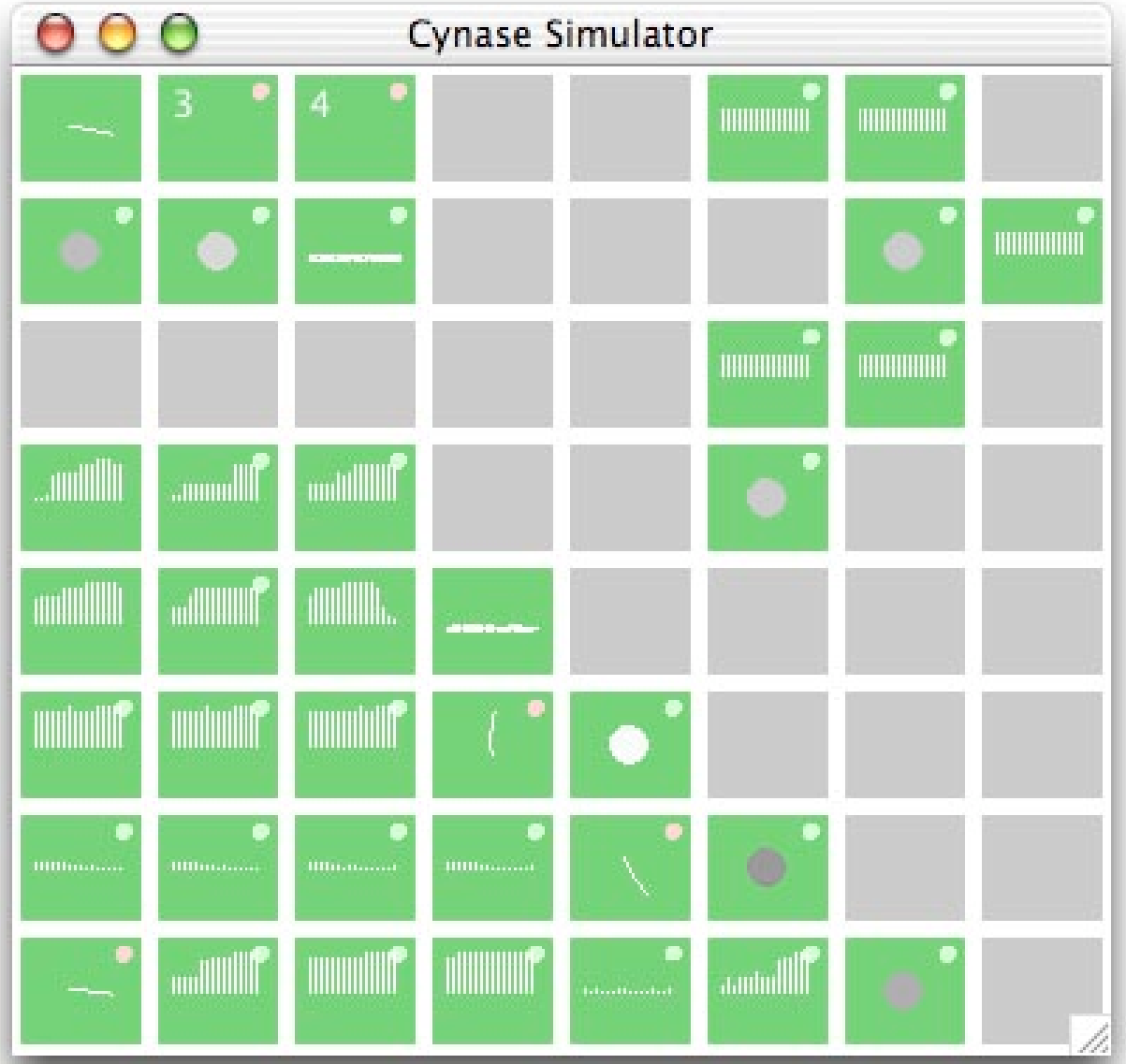



hitec
DELUXE
HS-422


pixera

statistical signaling

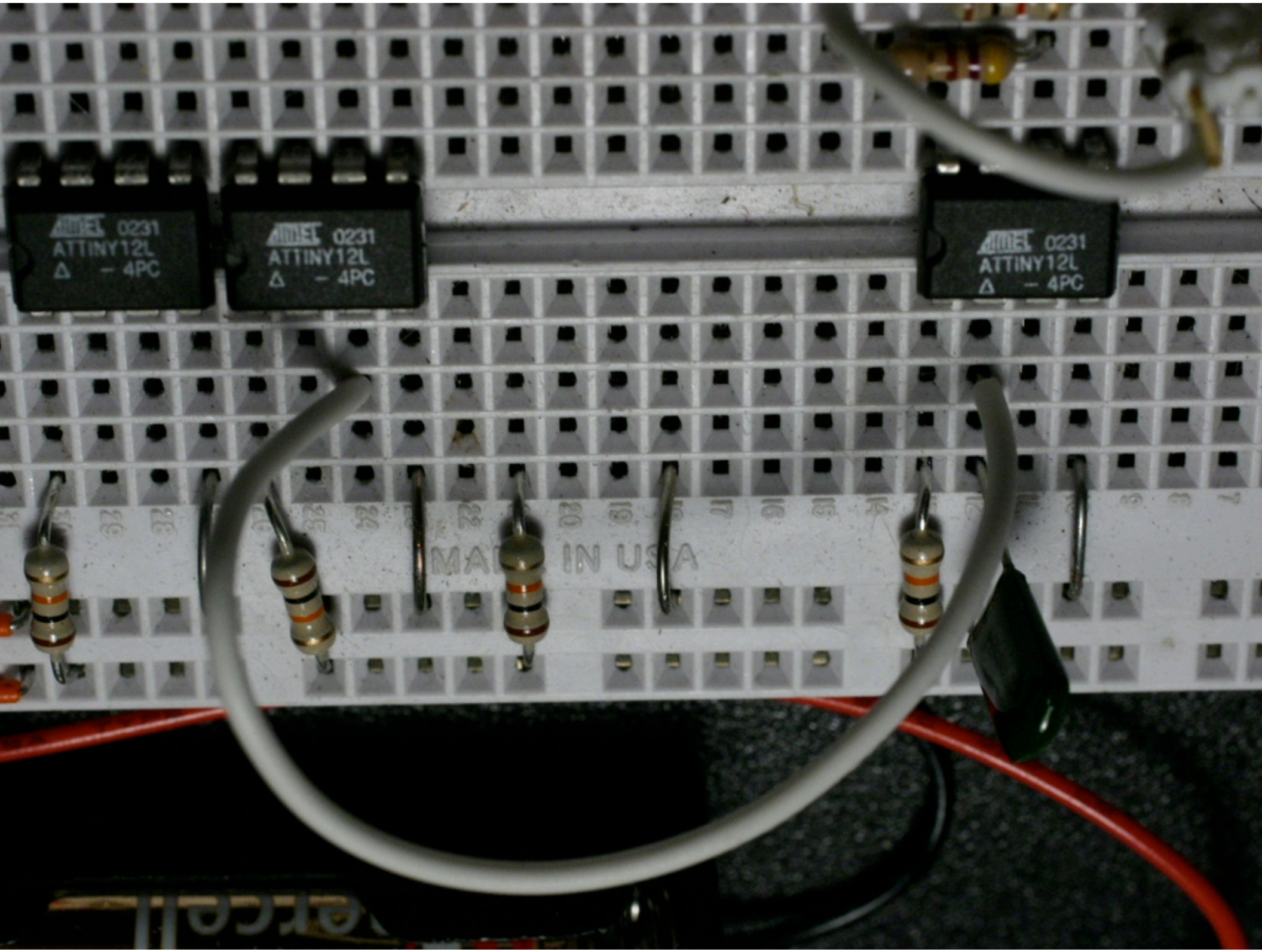


