

## Rubiks Cube Club – Introduction

Welcome and let's get started. First, each student is being given a PLC, an Ethernet cable and software. The software is from Siemens and is labelled:

Simatic Step 7 Basic V19

This software is licensed and is good for as long as the computer supports Windows 10 or 11. The license is not time limited. You will only need the first DVD from the box. It is labelled:

Siemens V19 Simatic Step 7 Basic/Professional, Step 7 Safety...

### Download Siemens Software:

If you choose to download the software from Siemens directly over the web, see instructions at:

<https://hybridplc.org/wp-content/uploads/TIA-Portal-Instructions.pdf>

If you download the software from the website, it will refer to a 21 day trial. This can be ignored if you have a key. There is a one download key in the box. It is the black memory stick located in the box.

### Key:

Use it to set up the license on the C drive of your computer. This is a single download key. Use the instructions above for this. **DO NOT DRAG/DROP THE LICENSE KEY.** Follow the instructions under the Automation License Manager.

### Setup of IP Address:

A note about the Ethernet IP addresses:

Please set up the computer port that communicates to the PLC to 192.168.0.2. We will get students to set the PLC to 192.168.0.3. If you choose another address, you are responsible for student instruction on how to set up the PLC.

### What to Expect:

We will post exercises starting week of Jan 13, hopefully Monday, January 13 to start the first lab. There may actually be some postings before this time but the official start date is Jan. 13. While exercises are expected to be completed by the students, there is no grade associated with the labs. However, we would like students to verify their attendance with a screen shot of the lab hopefully running with the final program statements shown. This will be explained as the class progresses.

An introduction with a 'syllabus' is given at the following:

<https://hybridplc.org/high-school-plc-club/>

under the tab Instructions to Get Started – Rubiks Club.

Instruction Videos will be found under

<https://hybridplc.org/videos/>

then youtube channel, then playlists, then Rubiks\_Club.

### **Getting Started Programming:**

The first thing we need to do is to check if you can load a program with the computer and PLC you have.

The sequence of programs written will be as follows:

Download a blank program	Week 1
Write and execute the Hot Dog Program	Week 1
Write and execute the Traffic Light Program	Week 2
Write and Execute the Cash Register Program	Week 3
At this time, if you have completed at least the Traffic Light program, you will be given a wiring kit. We will then redo the Hot Dog Program with Input wiring	Week 4
Redo the Traffic Light Program with Input and Output wiring	Week 5
Write, wire and execute the Simon Says Program	Week 6, 7
Write, wire and execute the Function Block Program	Week 8
Write, wire and execute the Stepper Motor Program	Week 9
Combine a Stepper Motor with a Function Block	Week 10, 11
Begin programming the First Level of the Rubiks Block	Week 12, 13
Regroup – See Where We Have Been	Week 14

### **For any questions, please contact:**

Wm Ted Evans

Professor, U of Toledo

Email: [william.evans@utoledo.edu](mailto:william.evans@utoledo.edu)

Cell 419-343-3681