

Component	Specifications	Reason(s)
<b>Nvidia Jetson Orin Nano Super Developer Kit</b>	CPU: 6-core ARM Cortex-A78AE 64-bit, GPU: 1024-core NVIDIA Ampere, Storage: microSD (Expandable), RAM: 8GB LPDDR5, Interfaces: 2x USB 3.2, 1x HDMI, 1x M.2 Key M, 1x M.2 Key E, Camera: 2x MIPI CSI-2	<ul style="list-style-type: none"> <li>• Run images through model quickly</li> <li>• Push data to cloud without compromising system performance</li> </ul>
<b>PI NOIR CAMERA V2 IMX219 8MP</b>	Resolution: 8MP (3280 × 2464), Sensor: Sony IMX219, Interface: MIPI CSI-2, Features: No IR filter for night vision	<ul style="list-style-type: none"> <li>• 8MP because the subject is within 1m</li> <li>• No IR to capture images in any lighting conditions</li> </ul>
<b>4.3-inch HDMI LCD 800x480 IPS Capacitive Touch Screen</b>	Resolution: 800 × 480, Display Type: IPS LCD, Touch: Capacitive, Interface: HDMI + USB (for touch), Power: 5V	<ul style="list-style-type: none"> <li>• Small screen that isn't intrusive when driving</li> <li>• Touch for easy interaction (dismissing alerts)</li> <li>• HDMI allows us to connect to Jetson</li> </ul>
<b>DC 3.3-5V Passive Low-Level Trigger Buzzer Alarm Module</b>	Voltage: 3.3V-5V, Trigger: Low-level signal, Type: Passive buzzer	<ul style="list-style-type: none"> <li>• To distinguish from regular speaker noise</li> <li>• Simple and constant tone that is loud/irritating</li> </ul>
<b>GY-521 MPU-6050 3-Axis Accelerometer and Gyroscope</b>	Sensor: MPU-6050, Interface: I2C, Axes: 3-Axis Accelerometer + 3-Axis Gyroscope, Voltage: 3.3V-5V	<ul style="list-style-type: none"> <li>• To collect vehicle metrics to determine the state of the car and driver</li> </ul>
<b>Thin Film Pressure Sensor Flex Bend Sensor SF15 600 10kg</b>	Type: Thin Film Pressure Sensor, Range: Up to 10kg, Interface: Analog	<ul style="list-style-type: none"> <li>• Used to measure pressure applied to steering wheel as a metric for determining drowsiness</li> <li>• Thin and flat, able to fit on steering wheel without impeding driver</li> </ul>
<b>Digital ADC Module 16-Bit ADS1115 I2C</b>	Resolution: 16-bit, Channels: 4, Interface: I2C, Voltage: 2V - 5.5V	<ul style="list-style-type: none"> <li>• Interface between pressure sensor and Jetson because Jetson doesn't have an onboard ADC</li> </ul>

<b>4-Channel ADC</b>		
<b>Heart Rate Sensor Module MAX30102</b>	Measures: Heart Rate, SpO2 (Blood Oxygen), Interface: I2C, Voltage: 1.8V - 3.3V	<ul style="list-style-type: none"> <li>• Used to measure heart rate of driver as a metric for determining drowsiness</li> <li>• Small and compact, allowing easy integration without impeding driver and other components</li> </ul>
<b>AW-CB375NF Dual-Band Wireless NIC</b>	Wi-Fi: IEEE 802.11a/b/g/n/ac, Dual-Band 2.4GHz (up to 300Mbps) and 5GHz (up to 867Mbps), Interface: NGFF (M.2 A/E Key) Bluetooth: Version 5.0, Supports BLE, Voltage: 3.5V	<ul style="list-style-type: none"> <li>• Provides high-speed wireless connectivity and Bluetooth support for devices with an M.2 A/E Key slot.</li> </ul>