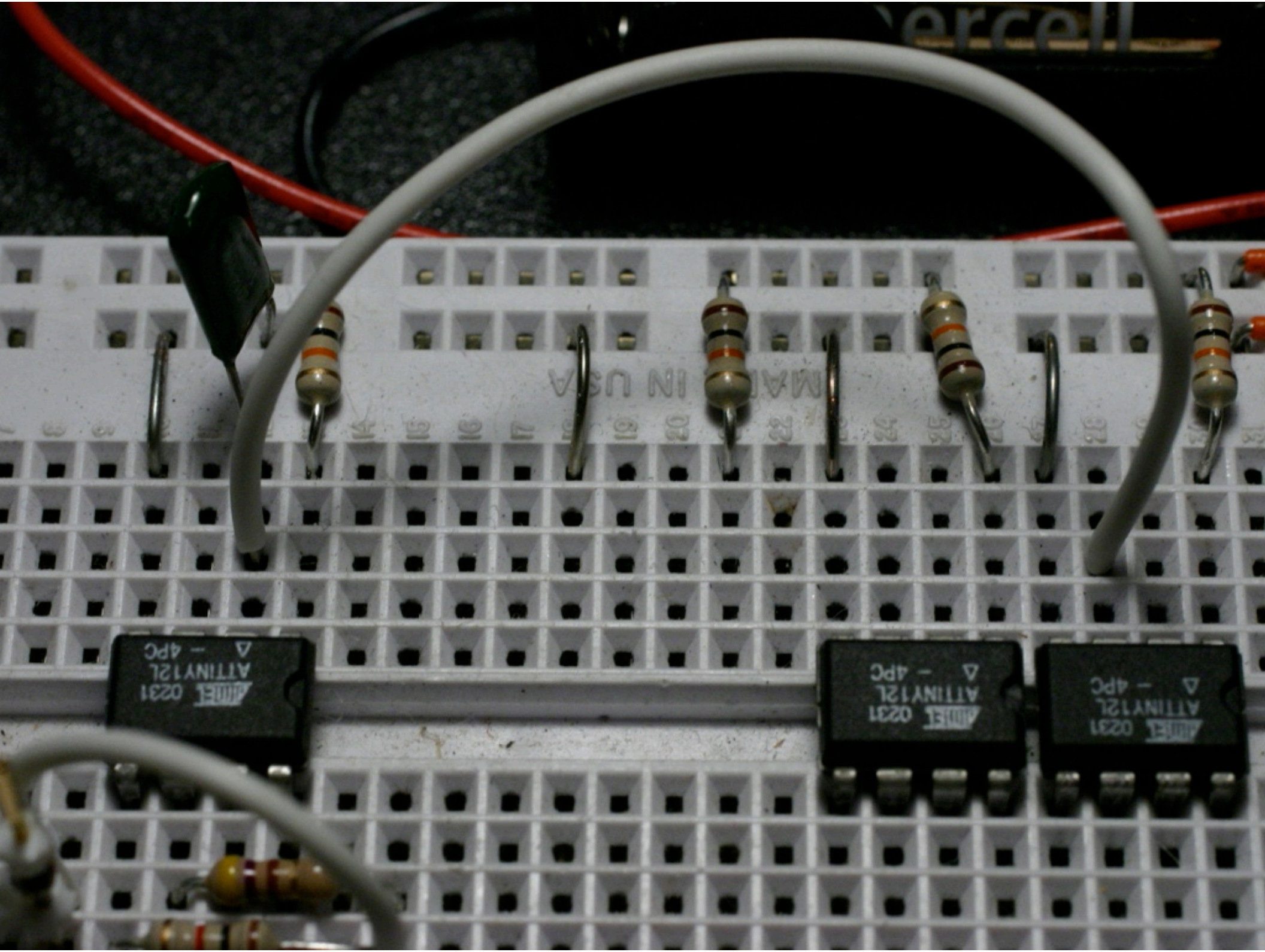

Cynase Simulator
3
4

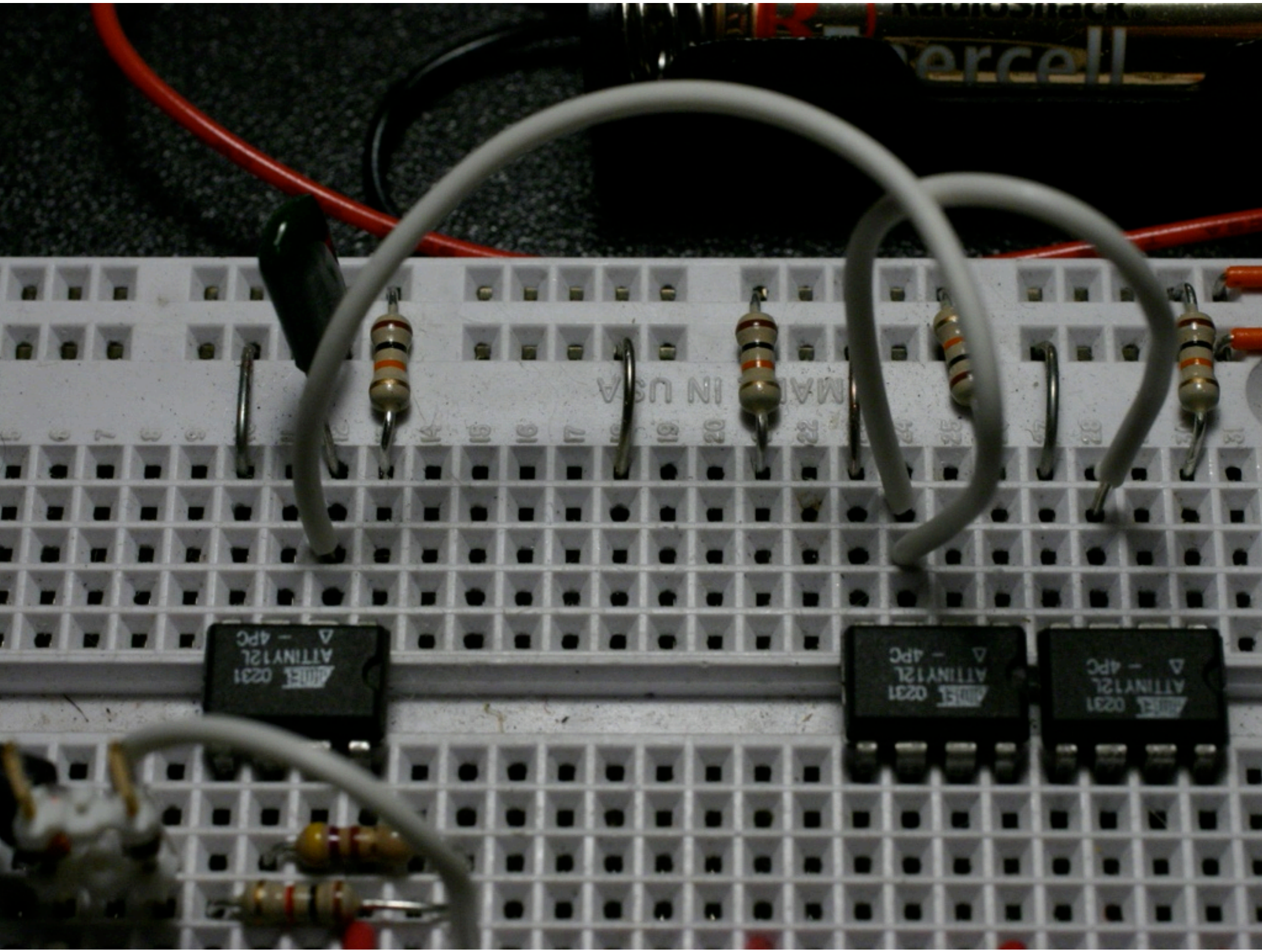
bynase

```
if value > random
  output high
else
  output low
```

