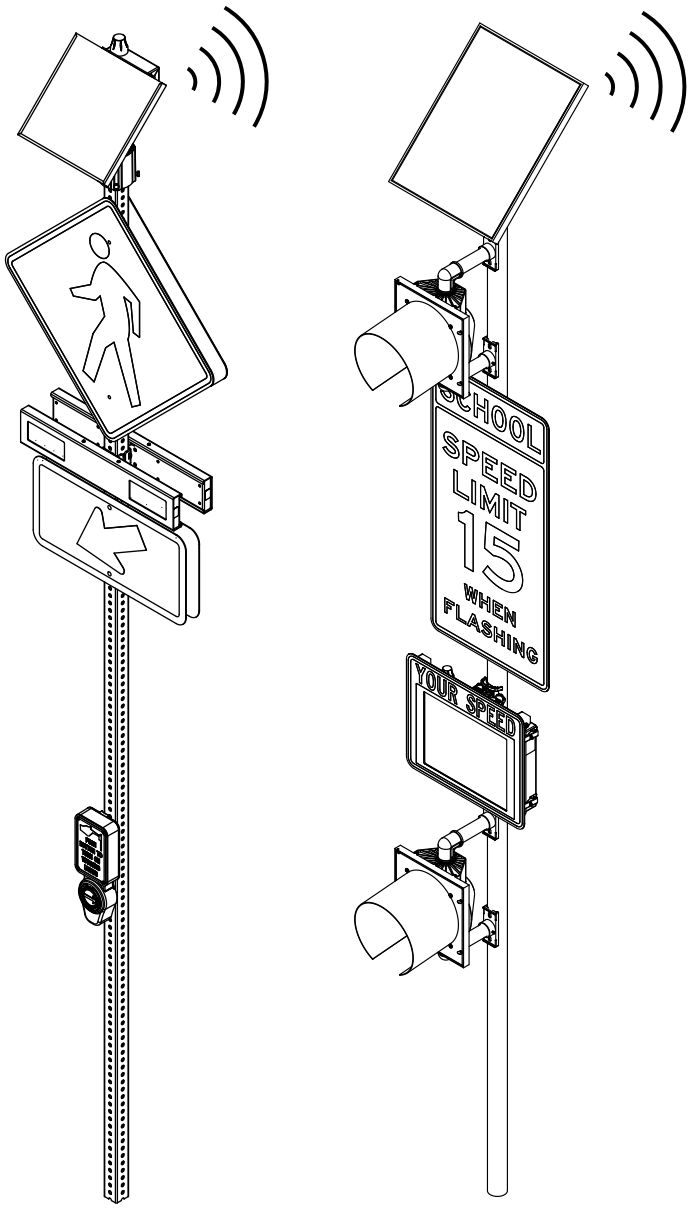
carmanah®
MX Series

MX Field App™
USER GUIDE



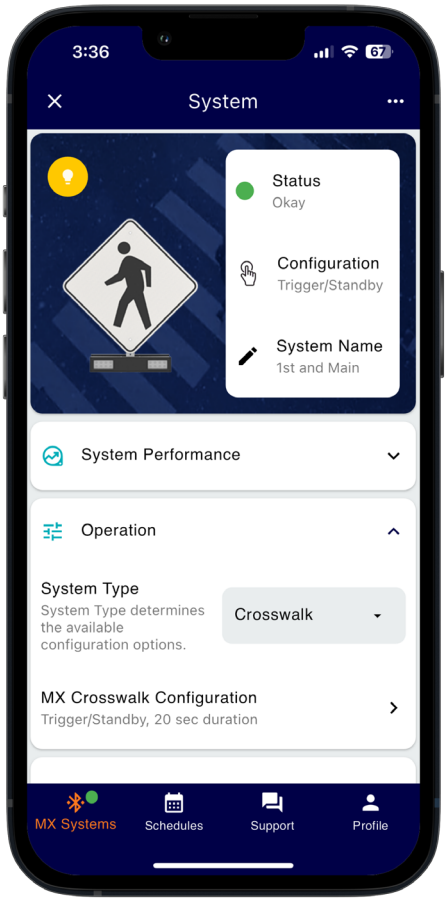


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Table of Contents

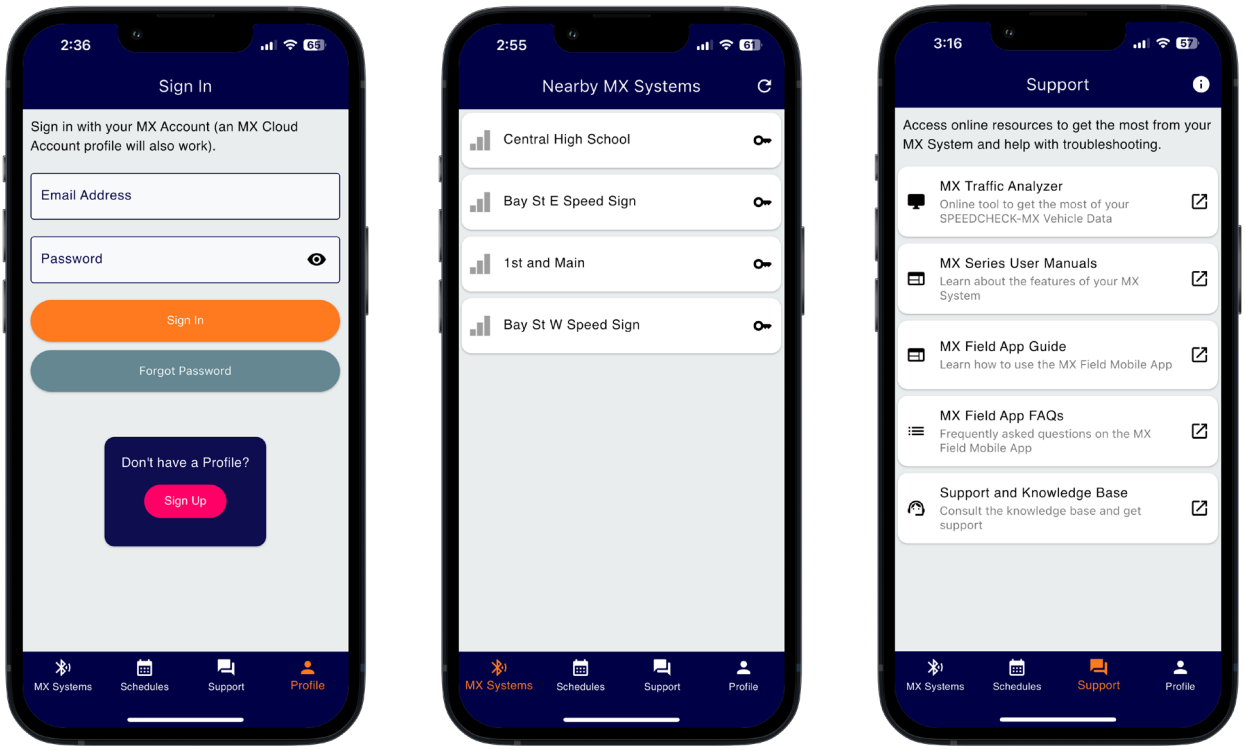
1.0 Introduction

1.1 About the App

The MX Field App wirelessly communicates with MX systems for programming, configuration and diagnostics. It utilizes the Bluetooth® connection between your mobile device and the MX system. Once you download the app, a cellular or Wi-Fi connection is required to create and sign into your Profile.

The MX Field App allows for system programming, scheduling, firmware updates and diagnostics from the ground without having to manually access the system.

The MX Field App is available free of charge on the Apple App Store and Google Play Store for compatible mobile devices.



NOTE To download the MX Series user/install manuals, please visit carmanah.com/mxdocs.

NOTE The images and descriptions in this document feature the iOS version of the app. The iPadOS and Android versions will be very similar.

NOTE All MX systems come embedded with a cellular radio for remote connectivity. For more information on MX Cloud, see support.carmanah.com.

