

# Program UI Process Guide

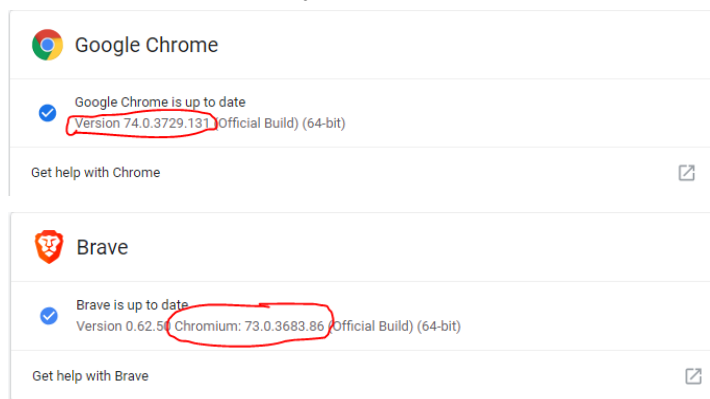
Programming distributed panels is done in **two stages**.

First you must **reset the MikroTik** (Downgrade RouterOS to 6.40.9 and Reset Configuration), then you must **program the components**.

## I. Setup (Extract .7z file then run the **Kai-ACK\_1.91.exe**)

### A. Troubleshooting

1. A Chromium based browser is required to program WattBoxes. You should use the [chrome driver version](#) for your browser version, named as "chromedriver.exe" in the Kai-ACK directory.



## II. Initializing Site Data (Select the **Load Site Data** button)

*Retrieves spreadsheet from sheets API then logs in and stores zone information.*

### A. Input the following information:

1. **Site Name** use the title of the spreadsheet as shown:

The image shows a Google Sheet titled 'automationTestZone'. The sheet has a blue header row with the title 'Site Name - City, State'. Below the header, there are three rows of data. The first row has columns for Cable Modem MTA MAC, Mikrotik MAC, Mikrotik SN, DDNS Hostname, and Program. The second row has values: 50955176D917, CC-2D-E0-B0-19-C3, 8B00080B22F6, 'Automation\_1 dynu.net', and Kai McGreg. The third row has values: CC-2D-E0-B0-19-C3, 8B00080B22F6, 'Automation\_2 dynu.net', and Kai McGreg. The fourth row has values: CC-2D-E0-B0-19-C3, 8B00080B22F6, 'Automation\_3 dynu.net', and Kai McGreg.

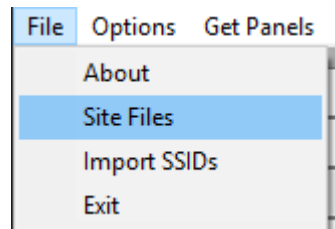
Cable Modem MTA MAC	Mikrotik MAC	Mikrotik SN	DDNS Hostname	Program
50955176D917	CC-2D-E0-B0-19-C3	8B00080B22F6	"Automation_1 dynu.net"	Kai McGreg
	CC-2D-E0-B0-19-C3	8B00080B22F6	"Automation_2 dynu.net"	Kai McGreg
	CC-2D-E0-B0-19-C3	8B00080B22F6	"Automation_3 dynu.net"	Kai McGreg

2. **Programmer Name** should use the name placed to the right of the DDNS Hostname (in the Programmer column) on the panels you're ready to program

Site Name - City, State			
ikrotik SN	DDNS Hostname	Programmer	Prog. Date
	"Automation_13.dynu.net"	▼	
	"Automation_14.dynu.net"	▼	
	"Automation_15.dynu.net"	My Name	▼
	"Automation_16.dynu.net"	▼	
	"Automation_17.dynu.net"	▼	

3. **Controller IP** and **AP Zone** information are loaded from the NAF

- B. Select the folder that contains the site's files using the '**Site Files**' button



1. If the site's password isn't present already, it will be added to the site master password list

- C. Troubleshooting:

1. Ensure that the NAF has been shared to be accessible with the service account

- D. If you don't want to load info from Google Sheets (*This portion of the code is unstable and subject to crashes*):

*Using this process will cause the **Program Double APs** button to be non-functional.*

1. Create a .TXT file containing the SSIDs you want to use to program each panel.  
The format of the text file should look as shown:

```

Untitled - Notepad
File Edit Format View Help
Automation_1
Automation_2
Automation_3
Automation_4
Automation_5
Automation_6
Automation_7
Automation_8
Automation_9
Automation_10
|

```

2. Use these settings under Miscellaneous in the User options:

Miscellaneous:

<input type="checkbox"/>	Write To Sheets
<input type="checkbox"/>	Use Timer
<input checked="" type="checkbox"/>	No NAF

- Enter the information for the controller cluster you want to use in the following format:

Advanced Options

Settings

User

Controller

**Controller Settings:**

**Login Information:**

User Name: programming

Password: .....