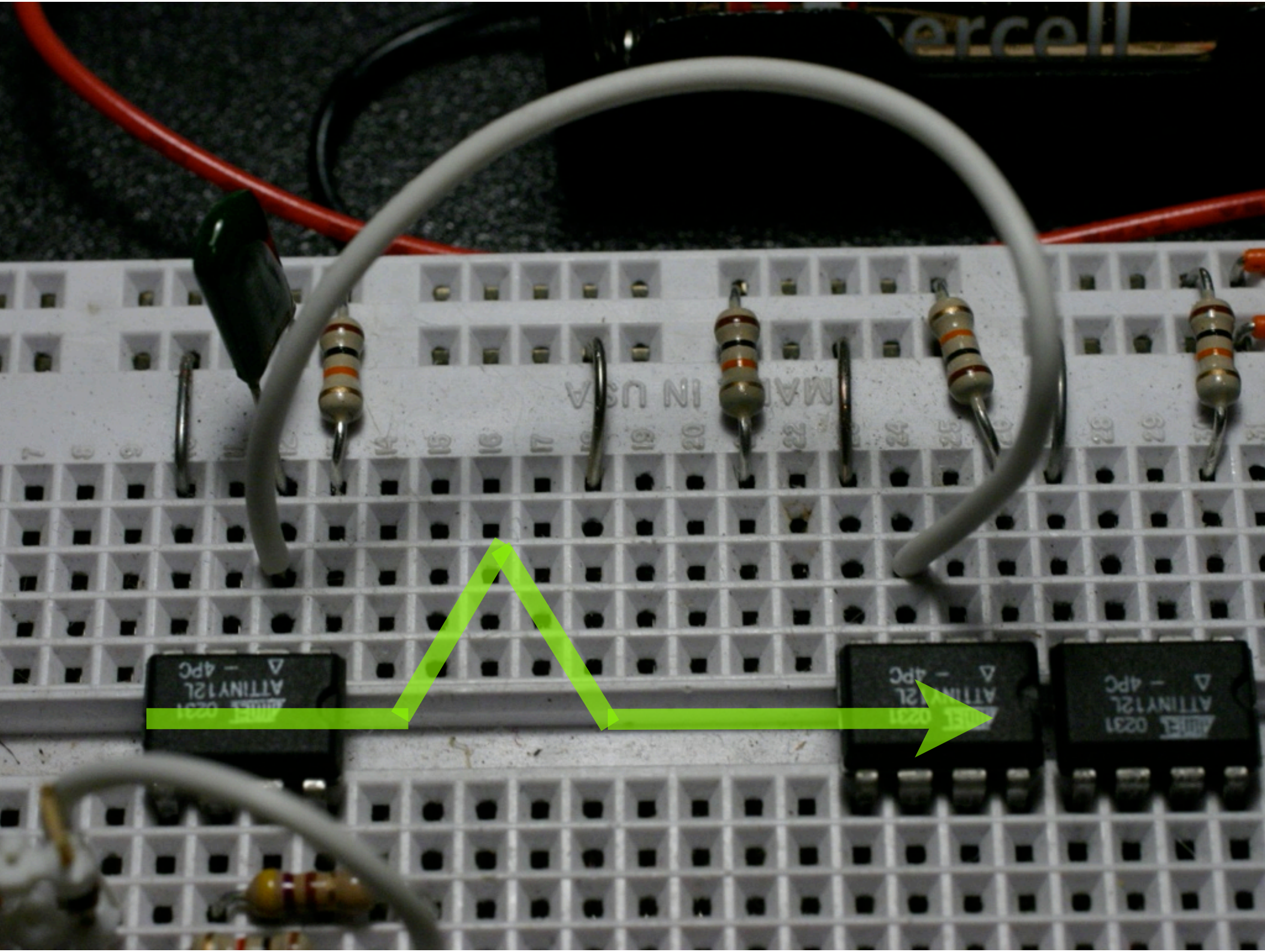
if input high
  increment value

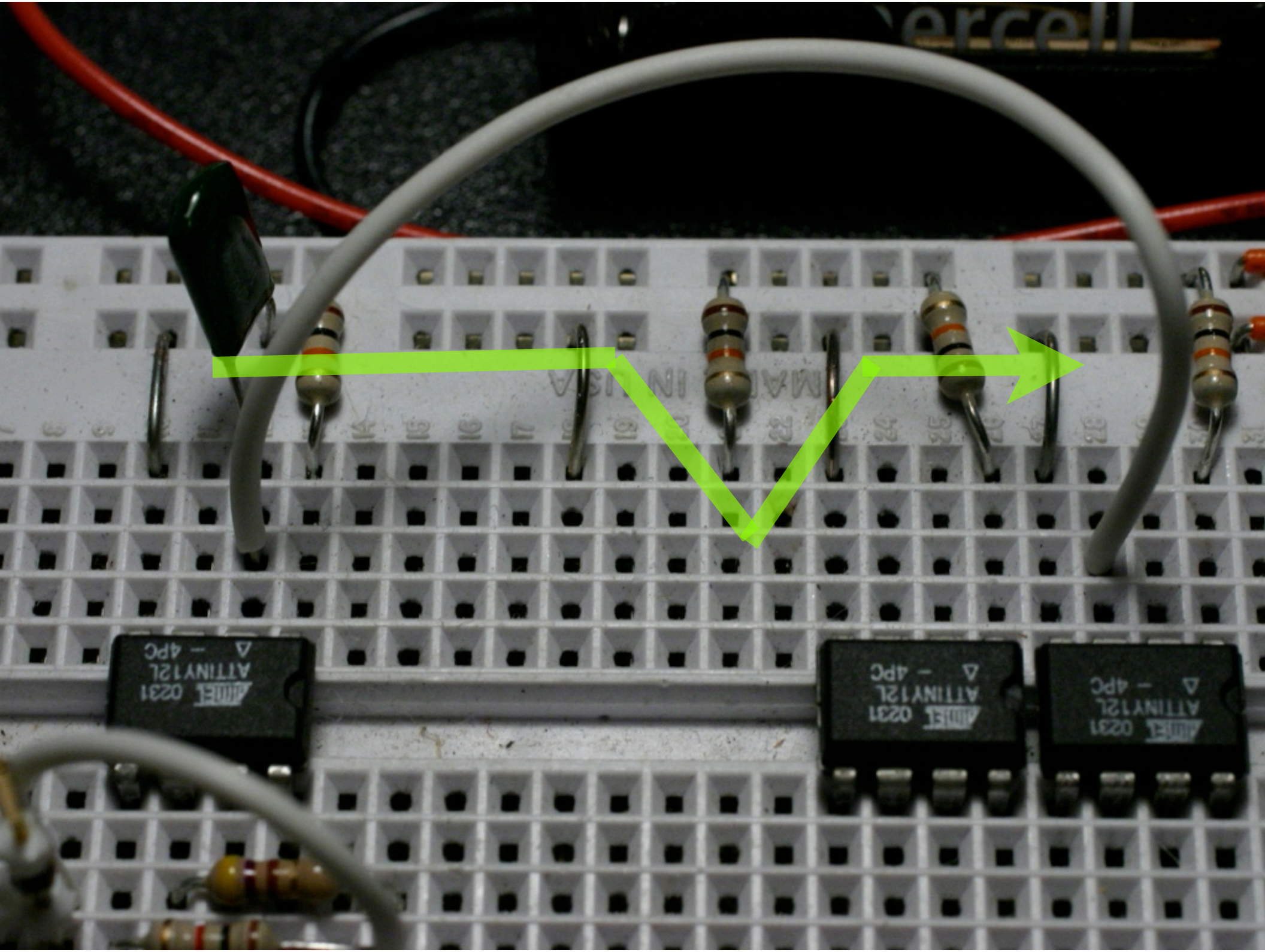

ATMEL 0231
ATTINY12L
Δ - 4PC
ATMEL 0231
ATTINY12L
Δ - 4PC
ATMEL 0231
ATTINY12L
Δ - 4PC