NOTE MX Series systems include beacons (various types) and radar speed signs. This document covers all variations of MX systems.

1.2 App Installation

Download and install MX Field App from the Apple App Store or Google Play Store:

Download on the App Store GET IT ON Google Play

The following are the minimum device requirements to download and use the app:

iPhone (iOS®) Requirements	iPad (iPadOS®) Requirements	Android Requirements
iOS version 13 or newer	iPadOS 13 or newer	Android 10 or newer

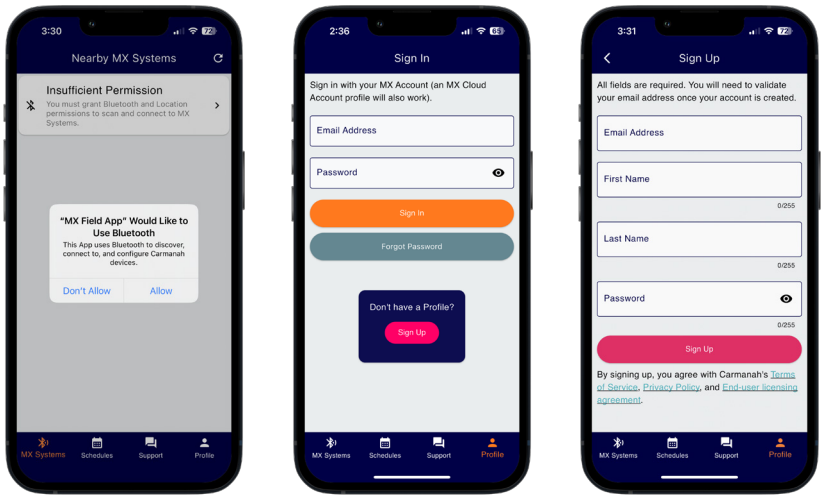
NOTE Mobile devices require Bluetooth Low Energy (BLE). Older hardware and/or software than listed above may be compatible but are not officially supported or tested by Carmanah.

2.0 Initial Setup

2.1 Self-Serve Profile Creation and Signing In

Upon opening the app you will be required to create a Profile. A valid email is required to verify this process.

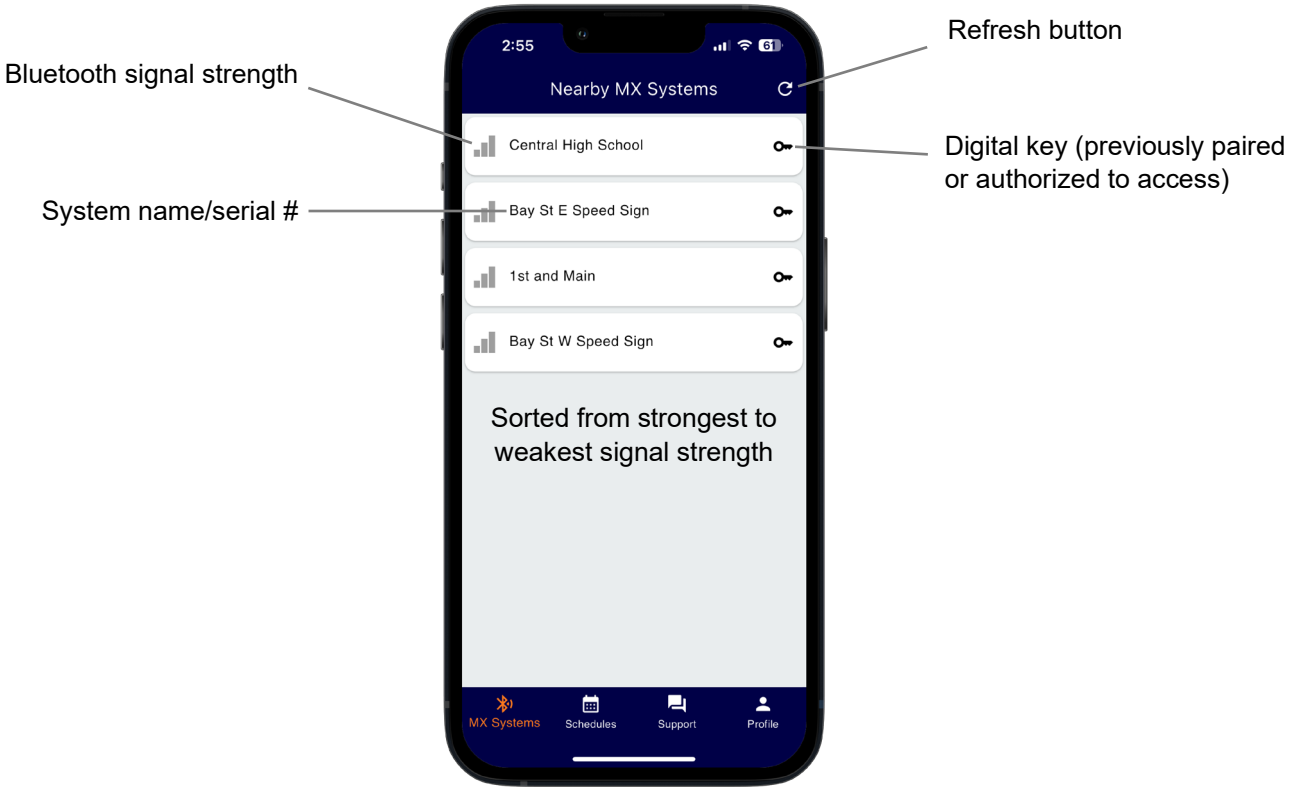
1. Tap on Allow to give permission to the app to access your phone's Bluetooth connection. If this is not done you will not be able to scan and connect to MX systems.
2. Tap on Sign Up.
3. Fill out all fields in the form and tap Sign Up.
4. Upon successful creation tap on OK.
5. Check your email to validate your Profile.
6. Return to the app. Enter your email address and password. Tap Sign In.



