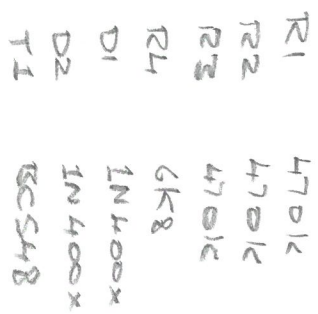
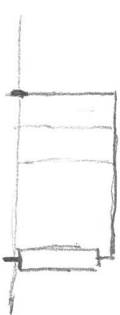


- X TRACK CUT IN HOLE
- = TRACK CUT BETWEEN HOLES
- + OCCUPIED BY NUT.



Light sensors wired  
to A1, A2, A3.  
A0 not connected  
but track cut.



PIN

13

40

41

42

ON BOARD LED

LDR

What Transistors Available?

Motor Drivers

Save more  $I = 50mA$

Brother, BC108C

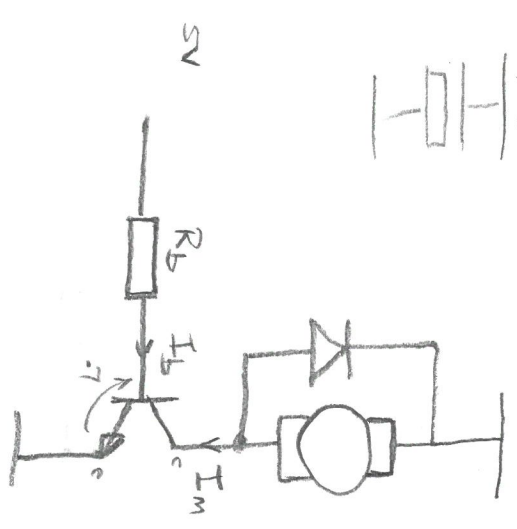
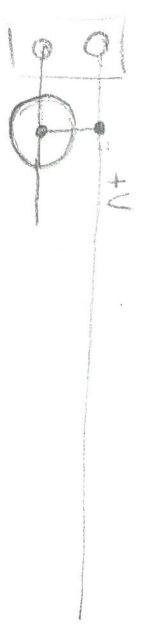
BC548  $I_c 100mA$

$\beta =$

$P_T 500mW$

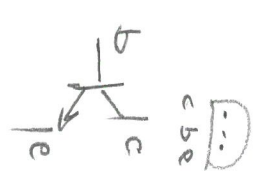
$f_{TE} 200-450$

Andromeda  
Pin 1, 2, 3, 5, 6, 9, 10, 11



BC548

TOP VIEW



Pin 1 = 10 T20 LOW!

AT LEAST 100

$I_m = 50mA$

$I_m = 50mA$

$I_b = 5mA$

$I_b = 5mA$

$$R_b = \frac{5 - 0.7}{5 \times 10^{-3}}$$

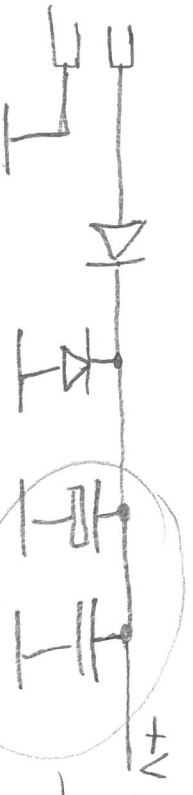
$$R_b = 8k\Omega$$

= 860

300 6k8

500 1k

$$P_{diss} = 7 \times 4.3 \times 10^{-3} = 3mW$$



ON REG.

See spreadsheet for numerical results.