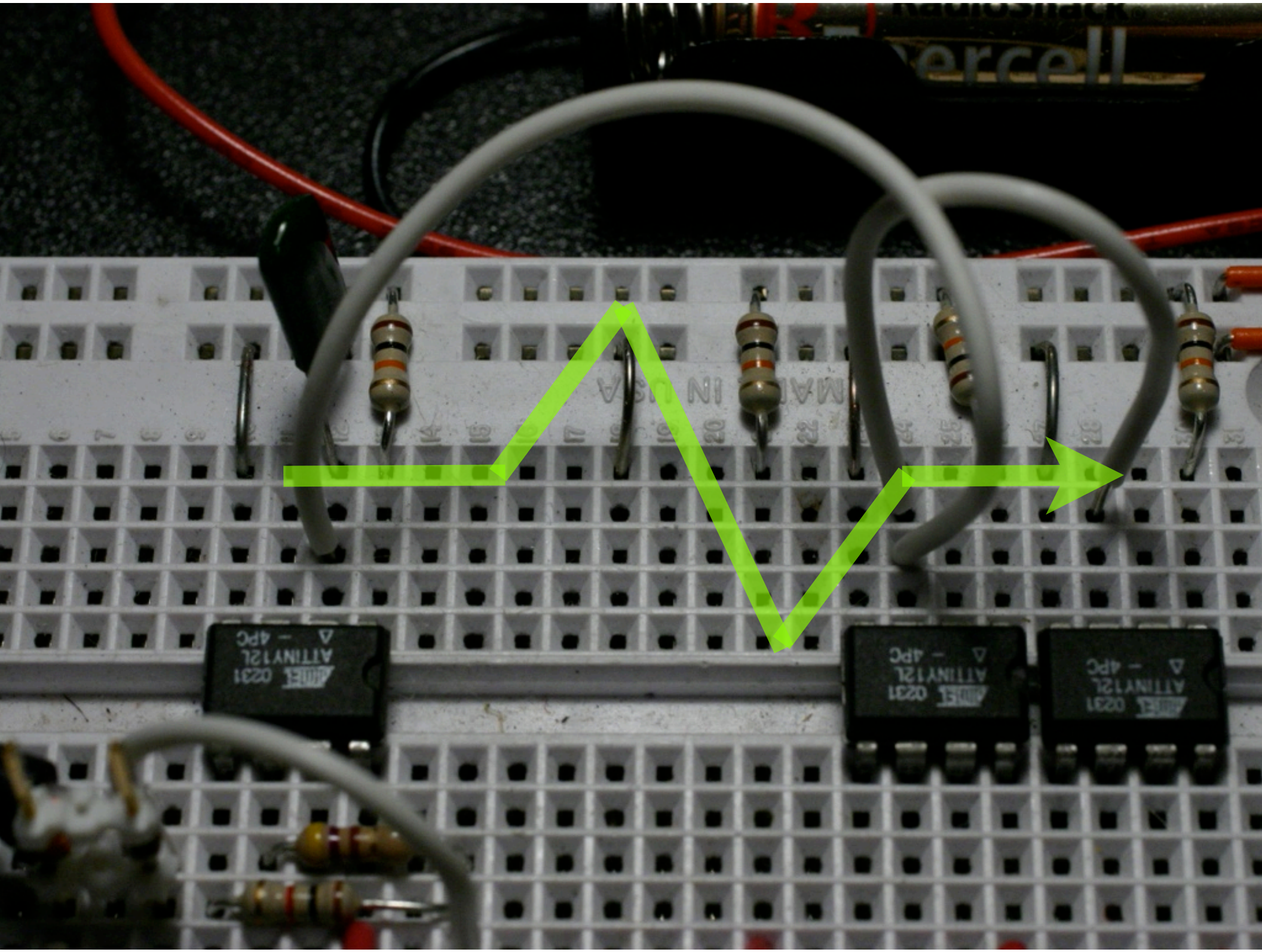

ATTINY12L
0231
- 4PC


ATTINY12L
ATTINY12L
ATTINY12L

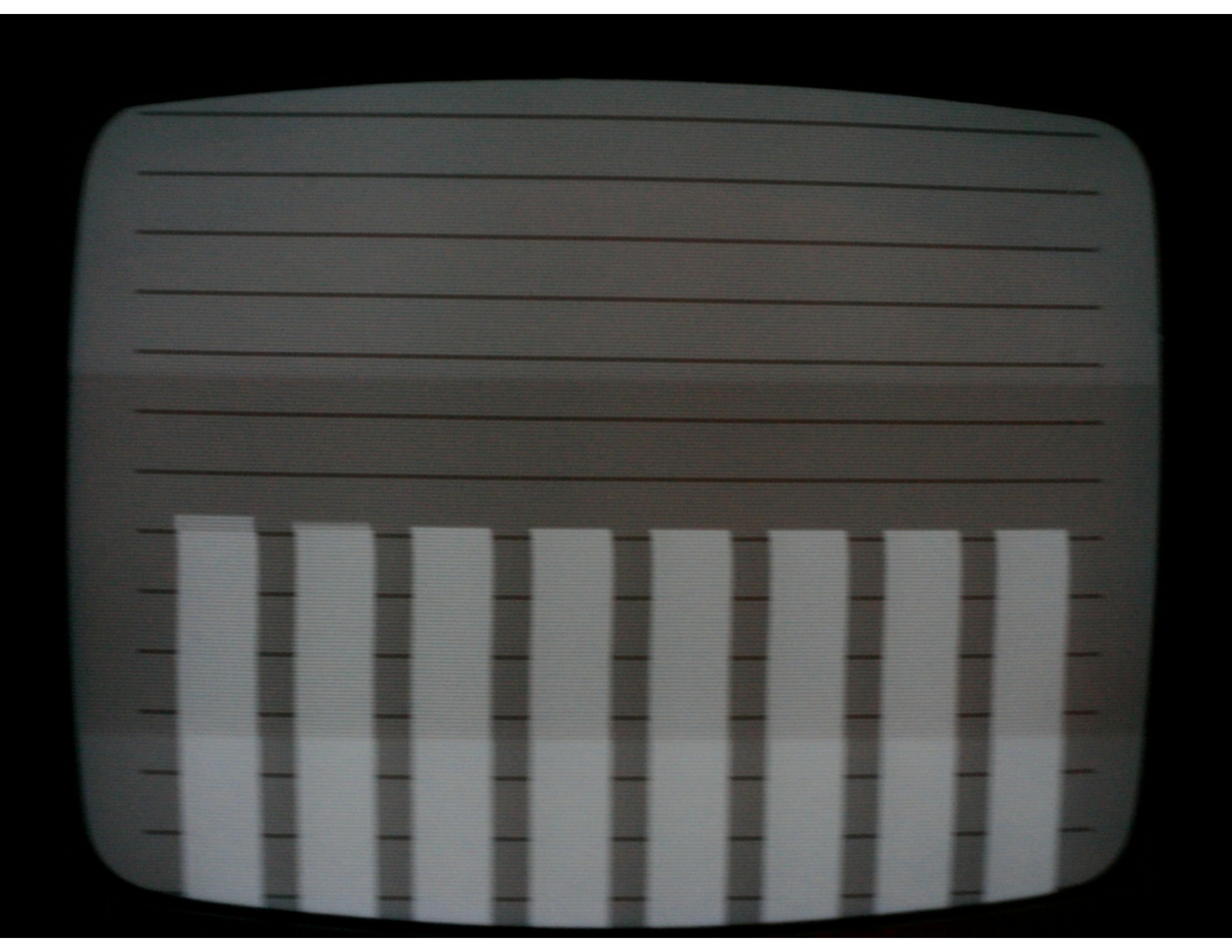
output high or low
output off

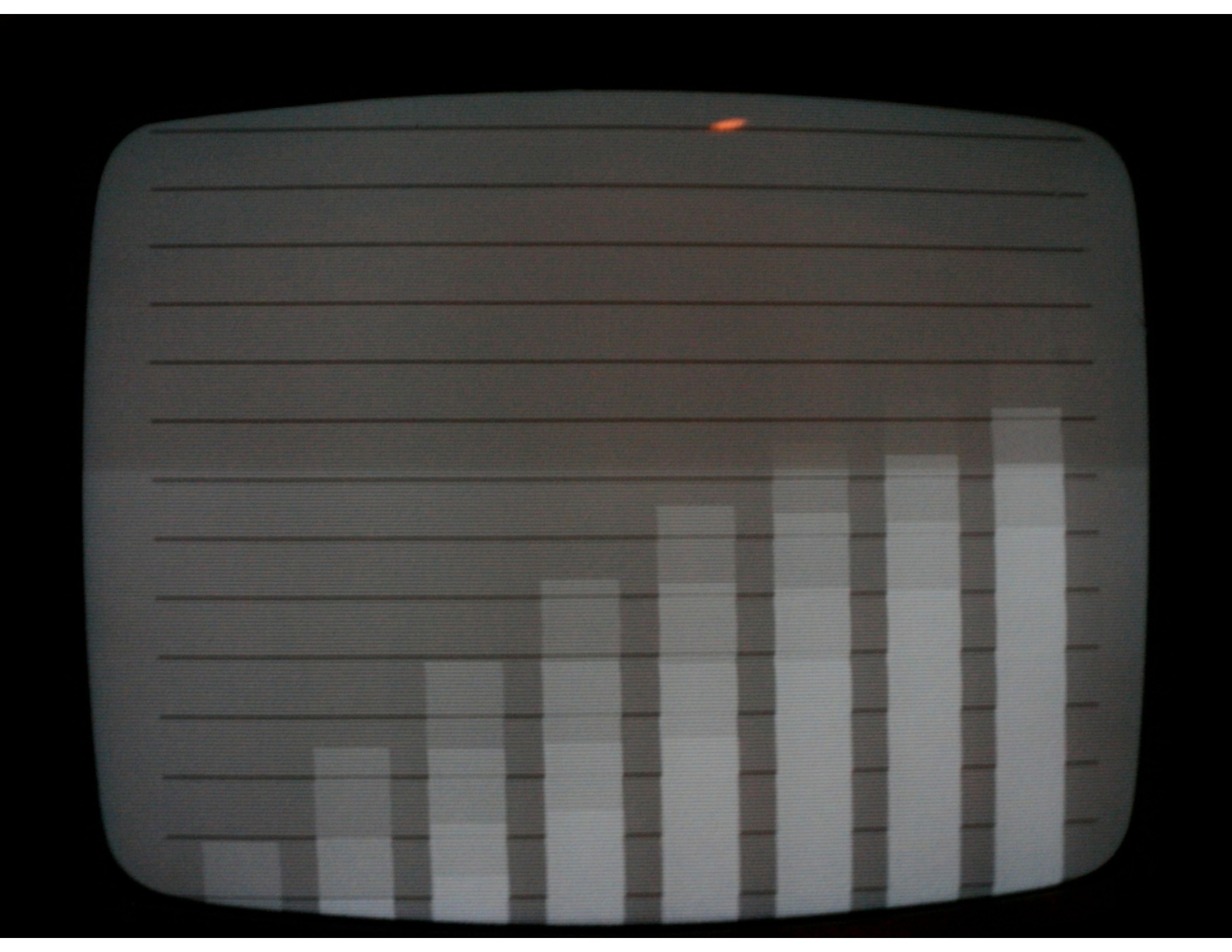

