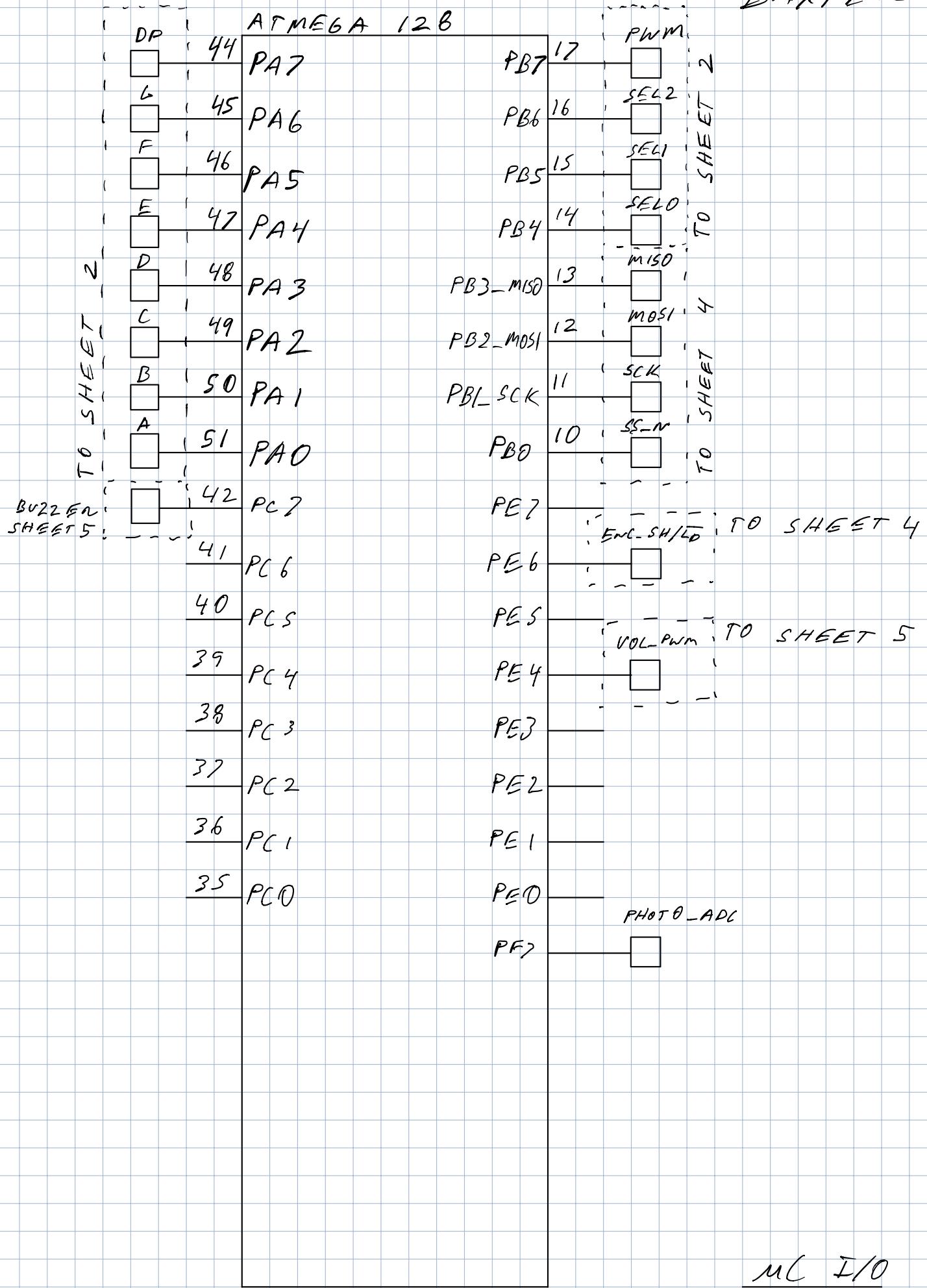
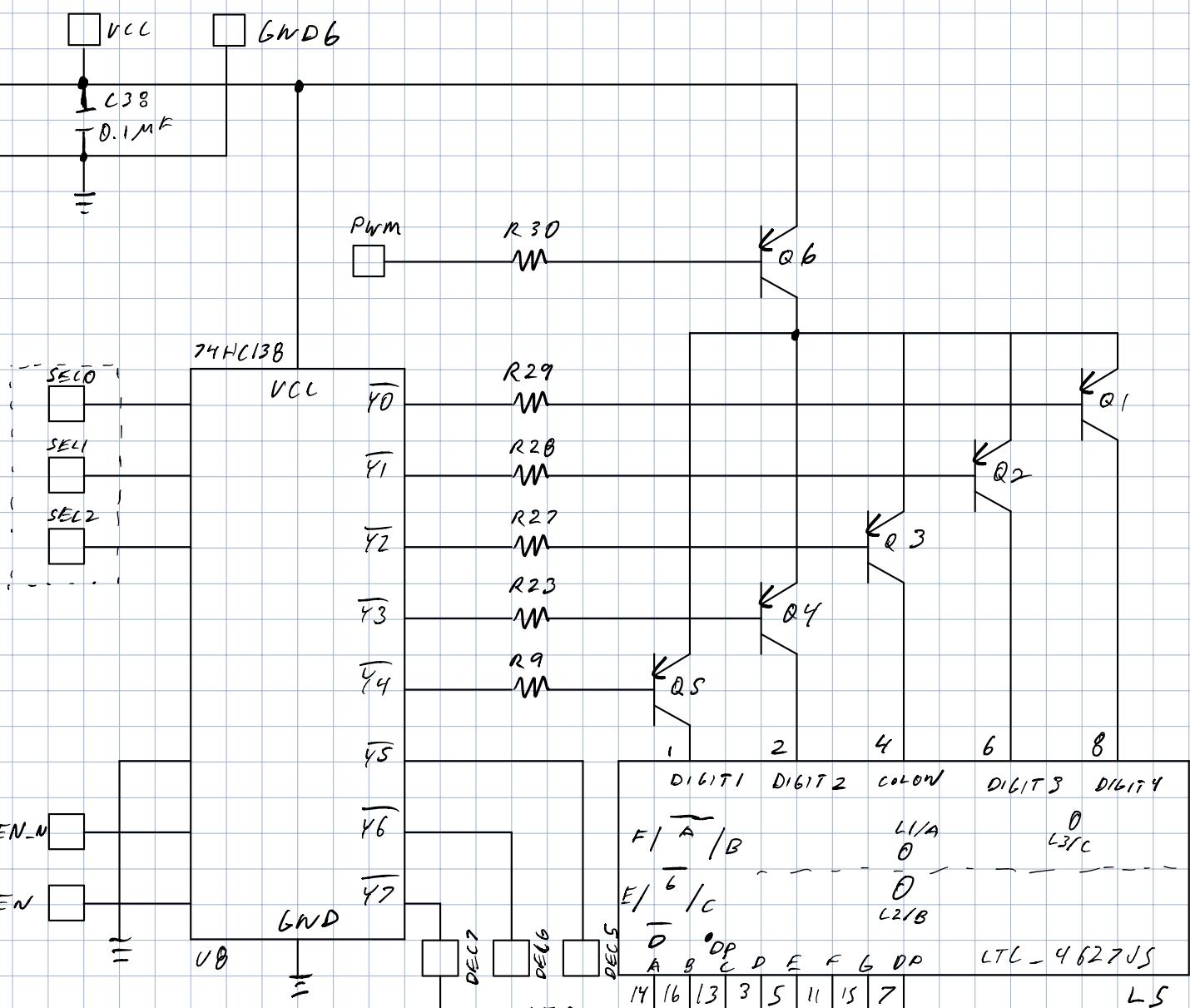


