City Block Technical Guide

Alcatel Switch:
Provides network switching services for all City Block components.

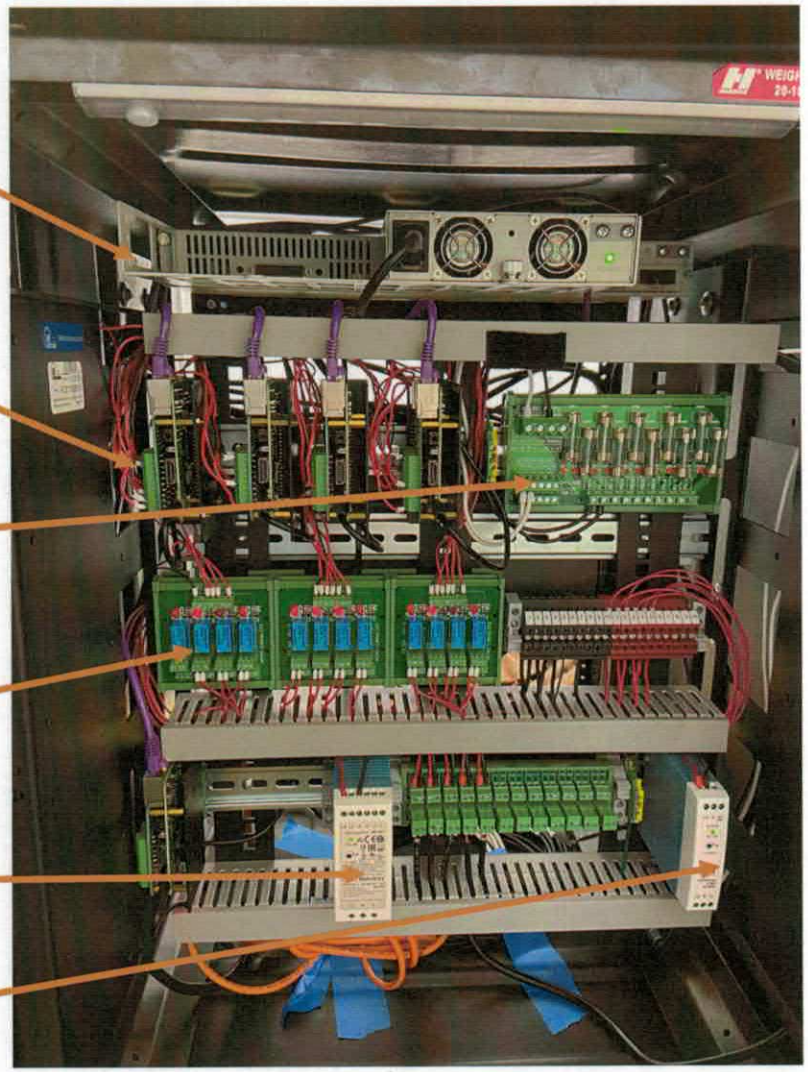
The Raspberry Pi PLCs:
IP addresses (left to right) – 10.10.10.1, 2, 3, and 4. Provide Programmable Logic Controllers (PLCs) for the ICS/SCADA environment.

A/C Power Supply with Fuses:
Provides power to City Block and provides overcurrent protection.
WARNING - SHOCK HAZARD – DO NOT TOUCH

5vDC Relays:
Turns 5VDC power to LEGO model components on and off depending on ICS/SCADA status.

24vDC Power Supply:
Provides Power to the HMI.
WARNING – SHOCK HAZARD – DO NOT TOUCH

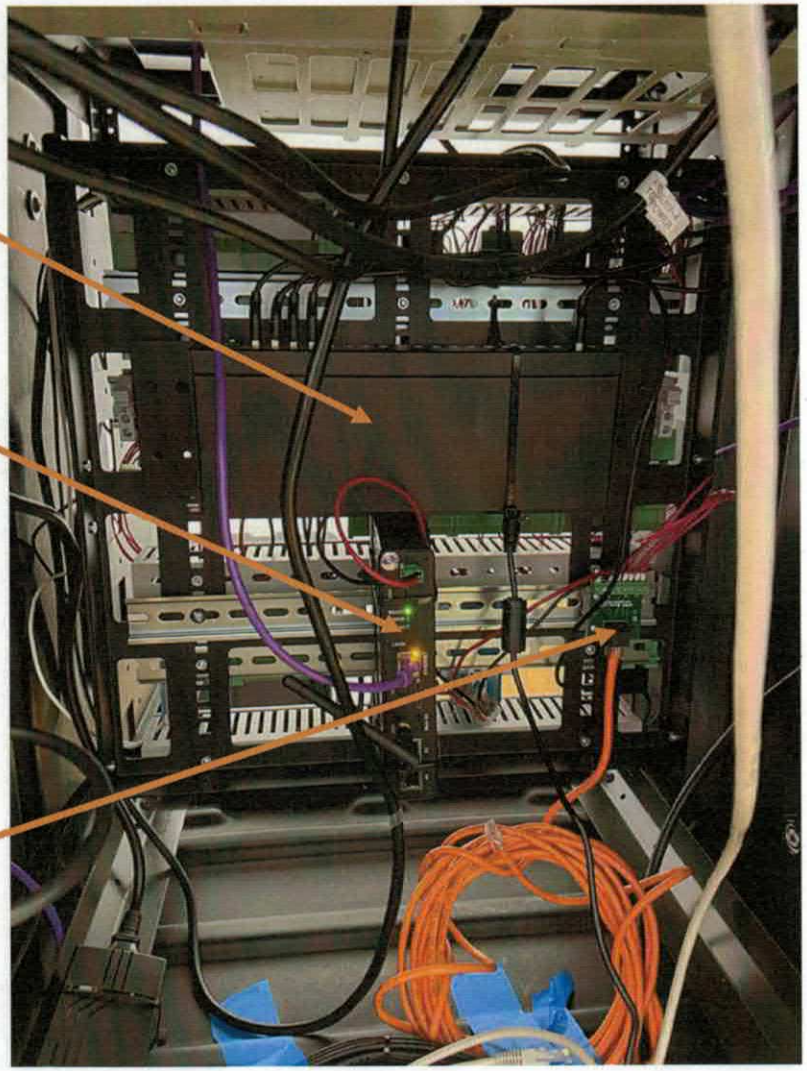
5vDC Power Supply
Provide 5VDC power to LEGO model components.