ATTINY12L
ATTINY12L
ATTINY12L




ATTINY12L
ATTINY12L
ATTINY12L

monitor



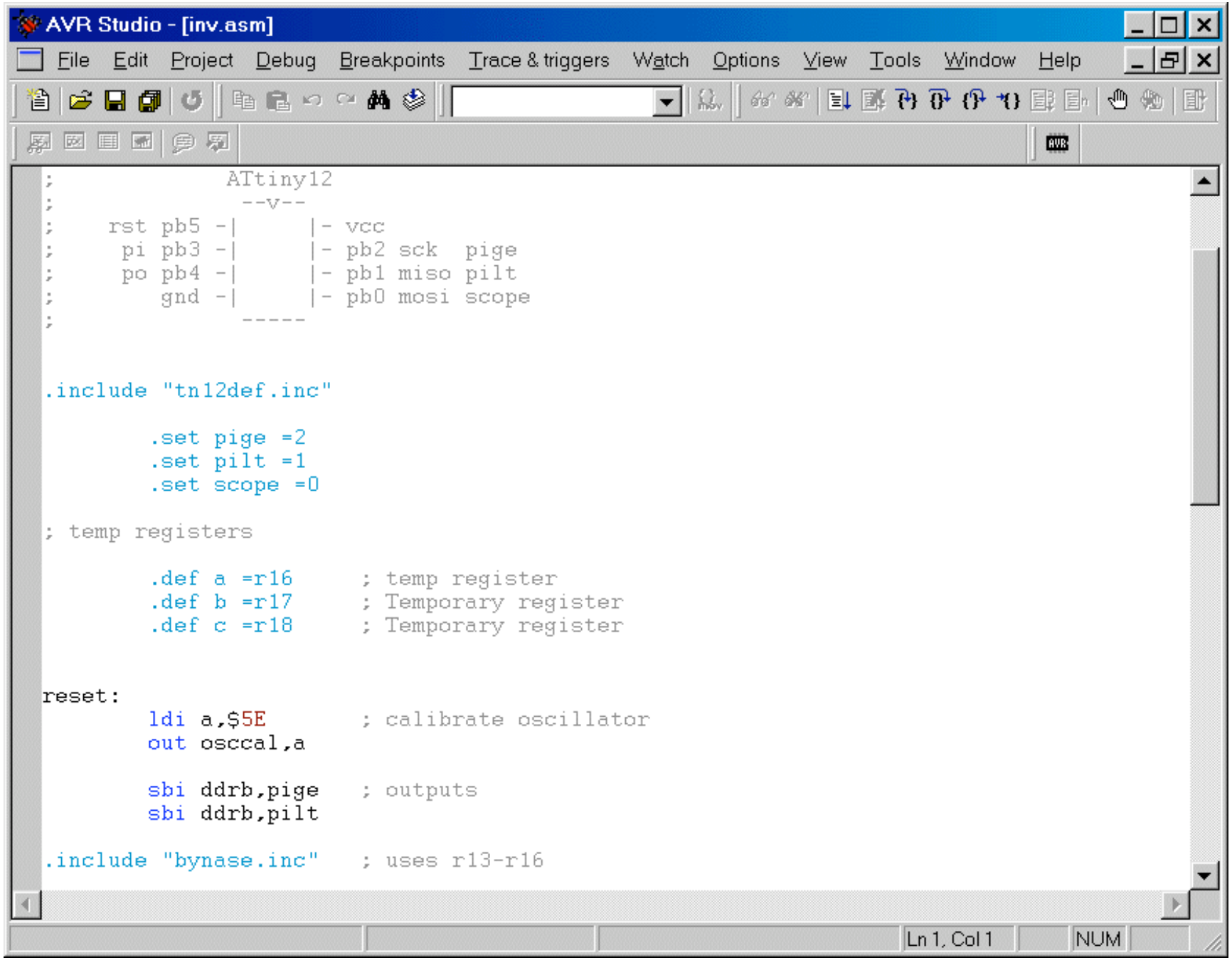


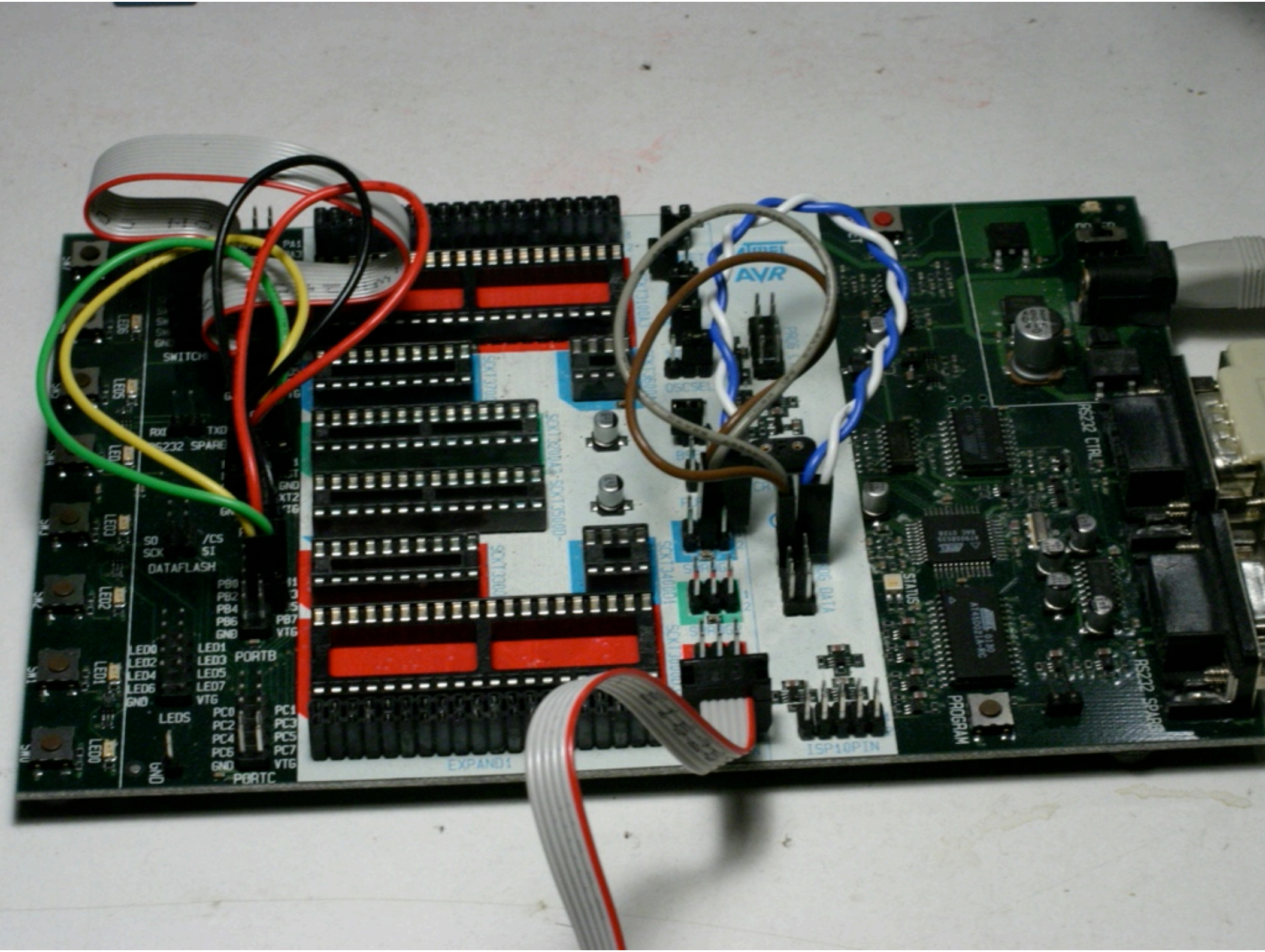
ten pixels per
clock tick