LAB SCHEMATIC

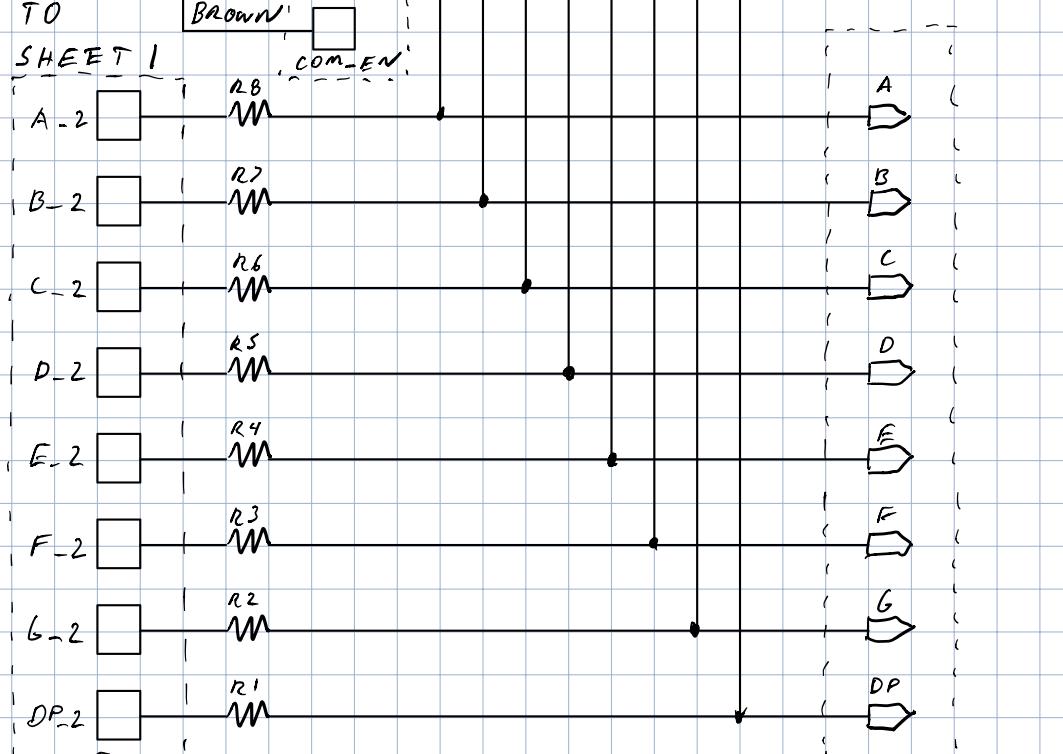
JORDAN  
BAXTER



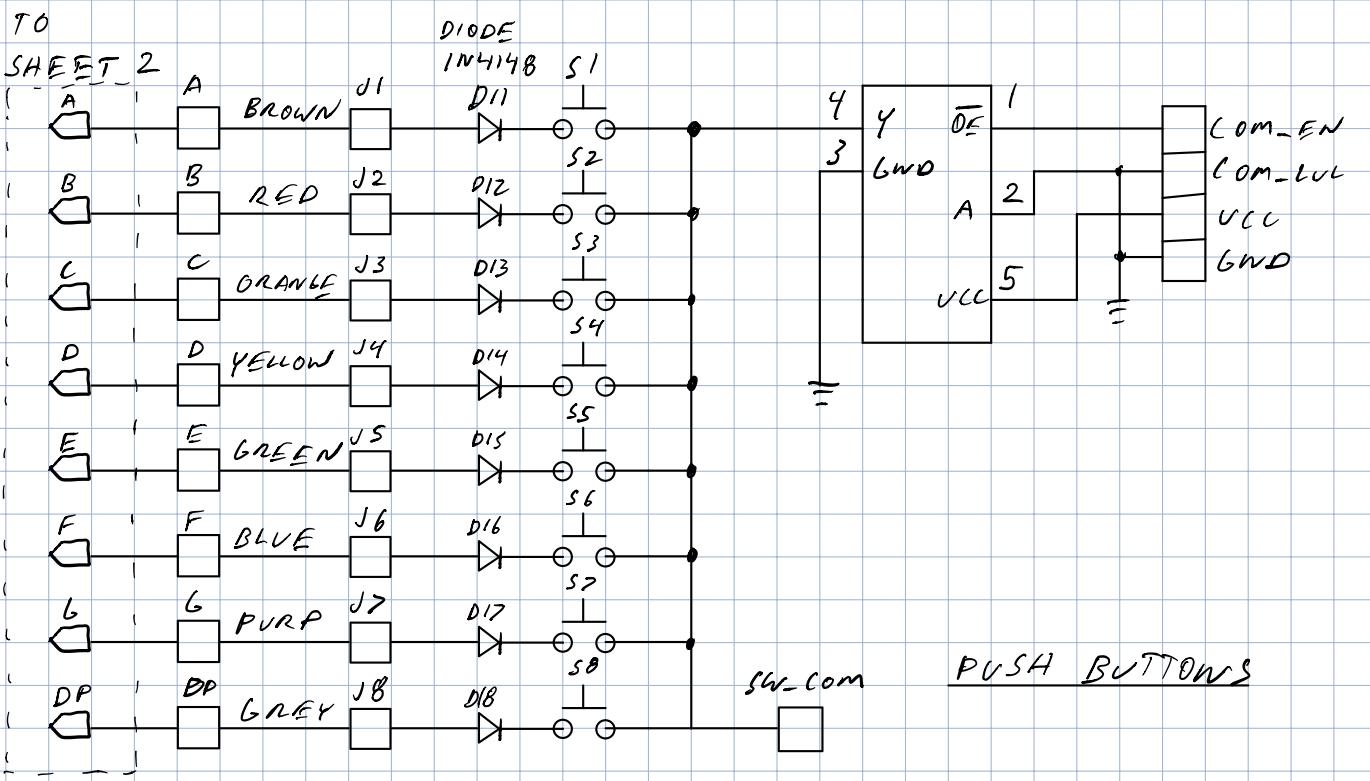


### NOTES

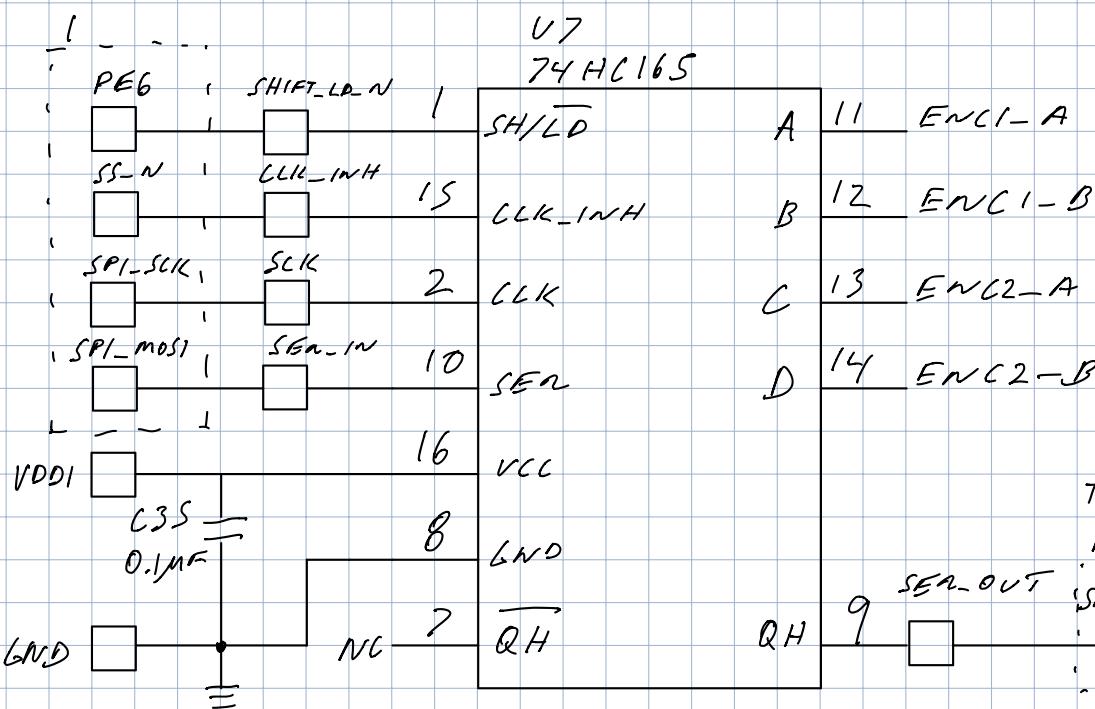
- 1]  $V_{DD}$  WILL ONLY ALLOW 1 BJT TO BE "ON" AT A TIME.
- 2]  $R_1 - R_8 = 385 \Omega$
- 3]  $R_9, R_{23}, R_{27} - R_{29} = 690 \Omega$