2.2 Pairing to the MX Series System

Once signed in, the app will take you to the Nearby MX Systems screen. On this screen, the app will automatically scan and detect any nearby MX systems (up to approximately 100' or 30 m away). To scan manually, tap the “refresh” button (↻) in the top right or swipe down on the screen.

For best performance, stand near the system when pairing.

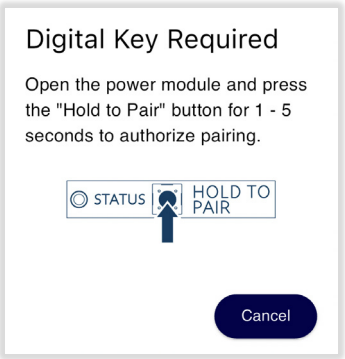


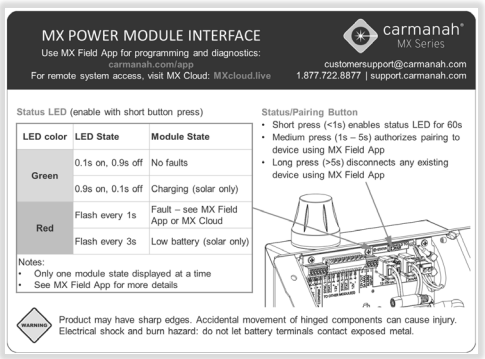
Nearby MX systems will be presented on this screen with the following information:

- Each MX system will display the system’s name or serial number.
- Each MX system will have a “reception” icon (📶) to the left that represents the Bluetooth signal strength.
- MX systems will be displayed from strongest to weakest signal strength.
- MX systems may show a “key” icon (🔑):
    - Key icon present – a “digital key” has been received from a previous pairing or directly from MX Cloud as an authorized user to the account. A current MX Cloud subscription and Internet connection is required to receive a digital key from MX Cloud.
    - Key icon missing – requires the use of the pairing button (see Pairing Process).
- If the system is linked with one or more other MX systems, there will be a “Linked” label (Linked). This is color coded to show which MX systems are linked with each other in the immediate vicinity. Color displayed can change and is randomized. See Section 3.4 for more information.

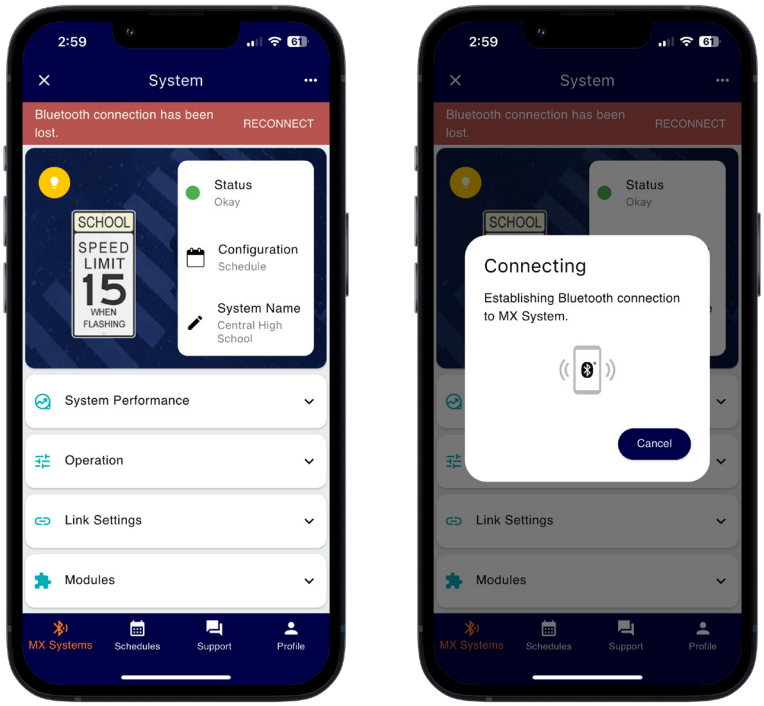
Pairing Process

Gain access to the power module and hold the pairing button for 1 – 5 seconds. This provides your mobile device with a digital key to access the system via the app. The app will retain the digital key for 14 days without having to sign in again. Once your session has expired you will simply need to sign in with your credentials again and the app will automatically download all the digital keys for systems you have paired with previously. See Section 10.1 for more information.





Once paired and connected, the app will automatically disconnect you from the system if you have been inactive for too long. Tap on the Reconnect button to resume your connection.



NOTE If a system is paired with another user's mobile device, it will not be available on the Nearby MX Systems screen. You may need to tap on the refresh button or swipe down on the center of the screen to check for new systems.