$$R2 = 470k$$

Output impedance

$$R_{eq} = R1 || R2$$

May not be strictly correct

$$= \frac{1}{\frac{1}{R1} + \frac{1}{R2}}$$

Time Constant,  $R1 + R2$

$$TC = RC$$

$$(R0 + R_{eq}) \times C_{in}$$

AT MEGA 328

10 bit

Analog source o/p Z < 10k

$$V_o = i \times R2$$

$$i = \frac{V_{in}}{R1 + R2}$$

$$V_o = \left( \frac{V_{in}}{R1 + R2} \right) \times R2$$

$$V_o = V_{in} \frac{R2}{R1 + R2}$$

$$\text{Light } V_{oL} = 5 \frac{47k}{40M + 47k}$$

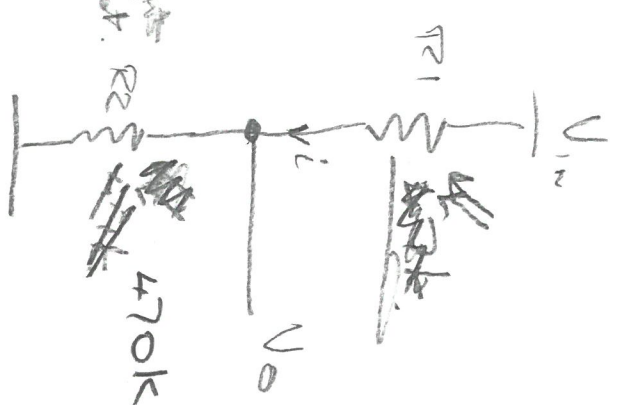
Dark See spreadsheet.

$$AD_{LSB} = \frac{V_{in}}{V_{REF}} \times 1024$$

10-30k  
Room light  
on, overcast.  
~ SM  
covered

~ 20M  
Light off -  
covered.

curtain closed  
light off.  
> 40M  
O.L. displayed.



3FF

# Light House Automation

2/12/12

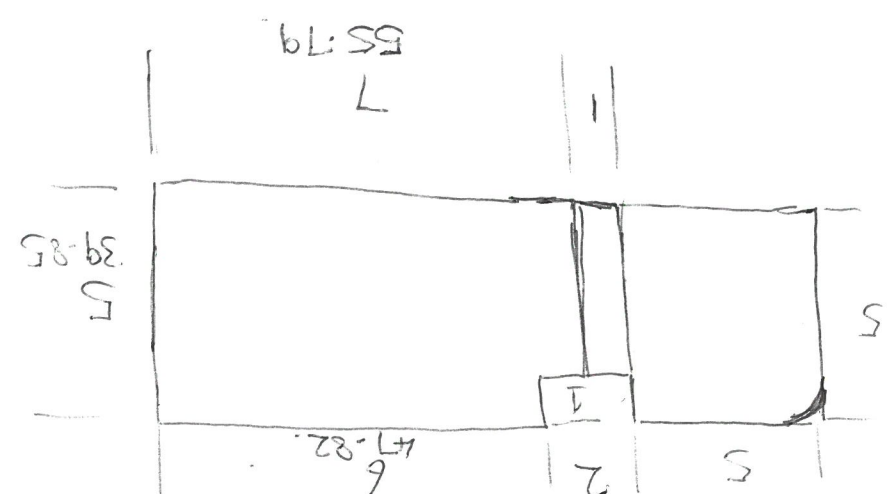
leg dimensions

8 pins 63.91mm  
63.86mm  
63.885

12 pins 95.57 1 pin 7.96

7.97

Light House Internal Dimensions



Height

Wall 5 47.8

Tower 6 + 1 x 3.16 = 3.16

60.16 51 9.5

# Large Parts

1 cat order 6/4

- 1) Abode - long. Grass pole 12m.
- 2) 2x2 off tiles
- 3) 2x2 off tiles

Plak 4x4 x2

4) Mats ment. 13x Yellow

↳ 1x2 = 4 off  
1/4 off 4 off.

1x4 4 off 1 educt.

5) LDR ment. 2x3 B-R 8 off.

6) Power counter unit?

7) Wlt 3/4 x 1 to reduce yellow tube in turn

Order No Y315729555  
Pick a break. 11998

- Rock Dark Stone Grey
- Platform Dark Green
- Walls Bright Red
- Windows Bright Yellow