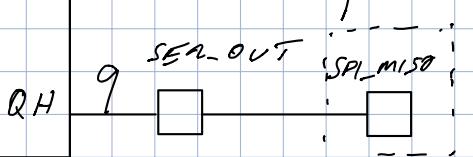
LED DISPLAY  
SHEET 2



TO SHEET

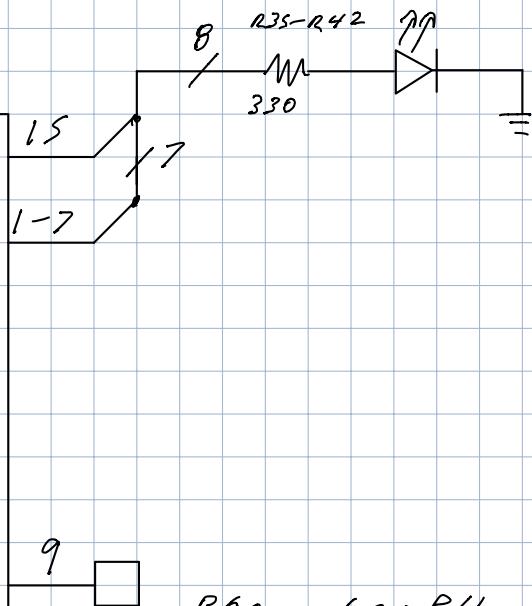
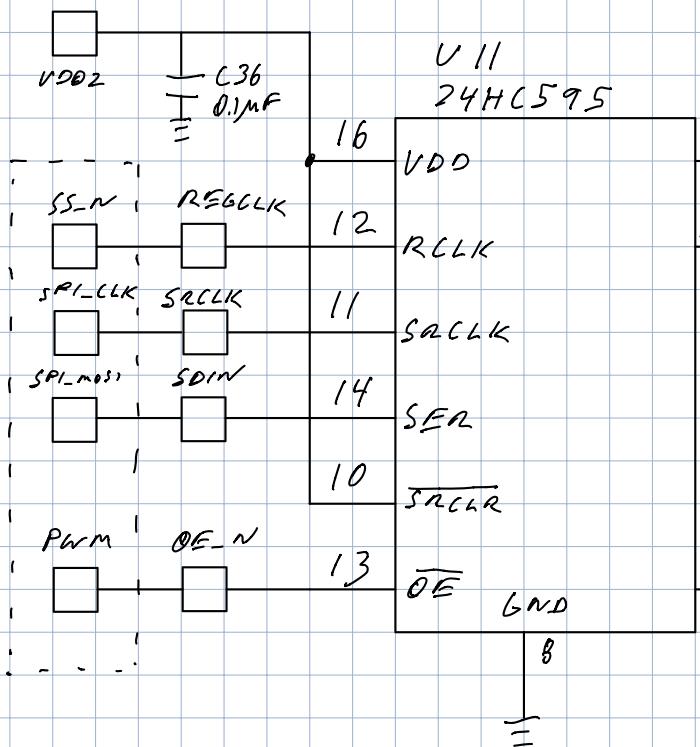


