

# NASA Robotics Alliance Project Reading

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CS56040

Chapter 6 – Electronics

# Reading Assignment

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- Chapter 6 - Electronics
  - Pages 170-186
- Read book and answer reflection questions on following slides

# Question 1: FRC Electronics

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Fill in the table to the left

Item	Definition/Description/Purpose	Image
Electronics System		NA
roboRIO		
Radio		
Driver Station		
Battery		
Main Breaker		
Power Distribution Panel (PDP)		
Motor Controllers (speed controllers)		
Voltage Regulator Module (VRM)		
Pneumatic Control Module (PCM)		
Solenoid		
Compressor		
Pneumatic Regulator		
Robot Signal Light (RSL)		

# Question 2: Control System Sketch

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- Create a sketch of the FRC control system using the Team 3161 diagram.

# Question 3: Sensors

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- What is the difference between digital and analog sensors?

# Question 4: Common FRC Sensors

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Fill in the table to the left.

Sensor	Definition
Rotary Encoder	
Magnetic (Mag) Encoder	
Potentiometer (Pot)	
Limit Switch	
Ultrasonic Sensor	
Accelerometer	
Gyroscope	
Beam Break Sensors	

# Question 5: Cameras in FRC

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- What are the purposes of cameras in FRC?

# Question 6: Compare FRC Vision Systems

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- Compare and contrast the LimeLight, PixyCam, Gloworm and Jevois vision systems



# Question 7: PWM & CAN

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- What is PWM? What is CAN?

# Question 8: Motor Controllers

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Name	Communication Method	Notes	Photo
Talon SRX			
Victor SPX			
Spark			
Spark MAX			
Nidec Controller			
TalonFX			

# Question 9: Pneumatics

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- What is a pneumatic system?

# Question 10: Pneumatic Components

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Fill in the table to the left

Component Name	Description/Use/Purpose
Accumulators (Air Tanks)	
Pneumatic Control Module (PCM)	
Solenoid	
Compressor	
Pneumatic Regulator	
Working Pressure	
Pressure Relief Valve	
Pneumatic Tubing	
Pneumatic Cylinder	
Single-Acting Pneumatic Cylinder	
Double-Acting Pneumatic Cylinder	
Cylinder Bore	
Cylinder Stroke	
Cylinder Rod	
Rod End	
Flow Regulator	
Fittings	

# Question 11: Pneumatic Use Cases

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- What are common uses of pneumatics in FRC?

# Question 12: Pressure Calculations

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- Calculate the force exerted by the following pistons:

Piston Diameter	Working Pressure	Calculated Force (psi)
6"	60 PSI	
4"	70 PSI	
3/4"	80 PSI	
1.5"	90 PSI	

# Question 13: Connectors

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- How are electrical connectors sized? How are they classified?

# Question 14: High Power Connections

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- Why are high power connections so critical? What are they used for in FRC?



# Question 15: Medium and Low Power Connections

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- What are the different types of medium and low powered connections? What are their uses?

# Question 16: Insulators

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- What is heat shrink used for? What about electrical tape?

# Question 17: Energy Chain

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- When kinds of mechanisms would energy chain be useful for in FRC?