**MMTS AND RIS UNIT DESCRIPTION**

**1.USB CAMERA:**

# PART NUMBER*: LAPCAM WEB CAMERA /LWC-042*

# SPECIFICATIONS:

# HI -SPEED USB 2.0

# HD 720P (UPTO 1280 x 720)

# The 5 Glass lens make sure to capture images with HD quality.

# Automatic low light correction feature for dim lighted environment.

**PURPOSE:**

Lap care Lap cam Web Camera enables the user to experience High resolution video recording and supports video quality up to 1280×720 pixels. Comes with Built-in Noise isolation Microphones which helps to avoid noise while recording videos.

**PURPOSE OF LAPCAM IN THE PROJECT**:

Lap cam is connected with RASPBERRY PI board interfacing via USB protocol. A Lap care Lap cam Web camera is used to monitor the person who is wearing the IR Reflection Jacket continuously. Once the camera detects the person and failed data received from server through MQTT protocol then it will give coordinates of person’s position.

**2.DCMOTOR:**

**PART NUMBER: *EC82M244632MLGH***

**SPECIFICATIONS:**

* 320 Watt
* 3.0 Amax
* 24 volts

**PURPOSE:**

A DC motor or direct current motor is an electrical machine that transforms electrical energy into mechanical energy by creating a magnetic field that is powered by direct current. When a DC motor is powered, a magnetic field is created in its stator.

The field attracts and repels magnets on the rotor; this causes the rotor to rotate. To keep the rotor continually rotating, the commutator that is attached to brushes connected to the power source supply current to the motors wire windings.

One of the reasons DC motors are preferred over other types of motors is their ability to precision control their speed, which is a necessity for industrial machinery. DC motors are able to immediately start, stop, and reverse—an essential factor for controlling the operation of production equipment.

**PURPOSE OF DC MOTORS IN THE PROJECT**:

* DC motor is used to rotate the target board in clockwise and anticlockwise direction.
* Two servo motors are used to rotate the gun in horizontal and vertical directions based on the coordinates of the pixel.

**3.RELAY:**

**PART NUMBER: SRD-12VDC-SL-C**

**SPECIFICATIONS:**

* High-current relay: 15A @ 125V AC or 10A @ 250V AC

**PURPOSE:**

Relays are electrically operated switches that open and close the circuits by receiving electrical signals from outside sources.

A relay is an electromagnetic switch that turns on or off based on an external electrical signal, and is used **to drive a high current load**. Relays isolate low power circuits (for example, the microcontroller) from high power circuits.

**PURPOSE OF RELAY IN THE PROJECT**:

* Raspberry Pi microcontroller is a low voltage circuit(5volts). Solenoid switch requires 12v. In order to communicate solenoid switch with microcontroller we are using relay.

**4.SOLENOID SWITCH:**

**PURPOSE:**

A solenoid switch is an electrical switch that is often used where a high current circuit, such as a starter motor circuit, is brought into operation by a low current switch. When the key switch is turned to Start and the gearshift is in neutral, the circuit between the battery and the solenoid switch is complete.

**PURPOSE OF SOLENOID SWITCH IN THE PROJECT:**

If the status 1 comes from server then no action will be taken, then if the status 0, solenoid switch will help to trigger the gun shot is done.

**5.BUCK CONVERTOR:**

**PURPOSE:**

A buck converter or step-down converter is a DC-to-DC converter which steps down voltage (while stepping up current) from its input (supply) to its output (load). It is a class of switched-mode power supply.

**PURPOSE OF BUCK CONVERTOR IN THE PROJECT:**

Buck convertor is used to convert the switch mode power supply high voltage (24v) to microcontroller low voltage (5v).

**6.SOLAR PANEL:**

**PART NUMBER: *BRAVO 80 x 40 - 1***

**SPECIFICATIONS:**

* Solar Panel 6v -60 MAH

**PURPOSE:**

Solar panels are made out of photovoltaic cells that convert the sun's energy into electricity. Photovoltaic cells are sandwiched between layers of semi-conducting materials such as silicon. Each layer has different electronic properties that energise when hit by photons from sunlight, creating an electric field.

**PURPOSE OF SOLAR PANEL IN THE PROJECT:**

Solar panel is the target board. Room temperature values are considered as solar voltage. These values will be varied instantly. whenever the laser light falls on solar panel, temperature values should be varied in the range between 50 to 100.consider that shot is successful. If not send the status to server.

**7.LIMIT SWITCH:**

**PART NUMBER: JLSCW** (1NO + 1NC)

**SPECIFICATIONS:**

240VAC BC9 LIMIT SWITCH

**PURPOSE:**

A limit switch is a switch operated by the motion of a machine part or the presence of an object.

A limit switch can be used for controlling machinery as part of a control system, as a safety interlock, or as a counter enumerating objects passing a point.

**PURPOSE OF LIMIT SWITCH IN THE PROJECT:**

Limit Switches are used to control the rotation of DC Motor.

Switch1 and switch2 are two end positions. When DC motor rotates in clockwise direction till the end position (limit switch-1 is pressed) and get back to the default position.

Similarly if DC motor rotates in counter clockwise direction till the end position (limit switch-2 is pressed) and get back to the default position.

**8.BUZZER:**

**PURPOSE:**

A buzzer is a basic audio device that generates a sound from an incoming electrical signal.

**PURPOSE OF BUZZER IN THE PROJECT:**

When trainer starts the timer, the buzzer is ON intimates to trainee that timer has been started.

Once the shot is done successfully, one more time buzzer beep sound will come.

**9. WIFI MODULE:**

**PART NUMBER: *ESP8266 NODE MCU***

**SPECIFICATIONS:**

* WIRELESS STANDARD: IEEE 802.11.b/g/n
* FREQUENCY RANGE: 2.412 - 2.484 GHz

**PURPOSE:**

Node MCU is an open-source Lua based firmware and development board specially targeted for **IoT based Applications**.

It can be used with ESP-AT firmware to provide Wi-Fi connectivity to external host MCUs.

**PURPOSE OF NODE MCU IN THE PROJECT:**

An app is managed by the Trainer which stores the information about person who entered the room. Trainer send the data (name, mode, time duration) to HIVEMQ cloud server using MQTT protocol. Node MCU reads the data from server through MQTT protocol and sends to microcontroller through UART communication protocol.

**10.MOTOR DRIVER:**

**PURPOSE:**

Motor driver is used to control motion of a motor and its direction by feeding current accordingly. Output of a motor driver is in digital form so it uses PWM (Pulse Width Modulation) to control speed of a motor. Motor Driver are basically current amplifiers followed by input signals.

**PURPOSE OF MOTOR DRIVER IN THE PROJECT:**

The Motor Driver is a module for motors that allows you to control the working speed and direction of motors simultaneously. driver is necessary because the microcontroller requires lower-level voltage than the motors.

Due to this, we cannot supply power directly from the microcontroller to the battery. We need a motor driver in between these electrical components at this point.