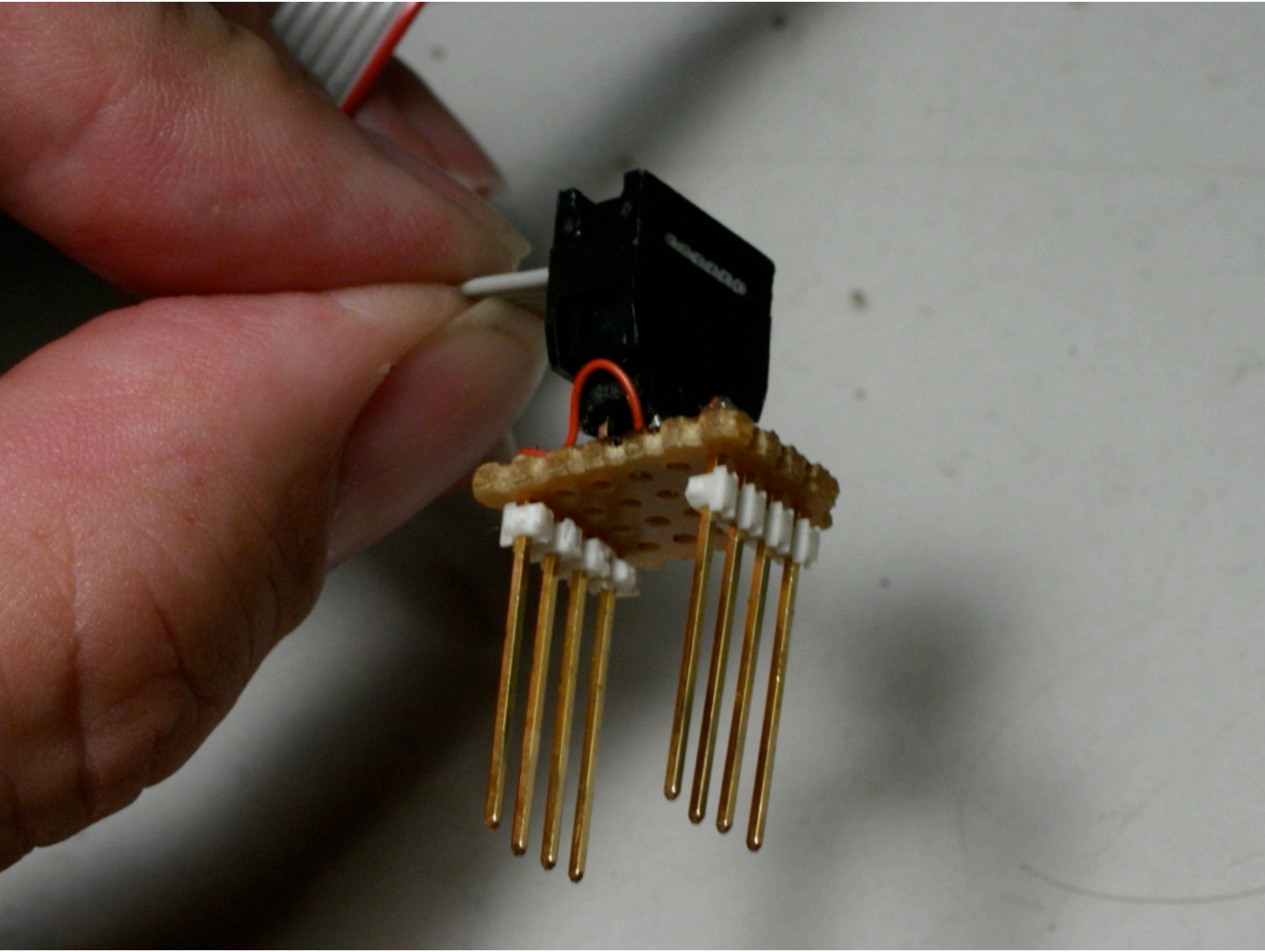
```
.macro bar
    nop
    cp line,@0
    mov b,vw
    out portb,grid
    brcc pc+2
    out portb,b
.endm
```

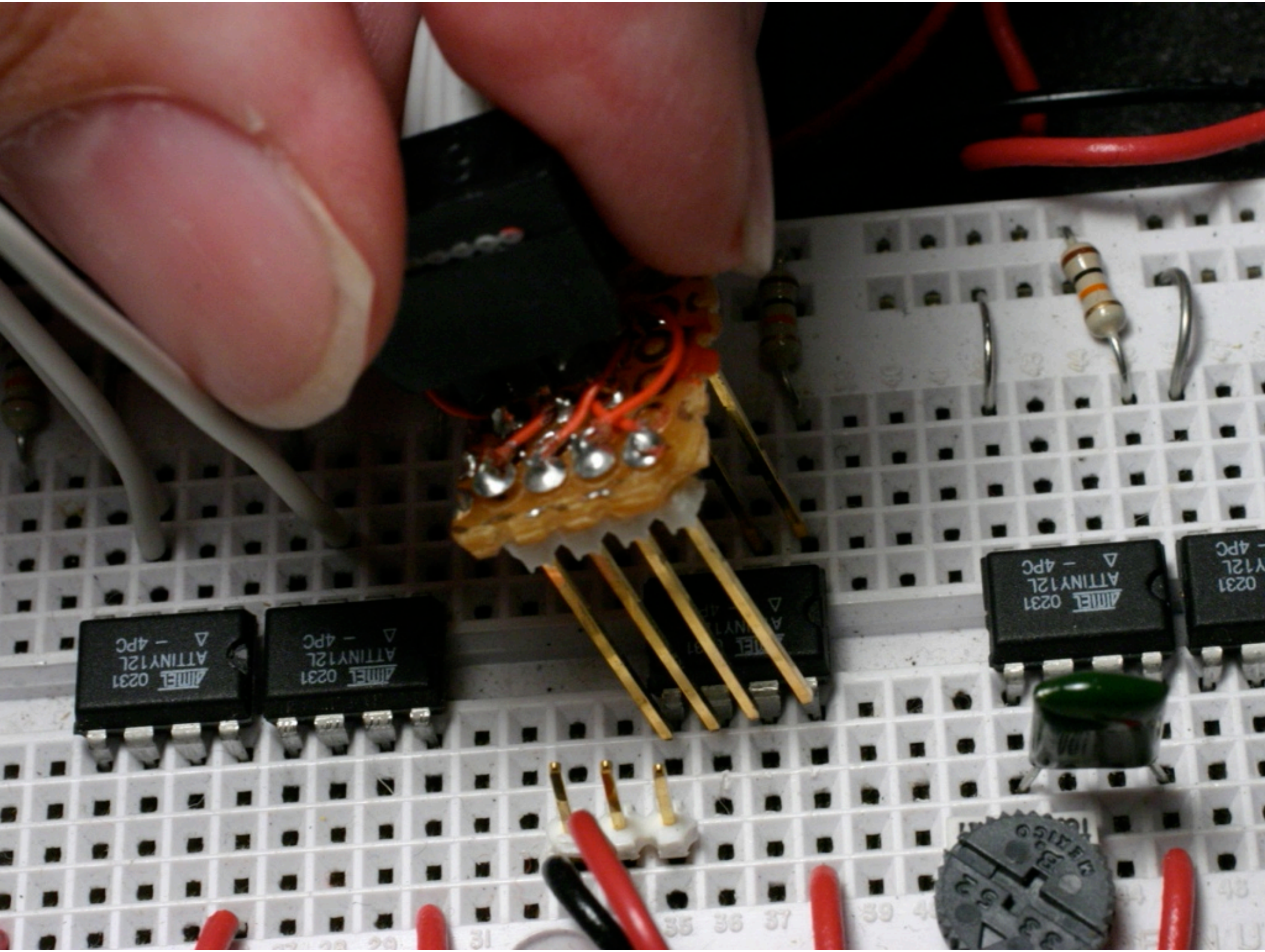
```
display:
    out portb,vg
    bar f0
    bar f1
    bar f2
    bar f3
    bar f4
    bar f5
    bar f6
    bar f7
        sbic pinb,input
        inc io
    nop
    out portb,grid
    out portb,vg
        inc line
    ret
```

