

Many QAM Pe:

$$P_e \approx \frac{2^{M-1}}{M-1} \operatorname{erfc} \left( \sqrt{\frac{3}{2M-1}} m \gamma_b \right)$$

MQP Lab work (preparing to drive 8x8 displays)

10/5/2011

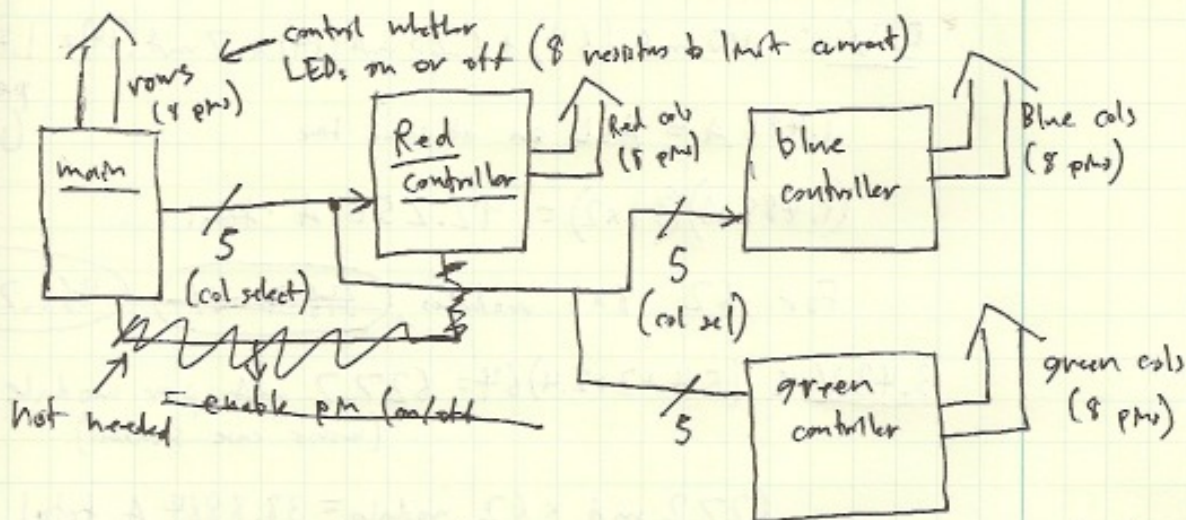
- MSP430 G2231 chips - 10 I/O
  - can potentially drive one 8x8 with 4 MSP430 chips
  - max current to any device pin =  $\pm 2 \text{ mA}$  (not enough?)

\* - PIC18FIXK22/LFIXK22

- max current sink/sourced by ~~one~~ a single I/O pin =  $25 \text{ mA}$

- 18 I/O

- can control one 8x8 module with 2 (3 might be easier)



ECE MQP Meeting - AK317A

10/7/2011

- we have the 8x8 RGB matrices
  - tested out one of the RGB LED packages (one LED 1x1 (column 1, row 1) for current and voltage for all colors using a 300  $\Omega$  resistor

→ Data on next page

LED 8x8 RGB  
ACTUAL FOOTPRINT  
(traced)

	Current (5V)	Current (3.43V)		5V current	3.43V current
R	10 mA	5.4 mA	R	10 mA	5.4 mA
B	7 mA	2.4 mA	B	6.25 mA	2 mA
G	6.25 mA	2 mA	B	7 mA	2.4 mA

5V is definitely brighter, but is not exactly necessary. 3.43 V gives w plenty of light to work with ~~with~~

**ALL VALUES** acquired using 300  $\Omega$  current-limiting resistor.

New plan: top row of high resolution displays (these 8x8 displays)  
- 2 rows, 30-31 columns (6 feet long)

Power considerations:

$$5V : 10 \text{ mA} (64) + 6.25 \text{ mA} (14) + 7 \text{ mA} (14) = 1.488 \text{ A}$$

per module  
(just LED)

1.488 A = ALL on at same time

$$(1.488 \text{ A})(31 \times 2) = 92.256 \text{ A total ...}$$

For 62 8x8 modules, ~~316.4 W~~ **461.28 W**

$$3.43V : (5.4 + 2 + 2.4)64 = 627.2 \text{ mA per module}$$

(worst case scenario)

$$627.2 \text{ mA} \times 62 \text{ modules} = 38.8864 \text{ A total}$$

$$38.89 \text{ A} \times 3.43 \text{ V} = \mathbf{133.4 \text{ W}}$$

still top part  
of display

**NEED RESISTOR  
ARRAY!!!**

Info. For Proposal:

- Cost for 60 modules = \$16/module = \$960

(maybe more)  
I need to write one page about the top part of the display

- Pros/cons, power consumption, cost, capabilities

- Give description of estimated final cost per module (processor, current chips, Resistor array, etc...)