**Cluster Information:**

Cluster List:

Delete Cluster Use Cluster

Add a Cluster:

Name: Cluster #

Control IP: \*IP of Leader here\*

Management IPs:

IP:Port One IP Two

IP Three IP Four

Add Cluster

OK

- Add Cluster then **Load Site Data**.

### III. Resetting Panels (Select the **Reset Panels** button)

*Resets the MikroTik's RouterOS version, then resets MikroTik's configuration using the site file's MTAutoscript.*

**When the button is pressed - the program will connect to the search the selected site folder & FTP the certificates, MTAutoscript.rsc and RouterOSv40.9.npk into the MikroTik's flash directory.**

A. Make sure cables use this setup for the MikroTik:

- Internet Source → Port 1
  - Only necessary when the master password list is needed
- Computer ethernet connection → Port 3

B. If the MikroTik/AP has been programmed before:

- Enable the '**Refurbished**' option in the options menu. This will repeatedly attempt to login to to both the MikroTik and AP using the site master password list. It will

also reset panels with the IPs 192.168.87.1 and 192.168.88.1 instead of just 192.168.88.1

- a) If SSH is disabled, the program will upload the 'enableSSH.auto.rsc' file which executes automatically upon upload to the Mikrotik
- b) If SSH and FTP are disabled, the Mikrotik API will be used to enable both services

#### IV. Programming Panels (Select the **Program Panels** button)

*Checks the status of device's connectivity (to the MikroTik), then applies the associated names and settings to each device.*

**After the MikroTik is up-to-date/reset, the following components will be programmed chronologically:**

##### A. MikroTik (Router)

*All site file names are absolute and case-sensitive except for the the routerOS file which must have 'routeros' in its filename as well as the '.npx' extension*

1. Only the following packages get disabled (goes into effect on reboot). The program detects when panels are ready to program when these have been disabled.
  - a) *mpls*
  - b) *ppp*
  - c) *wireless*
2. Cable connections to the WattBox and AP are checked. A message will display if no response is received by either component (only if the user enables the option to program each)
  - a) If no connection is received to either, see the appropriate section here: ([AP](#), [WattBox](#))
3. Information retrieved from MikroTik (via SSH):
  - a) **MikroTik**: MAC, SN
  - b) **AP**: MAC
  - c) **WattBox**: MAC

If SSH is disabled, the program attempts to enable SSH by uploading the 'enableSSH.auto.rsc' file which executes automatically upon upload to the Mikrotik

  - (1) If SSH and FTP are disabled, the Mikrotik API (not API-SSL) is used to enable both services
4. Password is set through SSH matching the password in the '**Password.txt**' file
5. Dynu Script assigns:
  - a) MikroTik public IP address
  - b) DDNS Hostname
  - (1) Taken from the NAF, then applied within the file '**dynuscript.rsc**' (located in program's install location) in the script's line containing "ReplaceWithDynu"

- (2) Allows IST to remotely log into each device once it's associated  
DDNS hostname is added to their service and field tech configures  
modem
- 6. Login file and other files are uploaded according to the state of the options menu  
at the time the panel was added. **Time** and **date** are set to make sure that the  
files have the current date
- 7. MikroTik is then QC'd and the following is checked and corrected:
  - a) DDNS Hostname
  - b) Script files are deleted
  - c) Number of files
    - (1) The MikroTik sometimes has one extra file stored in its RAM (the  
base directory) which gets cleared on restart
  - d) The number of certificates
  - e) Packages are disabled
  - f) RouterOS version (either 6.40.9 or 6.43.14)
  - g) Routerboard firmware version

## **B. Ruckus AP (Access Point)**

- 1. The Zone Info retrieved at the beginning of the process is used to move the AP's  
zone/AP group placement. The SSID of the panel is taken from the NAF to name  
the AP and WLAN Groups.
  - a) The settings that are configured in the APs are:
    - (1) **Name** (Unit SSID)
    - (2) **Description** (Unit SSID)
    - (3) **WLAN Group 2.4GHz + 5.0GHz** (Unit SSID/Guest)
      - (a) If the program can't find a WLAN Group with the name of  
the unit's SSID - a WLAN group with '**Guest**' in the name  
will be selected for that AP instead.
    - (4) **IPv4 Static IP Settings**
      - (a) IP: 10.10.10.254 (.253,.252,.251 for children, etc)
        - (i) If more than two APs are used: the MikroTik will  
need additional NAT rules
      - (b) Netmask: 255.255.255.0
      - (c) Gateway: 10.10.10.1
      - (d) Primary DNS: 10.10.10.1
      - (e) Secondary DNS: 10.10.10.1
  - b) AP configuration is then retrieved, and settings are double checked to  
verify the controller applied the settings correctly.
    - (1) AP SN is saved and stored in program during this process
  - c) Troubleshooting:
    - (1) If the AP isn't on the controller, the program will wait until it finds  
that it's registered then continue.
      - (a) To ensure an AP is directed to the correct controller, verify  
that the DHCP Option '**Option 43**' uses a correct hex value