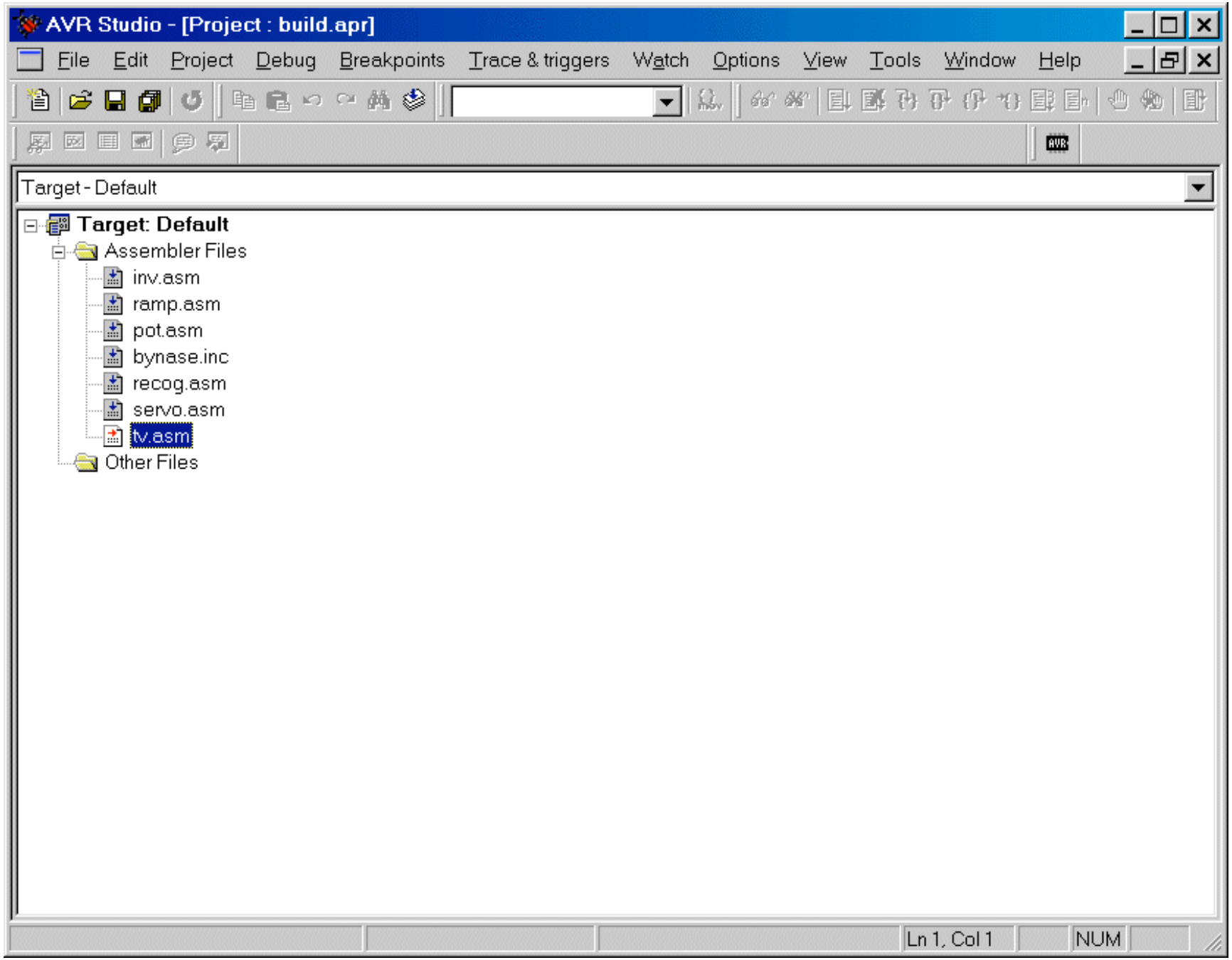
programming


AVR Studio - [inv.asm]
File Edit Project Debug Breakpoints Trace & triggers Watch Options View Tools Window Help
;   ATtiny12
;   --v--
;   rst pb5 -| |- vcc
;   pi pb3 -| |- pb2 sck pige
;   po pb4 -| |- pb1 miso pilt
;   gnd -| |- pb0 mosi scope
;   -----
.include "tn12def.inc"
.set pige =2
.set pilt =1
.set scope =0
; temp registers
.def a =r16 ; temp register
.def b =r17 ; Temporary register
.def c =r18 ; Temporary register
reset:
ldi a,$5E ; calibrate oscillator
out osccal,a
sbi ddrb,pige ; outputs
sbi ddrb,pilt
.include "bynase.inc" ; uses r13-r16
Ln 1, Col 1
NUM


SWITCH
RXD
TXD
RS232 SPARE
SO
/CS
SCK
SI
DATAFLASH
PB0
PB2
PB4
PB6
GND
PB7
VTG
LED0
LED1
LED2
LED3
LED4
LED5
LED6
LED7
GND
VTG
PORTB
LEDS
PC0
PC2
PC4
PC6
GND
PC1
PC3
PC5
PC7
VTG
PORTC
EXPAND1
ISP10PIN
AVR
RS232 CTRL
STATUS
PROGRAM
RS232 SPARE




ATTINY12L
4PC
0231


AVR Studio - [Project : build.apr]
File Edit Project Debug Breakpoints Trace & triggers Watch Options View Tools Window Help
Target - Default
Target: Default
Assembler Files
inv.asm
ramp.asm
pot.asm
bynase.inc
recog.asm
servo.asm
tv.asm
Other Files
Ln 1, Col 1
NUM