6/11/98

# Arduino Selection

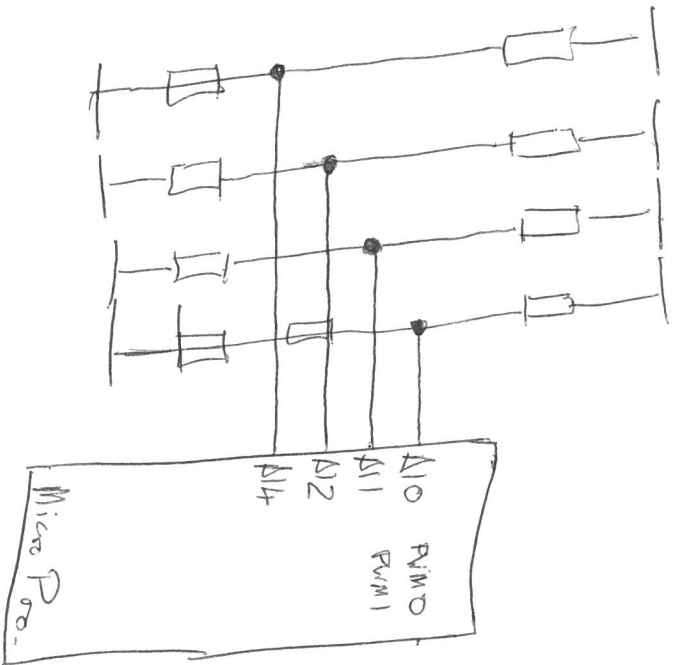
Arduino	L	W	USB	V <sub>in</sub>	IDF	Do	Min	Name	Micro	48	17.7	N	7-12V	✓	Disc	1.8V	3.3V	5V	12V	18V	24V	36V	48V	60V	72V	84V	96V	108V	120V	132V	144V	156V	168V	180V	192V	204V	216V	228V	240V	252V	264V	276V	288V	300V	312V	324V	336V	348V	360V	372V	384V	396V	408V	420V	432V	444V	456V	468V	480V	492V	504V	516V	528V	540V	552V	564V	576V	588V	600V	612V	624V	636V	648V	660V	672V	684V	696V	708V	720V	732V	744V	756V	768V	780V	792V	804V	816V	828V	840V	852V	864V	876V	888V	900V	912V	924V	936V	948V	960V	972V	984V	996V	1008V	1020V	1032V	1044V	1056V	1068V	1080V	1092V	1104V	1116V	1128V	1140V	1152V	1164V	1176V	1188V	1200V	1212V	1224V	1236V	1248V	1260V	1272V	1284V	1296V	1308V	1320V	1332V	1344V	1356V	1368V	1380V	1392V	1404V	1416V	1428V	1440V	1452V	1464V	1476V	1488V	1500V	1512V	1524V	1536V	1548V	1560V	1572V	1584V	1596V	1608V	1620V	1632V	1644V	1656V	1668V	1680V	1692V	1704V	1716V	1728V	1740V	1752V	1764V	1776V	1788V	1800V	1812V	1824V	1836V	1848V	1860V	1872V	1884V	1896V	1908V	1920V	1932V	1944V	1956V	1968V	1980V	1992V	2004V	2016V	2028V	2040V	2052V	2064V	2076V	2088V	2100V	2112V	2124V	2136V	2148V	2160V	2172V	2184V	2196V	2208V	2220V	2232V	2244V	2256V	2268V	2280V	2292V	2304V	2316V	2328V	2340V	2352V	2364V	2376V	2388V	2400V	2412V	2424V	2436V	2448V	2460V	2472V	2484V	2496V	2508V	2520V	2532V	2544V	2556V	2568V	2580V	2592V	2604V	2616V	2628V	2640V	2652V	2664V	2676V	2688V	2700V	2712V	2724V	2736V	2748V	2760V	2772V	2784V	2796V	2808V	2820V	2832V	2844V	2856V	2868V	2880V	2892V	2904V	2916V	2928V	2940V	2952V	2964V	2976V	2988V	3000V	3012V	3024V	3036V	3048V	3060V	3072V	3084V	3096V	3108V	3120V	3132V	3144V	3156V	3168V	3180V	3192V	3204V	3216V	3228V	3240V	3252V	3264V	3276V	3288V	3300V	3312V	3324V	3336V	3348V	3360V	3372V	3384V	3396V	3408V	3420V	3432V	3444V	3456V	3468V	3480V	3492V	3504V	3516V	3528V	3540V	3552V	3564V	3576V	3588V	3600V	3612V	3624V	3636V	3648V	3660V	3672V	3684V	3696V	3708V	3720V	3732V	3744V	3756V	3768V	3780V	3792V	3804V	3816V	3828V	3840V	3852V	3864V	3876V	3888V	3900V	3912V	3924V	3936V	3948V	3960V	3972V	3984V	3996V	4008V	4020V	4032V	4044V	4056V	4068V	4080V	4092V	4104V	4116V	4128V	4140V	4152V	4164V	4176V	4188V	4200V	4212V	4224V	4236V	4248V	4260V	4272V	4284V	4296V	4308V	4320V	4332V	4344V	4356V	4368V	4380V	4392V	4404V	4416V	4428V	4440V	4452V	4464V	4476V	4488V	4500V	4512V	4524V	4536V	4548V	4560V	4572V	4584V	4596V	4608V	4620V	4632V	4644V	4656V	4668V	4680V	4692V	4704V	4716V	4728V	4740V	4752V	4764V	4776V	4788V	4800V	4812V	4824V	4836V	4848V	4860V	4872V	4884V	4896V	4908V	4920V	4932V	4944V	