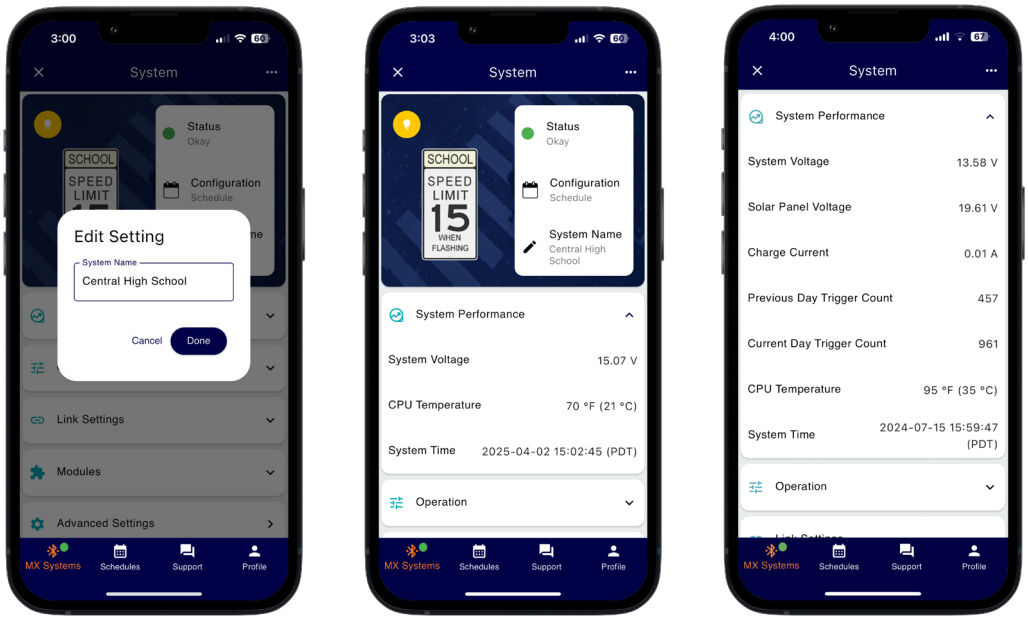
NOTE The pairing process is not required if you are an authorized user in the MX Cloud account this system belongs to.

2.3 System Setup

Once paired, you will be taken to the System screen. From here, you can change default settings and see the system's status and parameters.

Initial Setup

1. Perform a firmware update, if available – see Section 3.10.
2. Rename system – see Section 3.1.
3. Ensure system/battery voltage is reporting properly – see Section 3.2.
4. For solar systems, ensure solar panel voltage is reporting properly – see Section 3.2.
5. Follow one of the application types for your install:
    a. Crosswalk beacons (R920-MX) – see Section 5.2.
    b. School zone beacons (R829-MX) – see Section 5.3.
    c. 24-hour beacons (R247-MX) – see Section 5.4.
    d. Radar-triggered warning signs (R247-MX) – see Section 5.5.
    e. Chevron warning signs (CHEVRON-MX) – see Section 5.6.
    f. Wrong-way driver warning signs (WWD-MX) – see Section 5.7.
    g. Radar speed signs (SPEEDCHECK-MX) – see Section 5.8.



NOTE Typical adjustments to the default settings include: linking systems (synchronized flashing), flash duration length, nighttime intensity percentage, changing the activation mode (if applicable), and vehicle speeds (radar speed signs).

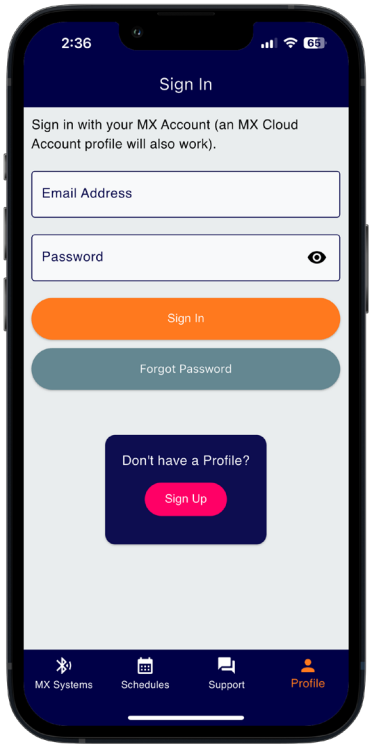
NOTE If a firmware update is available it will be noted on the System screen. It is recommended to update the firmware for all systems on site when available.

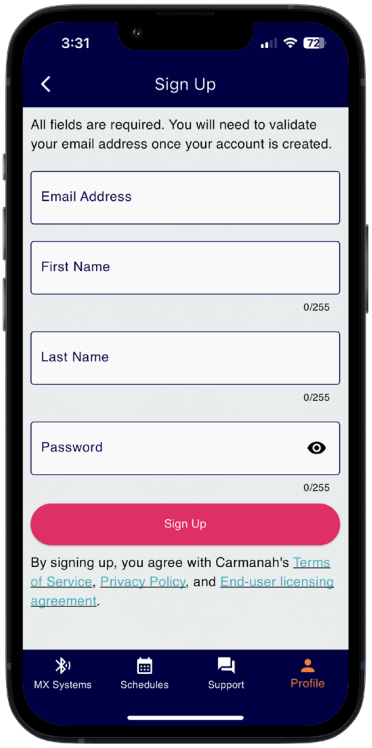
2.4 Sign In & Sign Up

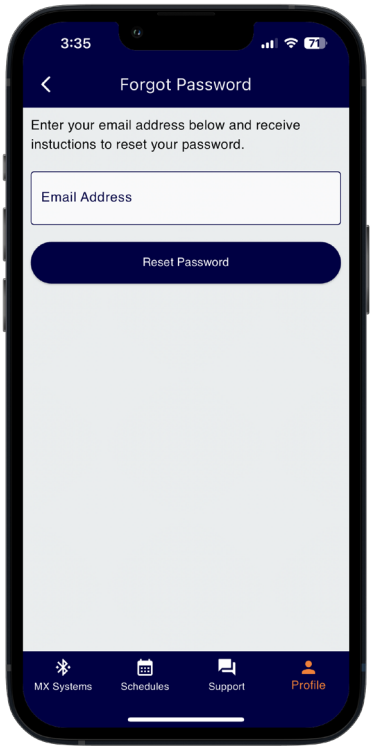
The Sign In screen will be the first to appear when opening the app. If you do not already have a Profile, you will be required to tap on the Sign Up button.

Fill out the information required to sign up for a Profile. Once you have validated your Profile using your email address you can proceed to signing in using your credentials.

If you have forgotten your password, you can tap on the Forgot Password button and follow the instructions to reset it.