and Control IP.

DHCP Server		
DHCP Networks Leases Options Option Sets Alerts		
+ -		
Name	Code	Value
Option43	43	0x060ds'173.95.43.154'
Option60	60	'Ruckus CPE'

- (b) The [hex value](#) should refer to the SCG (Smart Cell Gateway) and Control IP.

option 43 hex 060d3137332e39352e34332e313534

Wireless Controller Type: Ruckus Wireless (SCG) Option43 43 0x060ds'173.95.43.154'

Controller IP address(es): (separate by space, comma, colon, semicolon, or new

173.95.43.154

- (c) The Control IP should refer to the first Control Plane (the **Leader** cluster role) within a cluster.

Cluster (4) 4 Online 0 Flagged 0 Offline												
Control Planes												
Configure Delete Restart More												
Name	Status	Management IP	Cluster IP	Control IP	Model	Serial Number	# of APs	MAC Address	Description	Firmware	Cluster Role	Updt
Raleigh-Cluster6-vS21-C	Online	173.95.43.110	172.16.0.84	<u>173.95.43.154</u>	vS2-H	98P4CJ03L...	1397	52:54:00:3D:C5:89	Raleigh-C...	3.6.2.0.57	<u>Leader</u>	77d
Raleigh-Cluster6-vS22-C	Online	173.95.43.111	172.16.0.85	173.95.43.155	vS2-H	98UKQ5UJG...	1223	52:54:00:48:08:05	Raleigh-C...	3.6.2.0.57	Follower	76d
Raleigh-Cluster6-vS23-C	Online	173.95.43.112	172.16.0.86	173.95.43.156	vS2-H	9890QKQJ3...	1198	52:54:00:81:C7:96	Raleigh-C...	3.6.2.0.57	Follower	76d
Raleigh-Cluster6-vS24-C	Online	173.95.43.113	172.16.0.87	173.95.43.157	vS2-H	98F6N8TX40...	1248	52:54:00:59:BC:B1	Raleigh-C...	3.6.2.0.57	Follower	76d

- (2) The program configures APs using the **management IP** of a control plane. In the case a **Control Plane** on the controller is down, the program will move onto the next plane and continue until all available planes on the controller cluster have failed to get logged into.

- (a) If a user loses connectivity to the controller while programming an AP, the program will attempt to retry connection until it successfully finished configuring the AP.
- (3) Only APs connected to a Ruckus Virtual SmartZone controller can be programmed. This is because the program uses the publicly available [High Scale 3.6 API](#)
- (a) If a site uses a Smart Director, the APs must be programmed by hand.
- (4) Due to API limitations, the Primary & Secondary DNS fields within the IPv4 Static settings must be populated. To get around the issue, the Gateway of the MikroTik's Static DNS server is used for both.

### C. WattBox (Power Supply)

1. A unit-specific config (**WattBox.cfg** in the selected site's folder) is uploaded to the WattBox through browser automation using Chrome
  - a) The only unit specific changes made to this config are:

- (1) 'ReplaceWithSSID' on the **hostname**, **wbx\_domain**, **mail\_sender** lines
  - (2) Site password (mDu Project #) on the '**account\_passwd1**' (done in site setup)
  - (3) \* Email domain on the **mail\_sender lines** (done in site setup)
2. If the default authentication is incorrect, the program will try the site password, a previous password that gained access, and the passwords from the master password list

## V. Programming Double APs (Press the **Program Double APs** Button)

*Secondary APs are configured and model specific option is enabled on the parent AP*

1. Before programming secondary APs, the parent panel (AP & WattBox) should already be configured.

Mikrotik MAC	Mikrotik SN	DDNS Hostname	Programmer	Prog. Date	Ruckus MAC	Ruckus SN	Watt Box MAC	Watt Box SN
		"Automation_1.dynu.net"	-					
		"Automation_2.dynu.net"	-					
"MikroTik MAC here"	"MikroTik SN here"	"Automation_3.dynu.net"	My Name	1/1/2020	C8:00:73:17:54:D0	491849003987	"WattBox MAC here"	"WattBox SN here"
		"Automation_4.dynu.net"	-		B479C80387F0			