TO SHEET



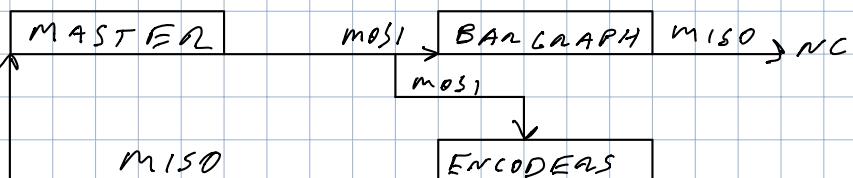
ENCODEARS

TO SHEET /

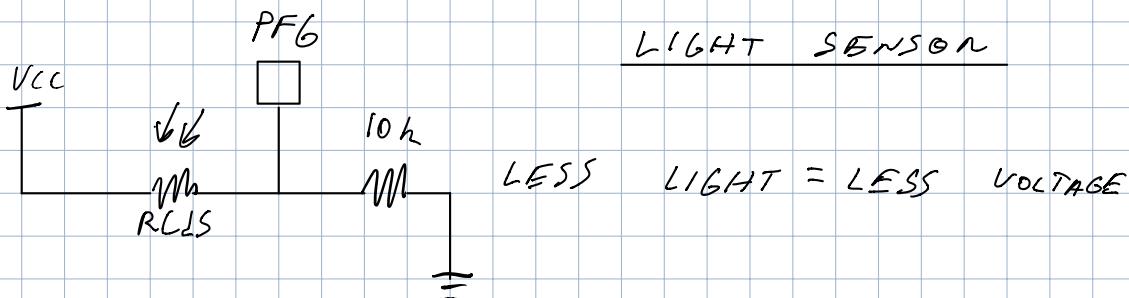
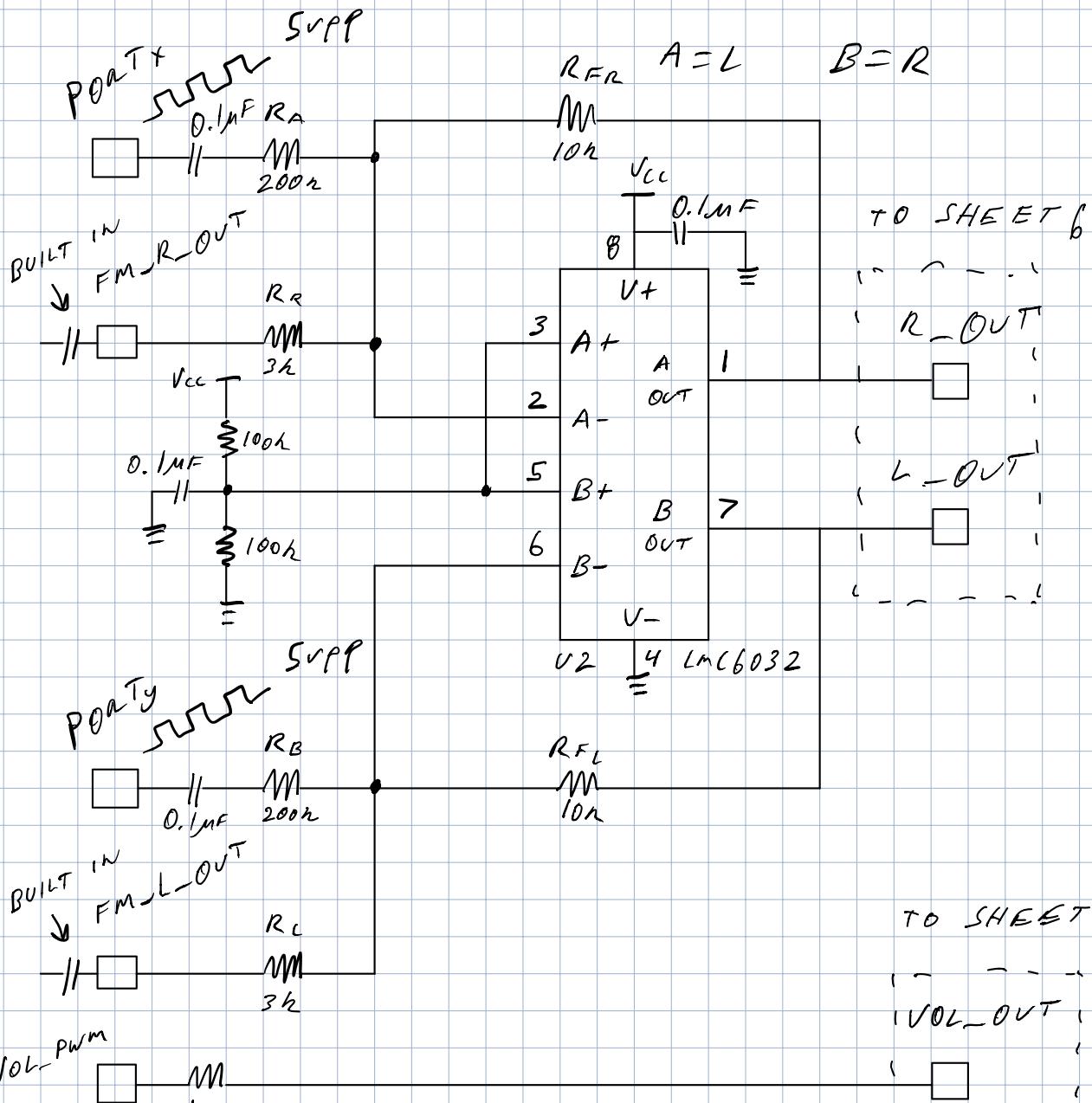