4956V	4968V	4980V	4992V	5004V	5016V	5028V	5040V	5052V	5064V	5076V	5088V	5100V	5112V	5124V	5136V	5148V	5160V	5172V	5184V	5196V	5208V	5220V	5232V	5244V	5256V	5268V	5280V	5292V	5304V	5316V	5328V	5340V	5352V	5364V	5376V	5388V	5400V	5412V	5424V	5436V	5448V	5460V	5472V	5484V	5496V	5508V	5520V	5532V	5544V	5556V	5568V	5580V	5592V	5604V	5616V	5628V	5640V	5652V	5664V	5676V	5688V	5700V	5712V	5724V	5736V	5748V	5760V	5772V	5784V	5796V	5808V	5820V	5832V	5844V	5856V	5868V	5880V	5892V	5904V	5916V	5928V	5940V	5952V	5964V	5976V	5988V	6000V	6012V	6024V	6036V	6048V	6060V	6072V	6084V	6096V	6108V	6120V	6132V	6144V	6156V	6168V	6180V	6192V	6204V	6216V	6228V	6240V	6252V	6264V	6276V	6288V	6300V	6312V	6324V	6336V	6348V	6360V	6372V	6384V	6396V	6408V	6420V	6432V	6444V	6456V	6468V	6480V	6492V	6504V	6516V	6528V	6540V	6552V	6564V	6576V	6588V	6600V	6612V	6624V	6636V	6648V	6660V	6672V	6684V	6696V	6708V	6720V	6732V	6744V	6756V	6768V	6780V	6792V	6804V	6816V	6828V	6840V	6852V	6864V	6876V	6888V	6900V	6912V	6924V	6936V	6948V	6960V	6972V	6984V	6996V	7008V	7020V	7032V	7044V	7056V	7068V	7080V	7092V	7104V	7116V	7128V	7140V	7152V	7164V	7176V	7188V	7200V	7212V	7224V	7236V	7248V	7260V	7272V	7284V	7296V	7308V	7320V	7332V	7344V	7356V	7368V	7380V	7392V	7404V	7416V	7428V	7440V	7452V	7464V	7476V	7488V	7500V	7512V	7524V	7536V	7548V	7560V	7572V	7584V	7596V	7608V	7620V	7632V	7644V	7656V	7668V	7680V	7692V	7704V	7716V	7728V	7740V	7752V	7764V	7776V	7788V	7800V	7812V	7824V	7836V	7848V	7860V	7872V	7884V	7896V	7908V	7920V	7932V	7944V	7956V	7968V	7980V	7992V	8004V	8016V	8028V	8040V	8052V	8064V	8076V	8088V	8100V	8112V	8124V	8136V	8148V	8160V	8172V	8184V	8196V	8208V	8220V	8232V	8244V	8256V	8268V	8280V	8292V	8304V	8316V	8328V	8340V	8352V	8364V	8376V	8388V	8400V	8412V	8424V	8436V	8448V	8460V	8472V	8484V	8496V	8508V	8520V	8532V	8544V	8556V	8568V	8580V	8592V	8604V	8616V	8628V	8640V	8652V	8664V	8676V	8688V	8700V	8712V	8724V	8736V	8748V	8760V	8772V	8784V	8796V	8808V	8820V	8832V	8844V	8856V	8868V	8880V	8892V	8904V	8916V	8928V	8940V	8952V	8964V	8976V	8988V	9000V	9012V	9024V	9036V	9048V	9060V	9072V	9084V	9096V	9108V	9120V	9132V	9144V	9156V	9168V	9180V	9192V	9204V	9216V	9228V	9240V	9252V	9264V	9276V	9288V	9300V	9312V	9324V	9336V	9348V	9360V	9372V	9384V	9396V	9408V	9420V	9432V	9444V	9456V	9468V	9480V	9492V	9504V	9516V	9528V	9540V	9552V	9564V	9576V	9588V	9600V	9612V	9624V	9636V	9648V	9660V	9672V	9684V	9696V	9708V	9720V	9732V	9744V	9756V	9768V	9780V	9792V	9804V	9816V	9828V	9840V	9852V	9864V	9876V	9888V	9900V	9912V	9924V	9936V	9948V	9960V	9972V	9984V	9996V	10008V	10020V	10032V	