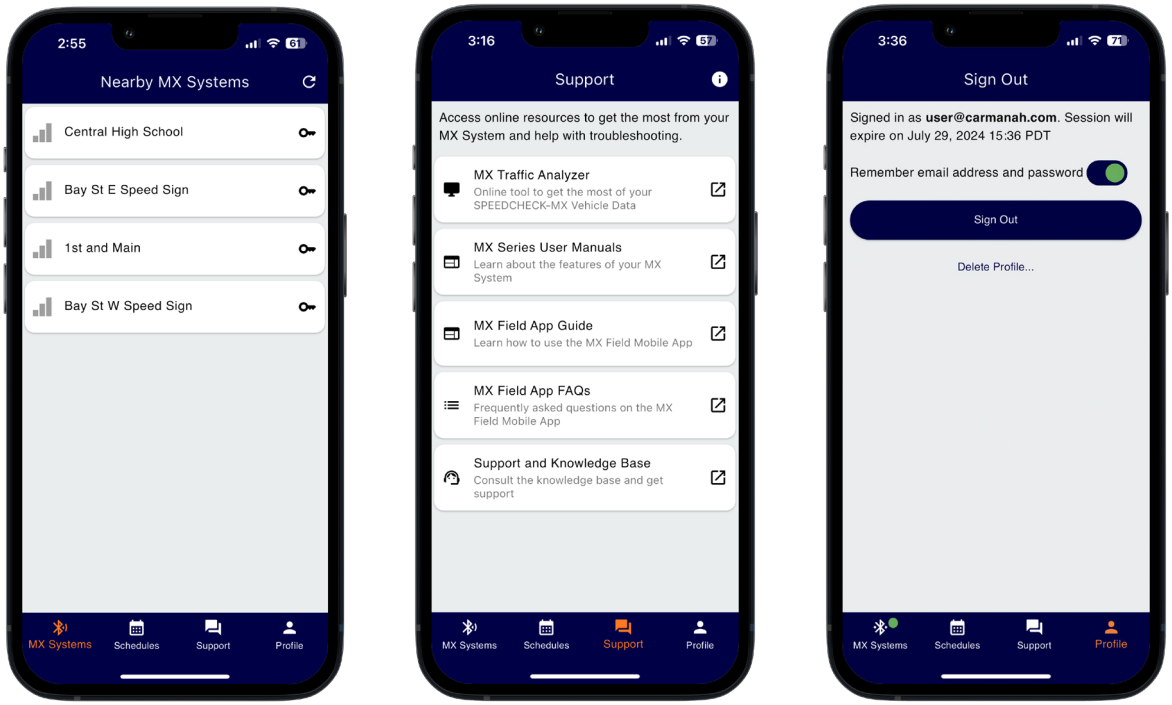


2.5 Nearby MX Systems Screen

The Nearby MX Systems screen is available once signed into your Profile. The app will display all detected MX systems in the immediate vicinity and will be sorted by signal strength. The MX system with the strongest signal strength will be at the top of the list. MX systems are automatically detected upon first entering this screen. The list can be refreshed manually by tapping the refresh button in the upper right or by swiping down on the screen.

At the bottom of the screen is a dock with additional functions:

- **MX Systems** – back to the main screen to scan for available systems.
- **Schedules** – manage your school zone schedules
- **Support** – access links to various manuals, FAQ and live support. See Section 9.1 for more information.
- **Profile** – manage your session and sign out. See Section 10.1 for more information.



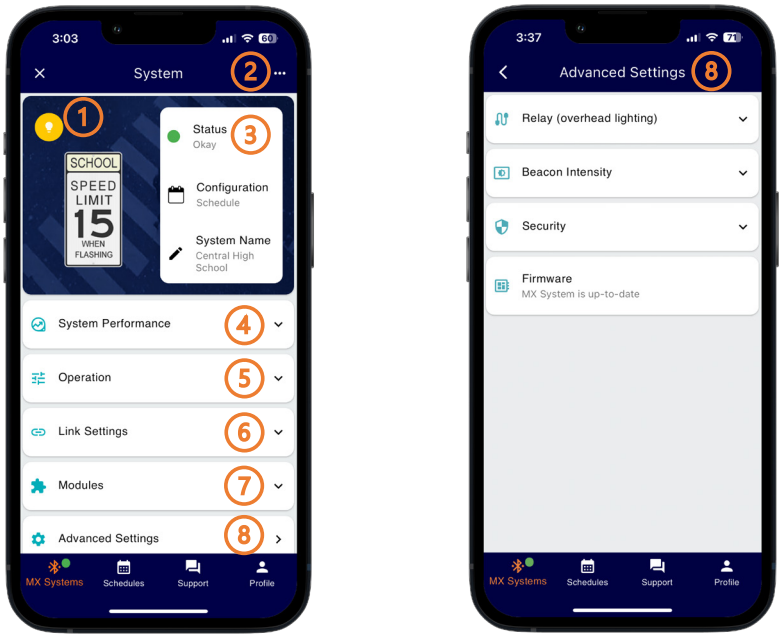
NOTE Follow the pairing procedure in Section 2.2 to connect to the system. When paired to a system, there will be a green dot next to the MX Systems icon in the bottom dock.

NOTE An MX system will not appear in the list if another mobile device is paired with it.

3.0 Beacon Systems

3.1 System Screen

The System screen will appear after you have successfully paired with a system. This screen will contain a variety of read-only statuses/statistics and configuration options. Below is a representation for beacon systems.

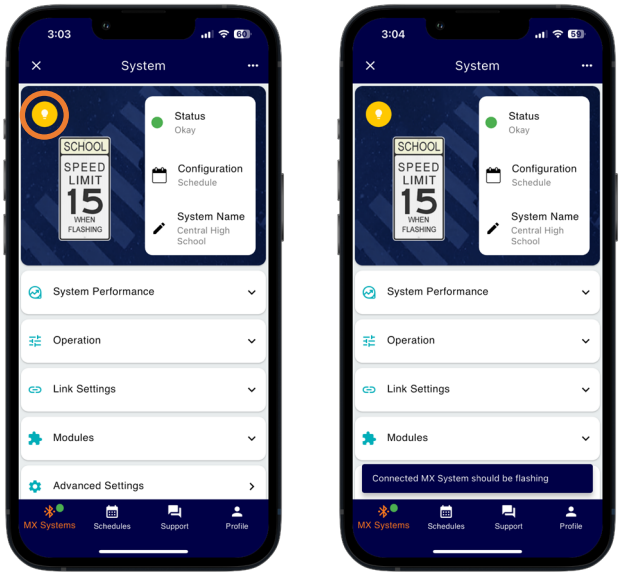


1. Identify System – temporarily activates the flasher module to verify which system you are paired with.
2. Reboot System – performs a soft reboot on the system.
3. System Information:
    a. Status – displays current system status.
    b. Configuration – displays current activation mode.
    c. System name – displays system name.
4. System Performance drop-down – provides read-only performance data.
5. Operation drop-down – provides system type and operation level settings. These options will change based on which activation mode you are in, and which flasher module(s) are connected to the system. Rectangular rapid flashing beacons (RRFB modules) can only operate in Trigger/Standby activation mode.
6. Link Settings drop-down – provides wireless settings to link systems together for flash synchronization.
7. Modules drop-down – shows the power module and flasher module(s) connected to the system.
8. Advanced Settings – additional functions.