High Power USB Charging Station:
Provides Power to all the Raspberry Pi Computers.

mySCADA myBOX HMI:
IP address 10.10.10.100 and 10.10.11.100
Provides Human Machine Interface services.

Traffic Light Connection:
Connects the traffic lights on the model to
The PLC that controls them.



Initial Setup

- Set up the LEGO model.
- Set up the 14U Pelican case.
  - Remove the covers.
  - Pull out the orange CAT 5 cable, the tan CAT 5 cable, the black power cable, and the black female USB connections (5 of them). All are taped down with painter's tape.
  - All the USB connectors are labelled with a number (1 – 5). Connect the cable with the associated male USB connection on the model.
  - Plug in the power cable.
  - Plug the orange CAT 5 cable to the traffic light on the model (you will find the connection inside the police station.)
  - Plug the tan CAT 5 cable into the computer that will be servicing the environment.
  - Turn the unit on using the orange power switch on the power rack inside the pelican case.

Using the Apple iPAD HMI

- Turn on the Apple iPAD. The iPad will automatically connect with the "mySCADA" wireless network served by the myBOX HMI.
- Open the Safari browser. The browser will automatically connect to the HMI.
- On the left side, choose the "Substation" view if the HMI is not already there. You will see that all the breakers are green to indicate that they are tripped. Close all the breakers in the environment by tapping them. You will know the breakers are closed when they turn red.
- After all the breakers are closed, the business district should light up and the generators should shut down after about 10 seconds.
- There are four different views for the HMI. Explore the HMI views. Manipulate different buttons in the environment and see the effect they have on the model.

Computer Setup

- Set the IP address to **10.10.10.42** … ensure that the computer is able to ping 10.10.10.1, 2, 3, 4, 5, and 100.
- The computer that will be serving City Block must have Python 3.X installed.
  - Python 3.X is available for download at www.python.org/downloads/. When the software is installed, ENSURE in the options that PIP is installed and the environment variables are set (i.e. the "python" command is in the path.)
  - After python is installed, restart the computer.
  - When the computer is restarted, open a command prompt. Type the following command: **pip install pymodbus**
  - After pymodbus is installed successful, the computer has the dependencies it needs to serve City Block.
  - Copy the **"Builds"** directory and the **modbus_to_unity.py** file to the computer desktop.
  - Install VNC viewer. It can be found at https://www.realvnc.com/download/viewer

Using the City Block Computer

- Open a command prompt. Change directory to the "Desktop" directory where the python file is located.
- Type the following command: python modbus_to_unity.py
- If the python script works properly, a black screen will appear with values for various components in the City Block environment. Minimize that screen. This python script must be running for the Unity environment to work properly.
- In the Windows GUI, find the "Builds" directory on the desktop and open it. Find the Unity program "LegoCityBlock" and double click it. The 3D City Block environment should start.
- The Unity environment will mirror the status of the LEGO environment. For instance, if the business district power goes out in the LEGO environment it should also go out in the Unity 3D environment. Traffic lights will match, etc.
- You can scroll through different views in the Unity environment by hitting the space bar.

Attacking the City Block Environment

- Open VNC Viewer. In the top box labeled "Enter a VNC Server address", type the following address: **10.10.10.5**
- Login with the following credentials --- Username: pi --- Password: raspberry
- After a successful login, you will be presented with the Raspberry Pi desktop.
- Locate the icon for opening a terminal window on the top left side of the desktop.
- Once the terminal window is opened, there are several different commands you can type:
  - **./fightclub.py** – typing this command will attack the city generators and substation and cut off all the power. The attacker will cycle the breakers quickly until the script is ended by hitting CTRL-C.
  - **./recover.py** – After an attack is done, you can run this script to bring the entire city back to normal.
  - **./alltogethernow.py** – Cycle between attacks and recovery indefinitely. Take about 2 minutes for a complete cycle. Great when showing the environment at trade shows.

Credential Across the Environment

- 10.10.10.1 – 10.10.10.5 –
  - Username: pi Password: raspberry
  - Web interface for OpenPLC … (IP Address):8080 – Username: openplc Password: openplc
- Wireless Access Point (10.10.11.0/24) –
  - SSID: mySCADA
  - Password: J0Yne$$! (Capital J – Number Zero – Capital Y – Little n – Little e – Dollar Sign – Dollar Sign – Exclamation Point)
- 10.10.10.100 (Ethernet) / 10.10.11.100 (Wireless) –
  - Username: admin Password: admin

- STRONGLY RECOMMEND not changing settings without the advice of either Scott Thompson or Rembrandt Bukowski.

Help Desk – Technical Points of Contact

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