10044V	10056V	10068V	10080V	10092V	10104V	10116V	10128V	10140V	10152V	10164V	10176V	10188V	10200V	10212V	10224V	10236V	10248V	10260V	10272V	10284V	10296V	10308V	10320V	10332V	10344V	10356V	10368V	10380V	10392V	10404V	10416V	10428V	10440V	10452V	10464V	10476V	10488V	10500V	10512V	10524V	10536V	10548V	10560V	10572V	10584V	10596V	10608V	10620V	10632V	10644V	10656V	10668V	10680V	10692V	10704V	10716V	10728V	10740V	10752V	10764V	10776V	10788V	10800V	10812V	10824V	10836V	10848V	10860V	10872V	10884V	10896V	10908V	10920V	10932V	10944V	10956V	10968V	10980V	10992V	11004V	11016V	11028V	11040V	11052V	11064V	11076V	11088V	11100V	11112V	11124V	11136V	11148V	11160V	11172V	11184V	11196V	11208V	11220V	11232V	11244V	11256V	11268V	11280V	11292V	11304V	11316V	11328V	11340V	11352V	11364V	11376V	11388V	11400V	11412V	11424V	11436V	11448V	11460V	11472V	11484V	11496V	11508V	11520V	11532V	11544V	11556V	11568V	11580V	11592V	11604V	11616V	11628V	11640V	11652V	11664V	11676V	11688V	11700V	11712V	11724V	11736V	11748V	11760V	11772V	11784V	11796V	11808V	11820V	11832V	11844V	11856V	11868V	11880V	11892V	11904V	11916V	11928V	11940V	11952V	11964V	11976V	11988V	12000V	12012V	12024V	12036V	12048V	12060V	12072V	12084V	12096V	12108V	12120V	12132V	12144V	12156V	12168V	12180V	12192V	12204V	12216V	12228V	12240V	12252V	12264V	12276V	12288V	12300V	12312V	12324V	12336V	12348V	12360V	12372V	12384V	12396V	12408V	12420V	12432V	12444V	12456V	12468V	12480V	12492V	12504V	12516V	12528V	12540V	12552V	12564V	12576V	12588V	12600V	12612V	12624V	12636V	12648V	12660V	12672V	12684V	12696V	12708V	12720V	12732V	12744V	12756V	12768V	12780V	12792V	12804V	12816V	12828V	12840V	12852V	12864V	12876V	12888V	12900V	12912V	12924V	12936V	12948V	12960V	12972V	12984V	12996V	13008V	13020V	13032V	13044V	13056V	13068V	13080V	13092V	13104V	13116V	13128V	13140V	13152V	13164V	13176V	13188V	13200V	13212V	13224V	13236V	13248V	13260V	13272V	13284V	13296V	13308V	13320V	13332V	13344V	13356V	13368V	13380V	13392V	13404V	13416V	13428V	13440V	13452V	13464V	13476V	13488V	13500V	13512V	13524V	13536V	13548V	13560V	13572V	13584V	13596V	13608V	13620V	13632V	13644V	13656V	13668V	13680V	13692V	13704V	13716V	13728V	13740V	13752V	13764V	13776V	13788V	13800V	13812V	13824V	13836V	13848V	13860V	13872V	13884V	13896V	13908V	13920V	13932V	13944V	13956V	13968V	13980V	13992V	14004V	14016V	14028V	14040V	14052V	14064V	14076V	14088V	14100V	14112V	14124V	14136V	14148V	14160V	14172V	14184V	14196V	14208V	14220V	14232V	14244V	14256V	14268V	14280V	142
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Main Power.