NOTE Swipe down on the screen to refresh the read-only values. Tap on the “close” button (✕) in the top left to disconnect from the system and return to the Nearby MX Systems screen.

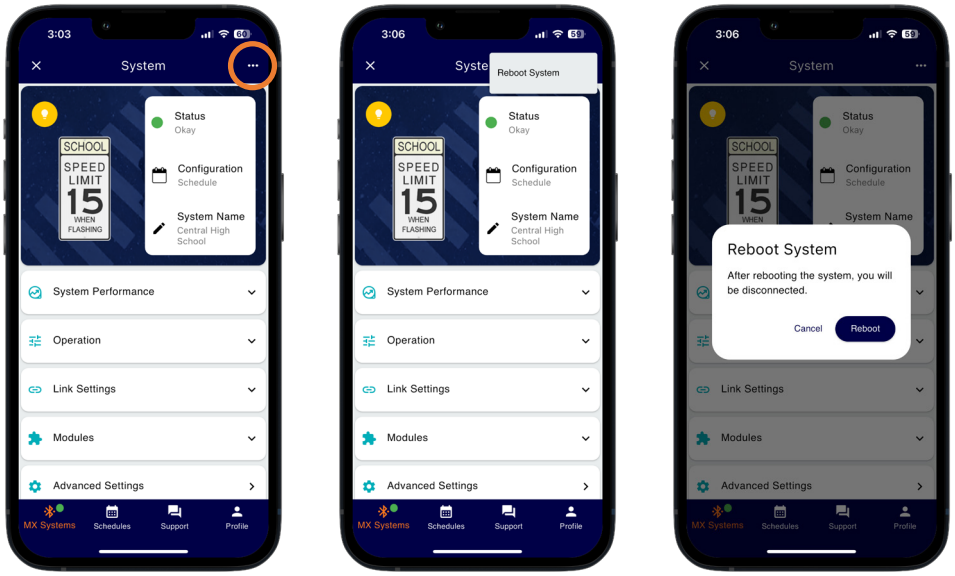
Identify System

Tap on the yellow light bulb in the upper left corner to verify the system you are paired with. The flasher module will quickly blink three times, even if it is already flashing its standard pattern. This is useful for confirming you are paired with the correct system.



Reboot System

Tap on the horizontal ellipsis (•••) in the upper right corner, tap on Reboot System and then tap Reboot to perform a soft reboot. This is useful if without access to the power module. If you have removed a flasher module from the system without turning power off to the system you can use this to clear a Flasher Removed fault, if present.



NOTE Rebooting the system will cause the GPS and date/time to reset. The system will reacquire the correct date and time within a few minutes.

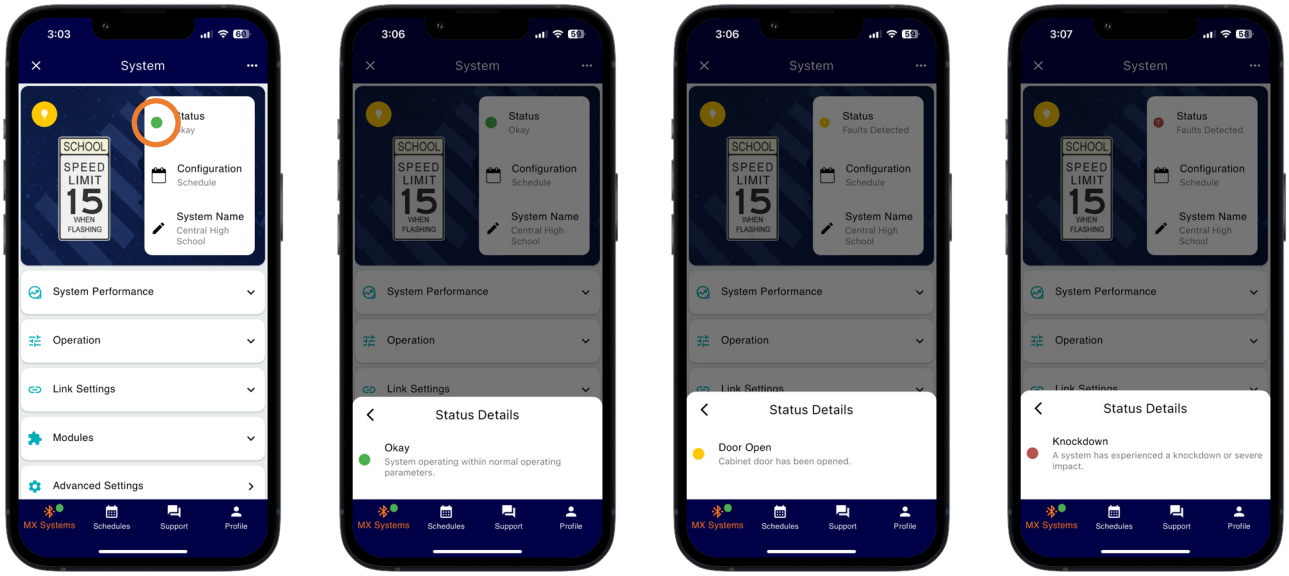
System Status

The system status is color-coded for quick and easy analysis:

- Green = okay
- Yellow = warning (abnormal condition)
- Red = critical fault

If the color is yellow or red, there will be a number inside of it. This shows how many warnings/critical faults are detected. Under normal circumstances there will be a green circle with the word “Okay” for the status.

