*Visual Inspection Device*

*User Manual*

VNI CCN Q DQ

Boboc Raul Madalin

July - September 2022

Table of Contents

[Purpose 3](#_Toc113875851)

[Notices 4](#_Toc113875852)

[Specifications 4](#_Toc113875853)

[Components 5](#_Toc113875854)

[Preparing For Use 7](#_Toc113875855)

[Controlling The Device 8](#_Toc113875856)

[Maintenance 9](#_Toc113875857)

[Frequent Problems 10](#_Toc113875858)

# Purpose

The Visual Inspection Device is a tool created for helping QMP Engineers in PCB inspection to obtain more precise results in a shorter time. After mounting the VID on a stable surface, users place the PCB on the base of the VID and start the process of inspection.

The design of the VID is meant to mimic as best as possible a human’s hand interaction with a microscope, with added stability and precision. The intuitive controls and functionalities make the device easy to use by any user, no matter their field or experience.

Future updates to the VID include autonomous scan, support for various models of microscopes and electronics replacement.

# Notices

Please read all the instructions in the manual and familiarize yourself with the Visual Inspection Device before setting-up and use.

Please follow all the safety warnings and notices, failure to comply with the warnings and instructions may result in individual injury, inferior results and device damage.

Keep your workplace tidy, away from flammable liquids, gas or dust.

Always use a properly grounded outlet and the cable provided to prevent damage to the device. Do not use outdoors. Keep away from direct sunlight.

Keep your hair, clothing and gloves away from moving parts. Keep only the PCB inside the device while in use.

Please follow all the recommendations regarding updating and maintaining the device before bringing any modification.

# Specifications

Version: 1.01

Dimensions: 500mm L x l x h

Weight: 5kgs

Input voltage: 12V

Microcontroller: Arduino UNO

Microscope: Microscope Camera DIGIMICRO 2.0 Scale

# Components

* A picture containing electronics, computer

  Description automatically generated12V Power source.
* Graphical user interface

  Description automatically generatedControlling PCB with 15 buttons, an emergency button and a LED light.
* A picture containing text

  Description automatically generatedMain PCB with 2 Arduino UNO Microcontrollers, 5 Stepper Drivers, 2 74HC959 Bit Shifters, a ULN and a 12V relay.
* Main frame (front face) with 5 Stepper Motors, 9 Endstop switches and 10 custom printed 3D parts.

**A picture containing indoor, worktable, cluttered

Description automatically generated**

# Preparing For Use

Make sure the device is placed on a flat, stable surface and that all the 4 special printed legs are touching the surface. The front face should be the one facing the user.

Make sure the belts and joints are not blocked or obstructed, no cables are entangled, and the power source is correctly plugged into a 12V outlet.

The device should be one entity, with no loose bolts or cables (except for microscope’s USB cable which should be disconnected from any device).

After starting, the device will automatically initiate to its home position and does not respond to control panel inputs. In case of malfunction, press the emergency button and contact an administrator.

If the initialization has finished, the microscope can safely be connected to a device.

# Controlling The Device

After the device has finished initialization, it can be manually controlled.

* X (yellow) buttons drive the microscope left and right.
* Y (yellow) buttons bring the microscope closer or farther from user.
* Home (green) button re-initiates the device in its origin point.
* Z (blue) buttons drive the microscope up and down.
  + Downward movement is SW limited, in case of bug or failure, press the emergency button and contact an administrator.
* R (blue) buttons rotate the microscope left and right.
* Safe Z (green) button sets a new maximum height for the device.
  + Safe Z must be pressed twice to have effect.
  + Safe Z is also SW limited, therefore in case of bug or failure, press the emergency button and contact an administrator.
* F buttons (green) calibrate the microscope’s focus.
* Speed (red) buttons change the device’s base speed\*\*\*.
* Emergency button stops the device.
* LED signals the device’s status and current running speed.

# Maintenance

# Frequent Problems