BAR GRAPH

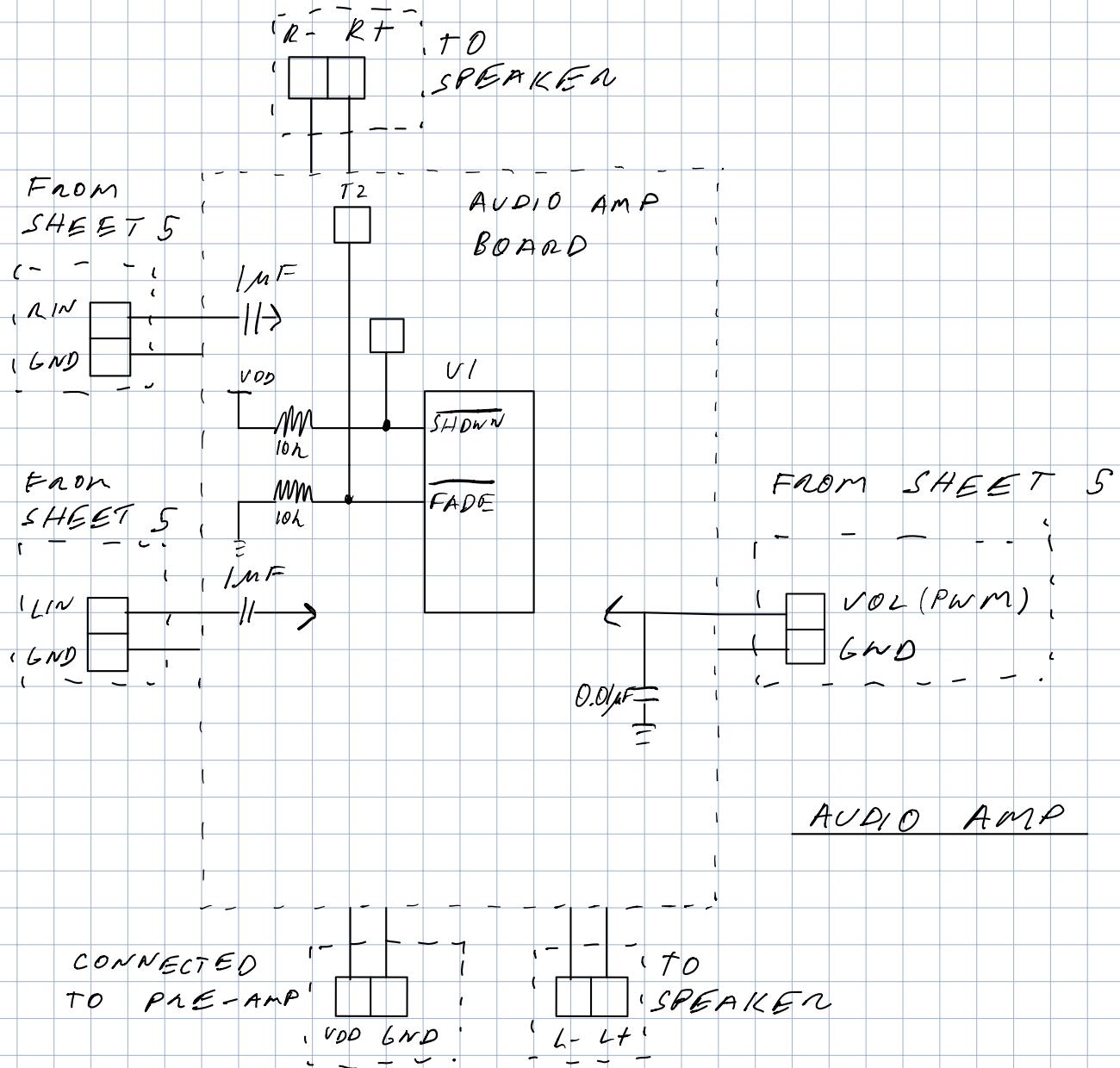
SPI DATA FLOW



SHEET 4 /



SHEET 5 /



### NOTES

1] ALL SYMBOLS OUTSIDE OF BOARD REPRESENT INPUTS

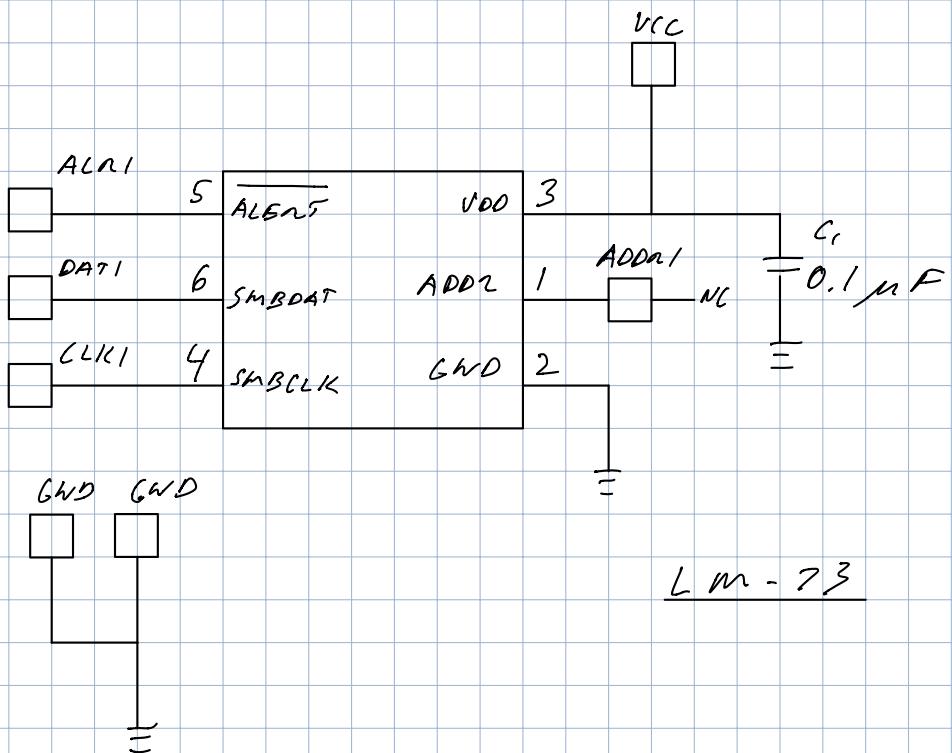
2] GAIN IS 32 STEP QUANTIZED VALUE

$$+ V_{vol} < 0.4V \rightarrow GAIN = -85dB$$

$$+ 0.4V \leq V_{vol} \leq 3.6V \rightarrow GAIN \leq 4.5dB / V - 95dB [DISCRETE STEPS]$$

$$+ V_{vol} > 3.6V \rightarrow GAIN = 20dB$$

3] WITH FADE AND SHUTDOWN IN CURRENT CONFIGURATION, DEVICE WILL FADE IN AND OUT WHEN SHUTDOWN IS TOGGLED.