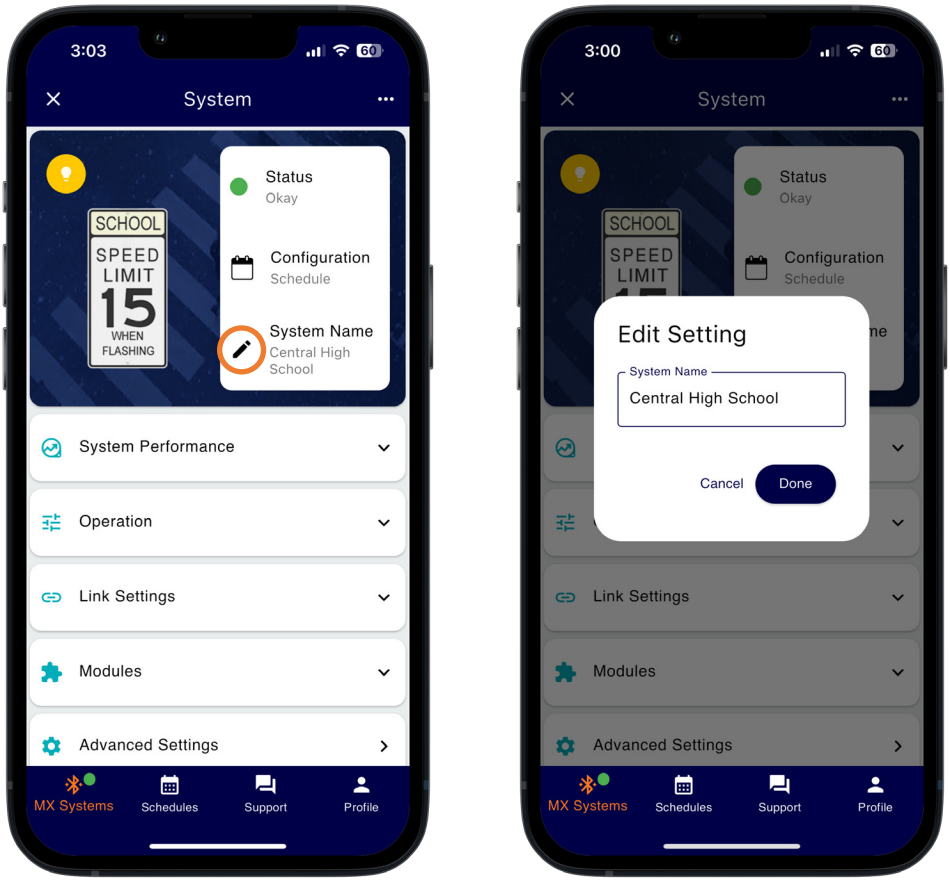
Tapping on Status in the upper right will bring up additional details about each fault detected. Swipe down on the Status Details pop-up or tap on the screen to hide the fault description.



NOTE For more information on the list of potential faults and how to resolve them, please visit support.carmanah.com.

System Name

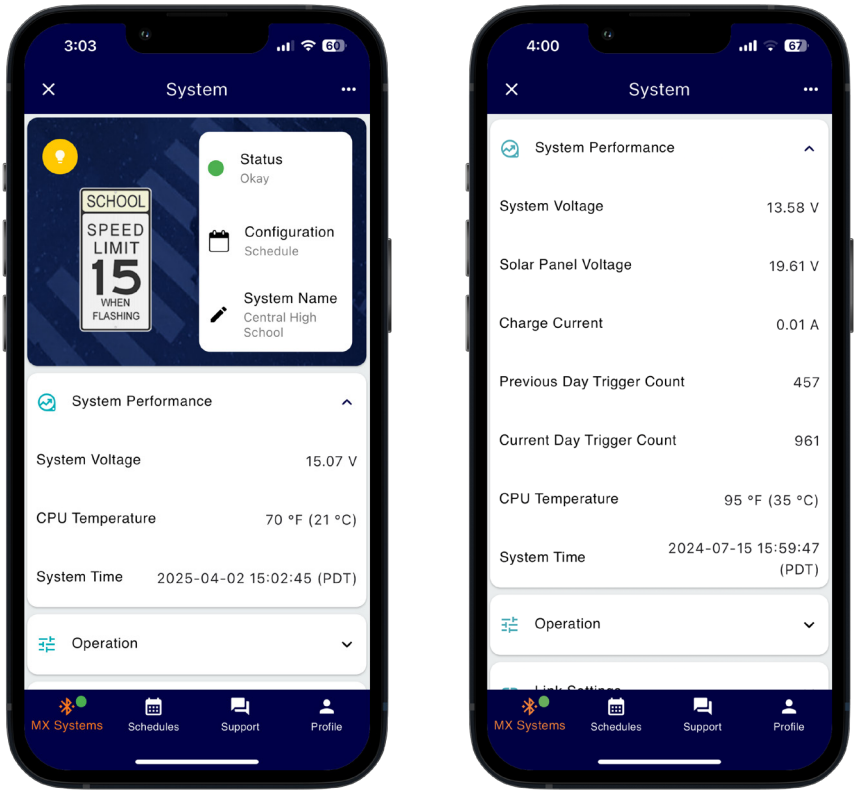
1. Tap on the “edit” button (✎) next to the system name.
2. Enter a system name to make it easier for system identification. The system will now show up with this name in the MX Field App and MX Cloud.
3. Tap Done to complete.



3.2 System Performance Drop-Down

The System Performance drop-down menu provides the following information:

- System voltage – current battery (solar) or system (AC) voltage reading.
- Solar panel voltage – current solar panel reading (solar only).
- Charge current – current charging current reading (solar only).
- Previous day trigger count – the number of trigger activations from the previous day. This applies to systems in Trigger/Standby activation mode only.
- Current day trigger count – the number of trigger activations for today. This applies to systems in Trigger/Standby activation mode only.
- CPU temperature – current system temperature reading.
- System time – current date and time reading taken from GPS.



NOTE Swipe down on screen to refresh the read-only values.

NOTE Information shown will change depending on activation mode and whether solar or AC powered.