- a) All child APs should be scanned in (without colons) without a SN as shown above
  - b) The WattBox SN cell for the parent panel needs to be filled in. The program won't retrieve the panel from the list if isn't filled.
2. All APs need to be connected to the controller before they're ready to be configured
    - a) If an AP is found to not be registered on the controller, the program will wait until it's added, then continue configuring
  3. When the button is pressed:
    - a) APs are programmed chronologically in the following pattern:
      - (1) **Model specific option** modified for the parent AP (PoE Operating Mode: 802.3at)
      - (2) **Basic configuration** is set on child APs (see [AP programming config](#)) with its IP set as one lower than the parent.  
Example:
        - (a) Parent IP → 10.10.10.254 (Model Specific 802.3at)
        - (b) Child AP → 10.10.10.253 (Model Specific 802.3at)
        - (c) Child AP → 10.10.10.252 (Model Specific 802.3at)
        - (d) Child AP → 10.10.10.251
    - b) All child AP information is gathered once all APs are programmed, QCd, and then written to the sheet (This can be done in bulk)

# WLAN Cloning Script

The script used to clone WLANs is separate from the UI. It runs on a higher version and different code structure than the UI operates with. There's no UI for the WLAN Cloning script.

The **WLAN Cloning Script** currently only supports standard MAC auth WLANs and **CAN NOT** create WLAN Groups yet. This is a feature that will be added once time is available.

## I. CSV Setup

A. **Save a list of SSIDS** you wish to be created in a .CSV format

1. Save it into the '**wlan**' folder with the file named '**CloneWLANList**'
2. The script will skip blank cells and WLANs containing 'Guest' or 'AP2'. The following formats are acceptable:

A	B
Automation_1	
Automation_2	
Automation_3	
Automation_4	
Automation_5	
Automation_6	
Automation_7	
Automation_8	
Automation_9	
Automation_10	

or

A	B
Automation_1	
Automation_1	
Automation_Guest	
Automation_1	
Automation_2	
Automation_Guest	
Automation_2_AP2	
Automation_3	
Automation_4	
Automation_5	
Automation_6	
Automation_7	
Automation_Guest	
Automation_8	
Automation_9	
Automation_10	

B. The reference WLAN should be created by hand before moving onto the next stage

## II. Script Execution

A. To run the script, users must have the following installed:

1. Python v3.6 (or greater) 64 bit
2. googlesheets library imported
3. Code Editor that can run Python (IDLE comes installed with Python)

B. **Open Ruckus.py**, and edit the '**apSSID**' variable to use the SSID of the WLAN you're referencing (the one created by hand in the beginning).

1. The spelling must be exact

C. **Run the code**



1. Any WLANs that were previously present in the zone or were named 'Guest'/'AP2' will be skipped. These will be shown in the log while the script is running
- D. WLAN Groups must be created and assigned to each WLAN by hand once creation is completed

## Changes to the Company

- Puts more responsibility on Site Setup, site setup should be familiar with the code in case errors occur on the production line
- QC not necessary (Each step rechecks settings on completion)
- Programmers have responsibility to double check Kai-ACK ran correctly
- Margin for human error is smaller, counting errors should only be used for program tracking and debugging purposes
- Higher demand for panels from assembly, more load on packaging
- Movement across the production floor will increase with time as the program develops. Space will become an issue in the long term
  - Time it takes to unplug and QC is eliminated.
  - Existing QC team turns into programmers.
  - Programming time cut in half
  - Program will get faster once more features (DHCP) are added in.
  - Error rate drops drastically.
  - Site setup faster and more accurate.
  - 10,000 Panels a month is achievable.

## Resources

Program is designed for use with Spectrum AWS Distributed hardware.

Components used include:

MikroTik hEX (GL, GR2, GR3)

Ruckus Access Points (H510, R510, R610, T300)

Wattbox W300-IP-3

Services Required:

- Access to the Ruckus SmartZone 3.6 Wireless LAN Controller
  - Ruckus Virtual SmartZone (High Scale) v6\_1 API
- 110S (Setup done outside this software)
- Files/Scripts used to configure MikroTik & Wattbox
  - MTAutoscript.rsc - Resource file featuring the router config of the MikroTik
  - WattBox.cfg - Config file used to set WattBox network and power settings
  - dynuscript.rsc - Resource file that dynamically generates Dynu scripts with the DDNS Hostname taken from the spreadsheet.
- [Master Password list](#)