Vcc or ~~DDA~~ ~~5V~~

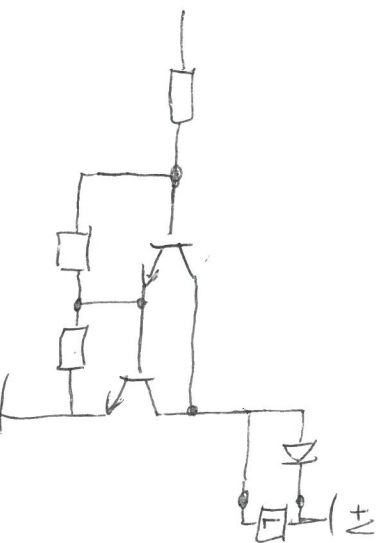
LDR Values  
see PIC gate  
band.



T

Darked Light sensor  
for input pic.

Unibit Diner VLN2003AN  
Rather complex 50V 500mA.  
Senses water >20mA on load.  
Senses 100mA load.



# Light House

Test Motors / Select Motors

Glue Motors to Base

Test Beams

Group Connectors

①

②

③

④

⑤

⑥

Find them all - 3 needed  
Reactors or Diodes?

② Modify Brakes

③ Glue in

④ Wire Up

Motors

Light Sensors

Power Supply

Light Sensors

LED drive

Motors drive - inducting

Power Supply

5W



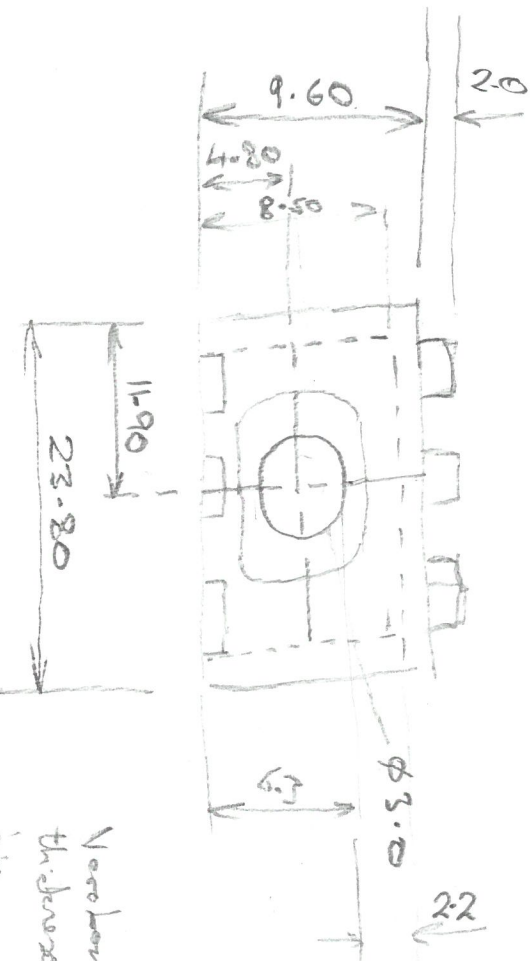
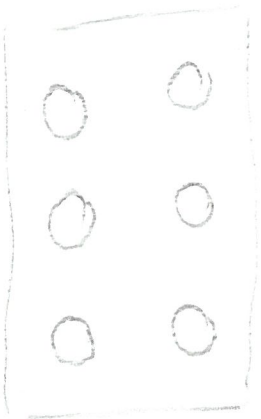
# Light Sensitive Mechanisms

Wire  $\phi = 1.5 \text{ mm}$ .

Two wire fit =  $3.0 \phi$  hole.

LDR  $4 \times 5 \text{ mm}$ .

Seals  $3.0 \phi$  hole.