PULL-UP CALC:

GENERAL RULE OF THUMB IS TO MAKE PULL UP RESISTORS AS LARGE AS POSSIBLE WITHOUT INTERFERING w/RISE TIMES. FROM THE ATMEGA128 DATA SHEET:

$$R_{MAX} = \frac{300\text{ns}}{C_{BUS}} \Rightarrow C_{BUS} = C_{in} // C_{LINE} \quad C_{in} = 5\text{pF}$$

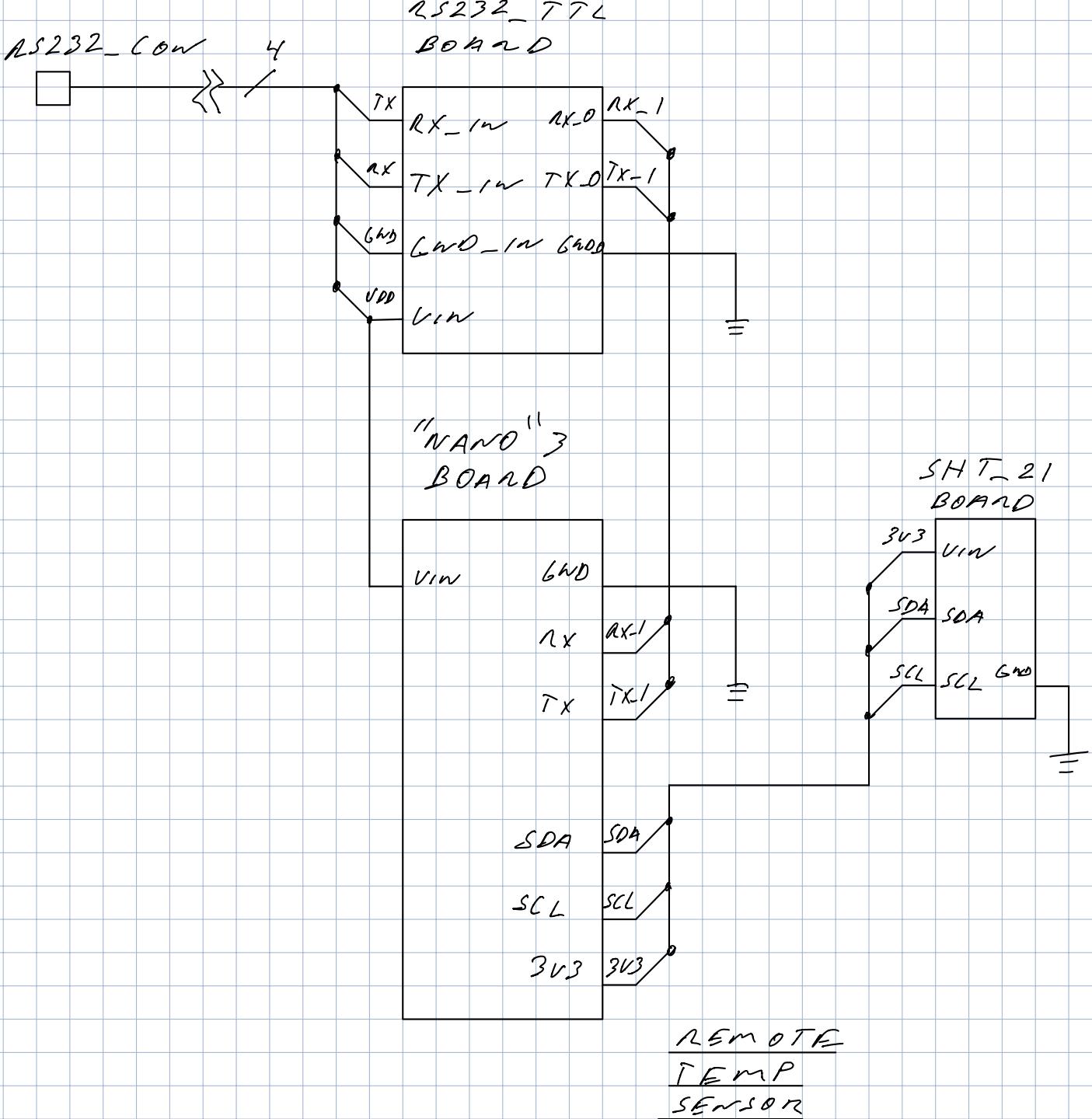
$$= C_{in} + C_{LINE}$$

CURRENT PULL-UP ON 128 BOARD =  $10k\Omega$

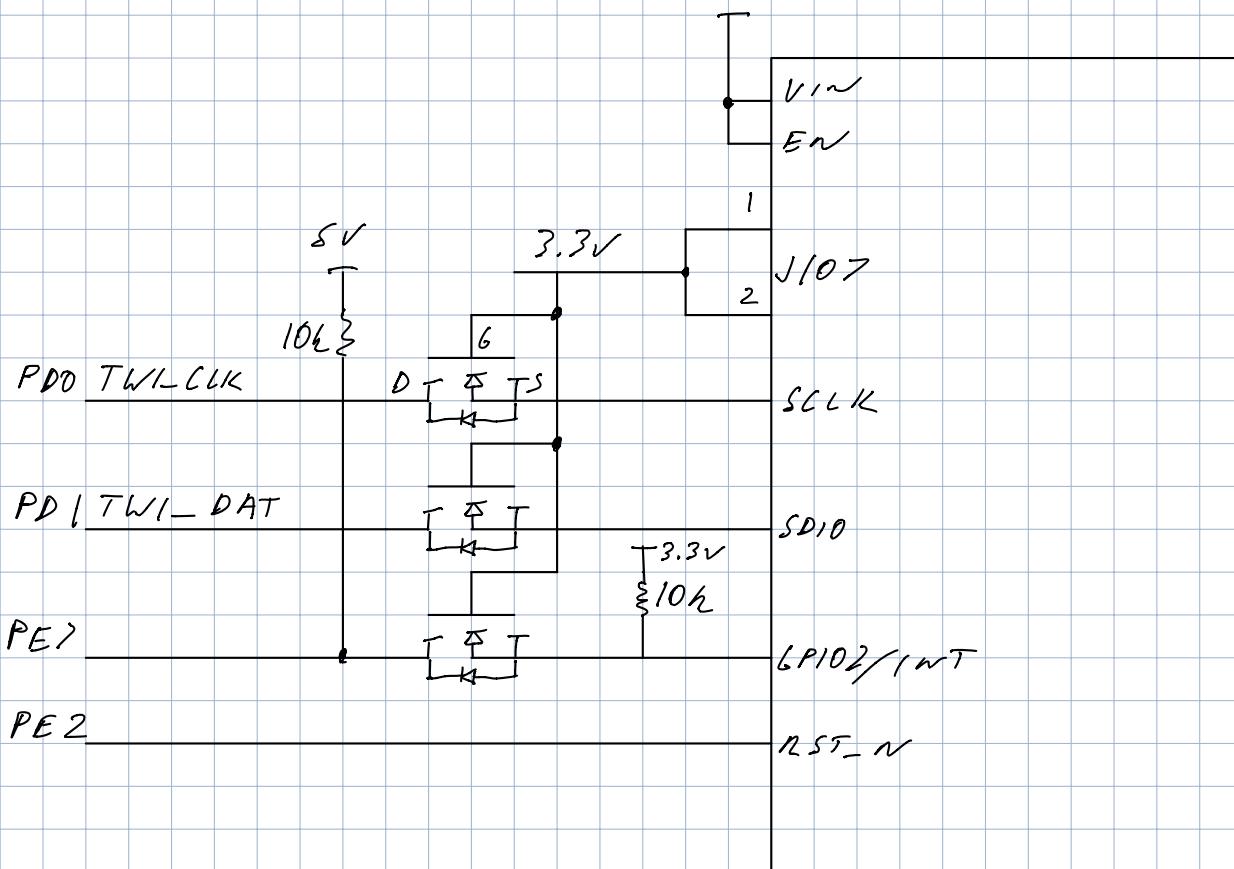
$$10k \leq \frac{300\text{ns}}{C_{BUS}} \Rightarrow C_{BUS} \leq \frac{300\text{ns}}{10k}$$

$$C_{BUS} \leq 30\text{pF}$$

$C_{LINE} \leq 25\text{pF}$  → LARGE MARGIN OF ERROR  
FOR MICROSTRIP STYLE T-LINE.  
→ NO GND PLANE UNDER MICRO-STRIP,  
∴ LINE CAP < 25 pF ✓



# RADIO BOARD



# WIRING TABLES

## PORT A

### WIRING TABLE

MEGA	JACK	CABLE	DISP
0	1	Brown	A-2
1	2	RED	B-2
2	3	ORANGE	C-2
3	4	YELLOW	D-2
4	5	GREEN	E-2
5	6	BLUE	F-2
6	7	PURP	G-2
7	8	GREY	DP-2