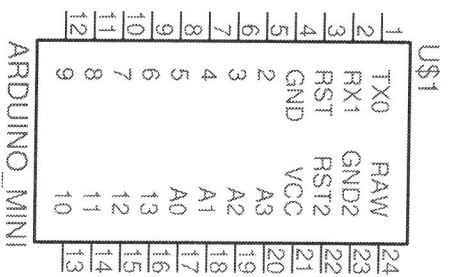
$$\begin{array}{r} 4.8 \\ - 2.0 \\ \hline 2.8 \end{array} \quad \begin{array}{r} 4.8 \\ - 2.5 \\ \hline 2.3 \end{array}$$

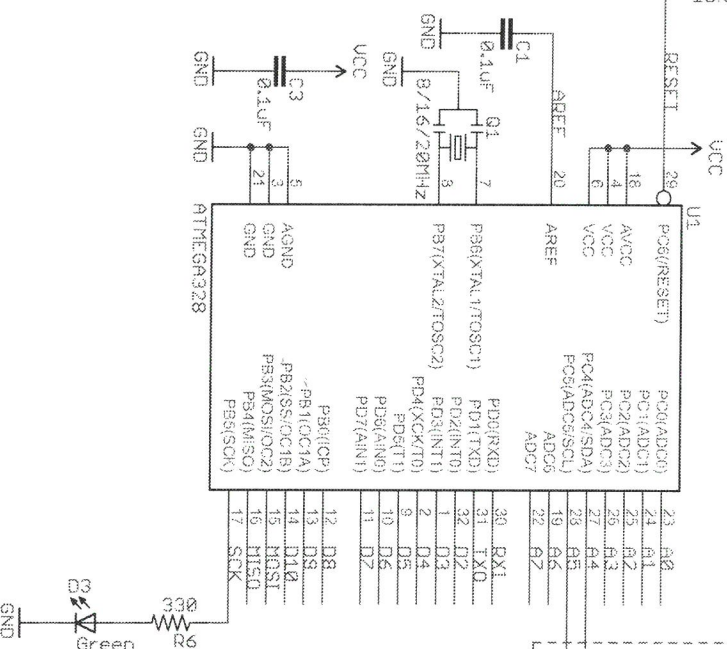
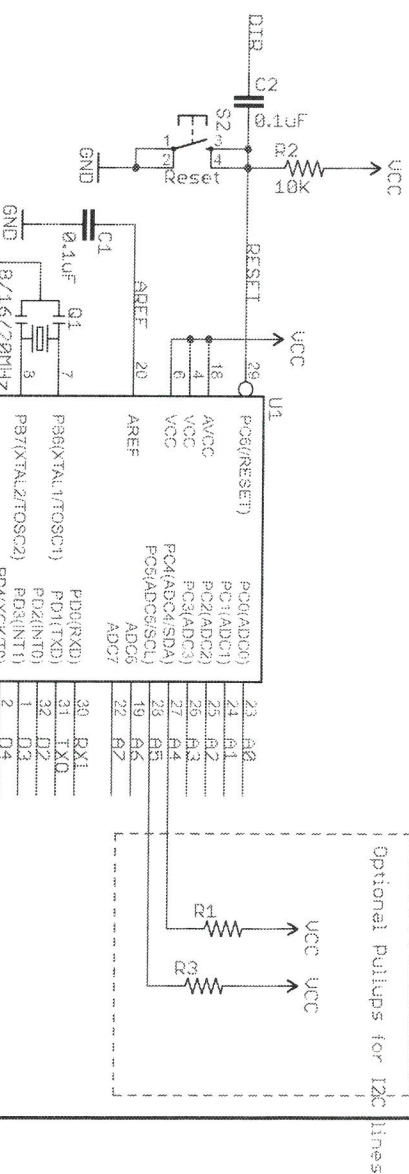
$$\begin{array}{r} 11.90 \\ 2 \overline{) 23.80} \\ \underline{20} \phantom{00} \\ 38 \phantom{00} \\ \underline{36} \phantom{00} \\ 20 \phantom{00} \\ \underline{20} \phantom{00} \\ 00 \end{array}$$

$$\begin{array}{r} 4.80 \\ 2 \overline{) 9.60} \\ \underline{8} \phantom{00} \\ 16 \phantom{00} \\ \underline{16} \phantom{00} \\ 0 \end{array}$$

Vessel board  
thickness = 1.60

$$\begin{array}{r} 2.70 \\ - 1.60 \\ \hline 1.1 \end{array}$$





TITLE: Arduino-Pro-Mini-v13

Document Number:

Sheet: 1/1