GND	9	WHITE	GND
VCC	10	BLACK	VDD

## PORT B

### WIRING TABLE

MEGA	JACK	CABLE	DISP
0	1	BLACK	SS-N
1	2	WHITE	SCIK
2	3	GREY	MOSI
3	4	PURPLE	MISO
4	5	BLUE	SEL0
5	6	GREEN	SEL1
6	7	YELLOW	SEL2
7	8	ORANGE	PWM
GND	9	RED	EN-N
VCC	10	BROWN	EN

## PORT C

### WIRING TABLE

MEGA	JACK	CABLE	DEST
0	1		
1	2		
2	3		
3	4		
4	5		
5	6		
6	7		
7	8	GREEN	R-AMP_BUZZER
GND	9	YELLOW	AMP_GND
VDD	10	ORANGE	AMP_VDD

## PORT D

### WIRING TABLE

MEGA	JACK	CABLE	DEST
0	1	BLACK	LT_SCL
1	2	WHITE	LT_SDA
2	3	GREY	
3	4	PURPLE	
4	5	BLUE	
5	6	GREEN	
6	7	YELLOW	
7	8	ORANGE	
GND	9	RED	
VDD	10	BROWN	LM-73VIN

## PORT E

### WIRING TABLE

MEGA	JACK	CABLE	DEST
0	1	NONE	UART_RX
1	2	NONE	UART_TX
2	3	Brown	RAD_RST
3	4		
4	5	GREEN	VOL_PWM
5	6		
6	7	WHITE	ENL_SHLD
7	8	PURPLE	EDGE_INT
GND	9		
VDD	10		

## PORT F

### WIRING TABLE

MEGA	JACK	CABLE	DEST
0	1		
1	2		
2	3		
3	4		
4	5		
5	6		
6	7		
7	8		
GND	9		
VDD	10		