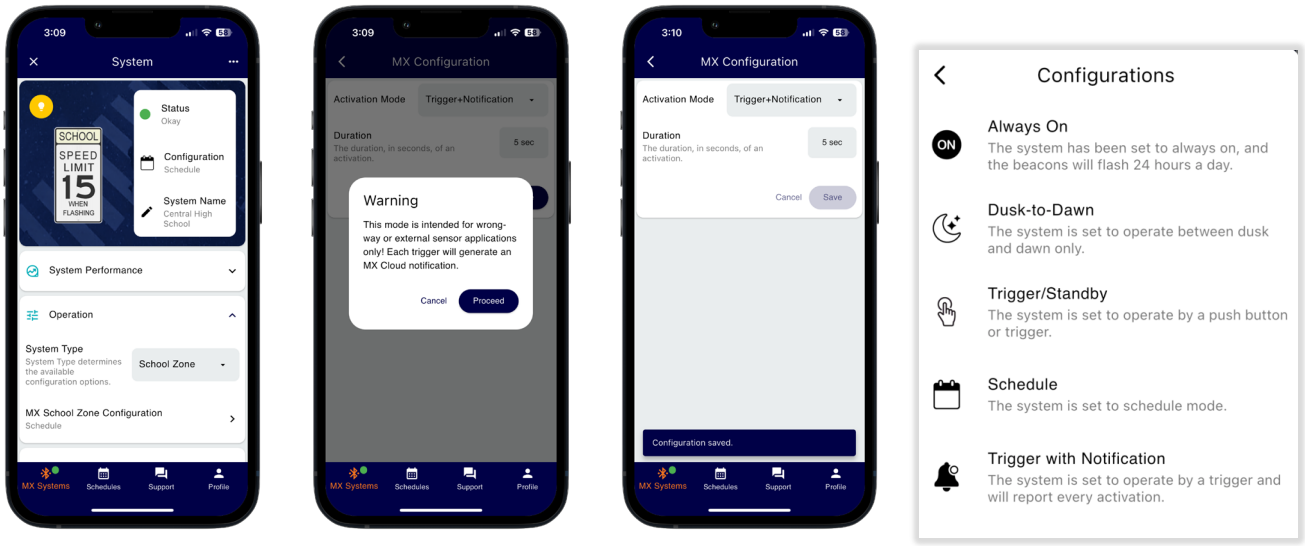
NOTE Trigger count is calculated by the total activation time divided by the flash duration set.

3.3 Operation Drop-Down

The Operation drop-down menu provides the following functions for configuring how the system operates:

- System Type – choose your application.
  - Crosswalk, School Zone, Stop Sign, Warning Sign, or Chevron Sign.
- Activation Mode – sets the way the system will operate.
  - Always On – beacon(s) will flash 24 hours a day.
  - Dusk-to-Dawn – beacon(s) flash continuously during nighttime only.
  - Trigger/Standby – beacon(s) are activated by a push button or external trigger, such as a pedestrian sensor.
  - Trigger with Notification – beacon(s) are activated by an external trigger or sensor. An SMS and/or email alert is sent each time the system is triggered. Requires an MX Cloud profile with notifications enabled and an active MX Cloud subscription for the system.
  - Schedule – beacon(s) flash based on a user generated schedule.
- Duration – sets the flash duration length (Trigger/Standby or Trigger with Notification mode only).

See Section 5 for programming the system based on the application type. Tapping on the activation mode programmed in the upper right will bring up an explanation of each mode.



NOTE Trigger with Notification is intended to be used in applications with an external trigger or sensor: such as wrong-way driver, high water sensor…etc.

NOTE System Type is restricted based on MX Modules installed.

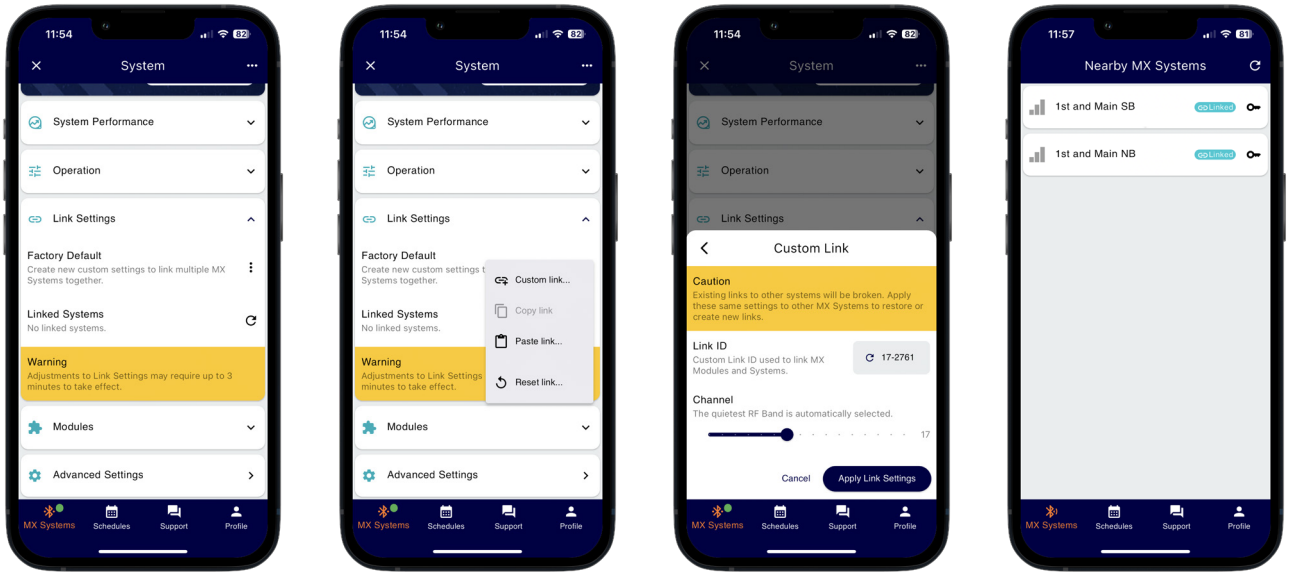
3.4 Link Settings Drop-Down

The Link Settings drop-down menu allows linking two or more systems with each other for synchronized flashing. Linked systems share the same wireless settings, which include: Link ID, Channel and Link Key. Tap on the vertical ellipsis (⋮) to expose the following functions:

Custom Link/Factory Default/RRFB Default – unique network settings.

- Custom Link – generates a random link ID/link key and chooses the optimal channel to form a custom link. These settings are automatically copied to link with another system.
    - Tapping on the Link ID # will allow manual randomizing the ID. Adjusting the channel is typically not required.
- Copy Link – copies the existing settings to apply to another system to form a link.
    - Only available if system is not on the Factory Default settings.
- Paste Link – exposes all systems that have been copied to apply to another system to form a link.
- Reset Link – resets wireless settings to factory default.

Linked Systems – a list of all nearby systems that are linked to the system you are paired with. Tap on the refresh button to the right to update this list.



NOTE If you see a gray Linked icon with a flag (Linked), that signifies the RRFB system(s) are using the factory link settings and it is **strongly recommended** to manually link these.

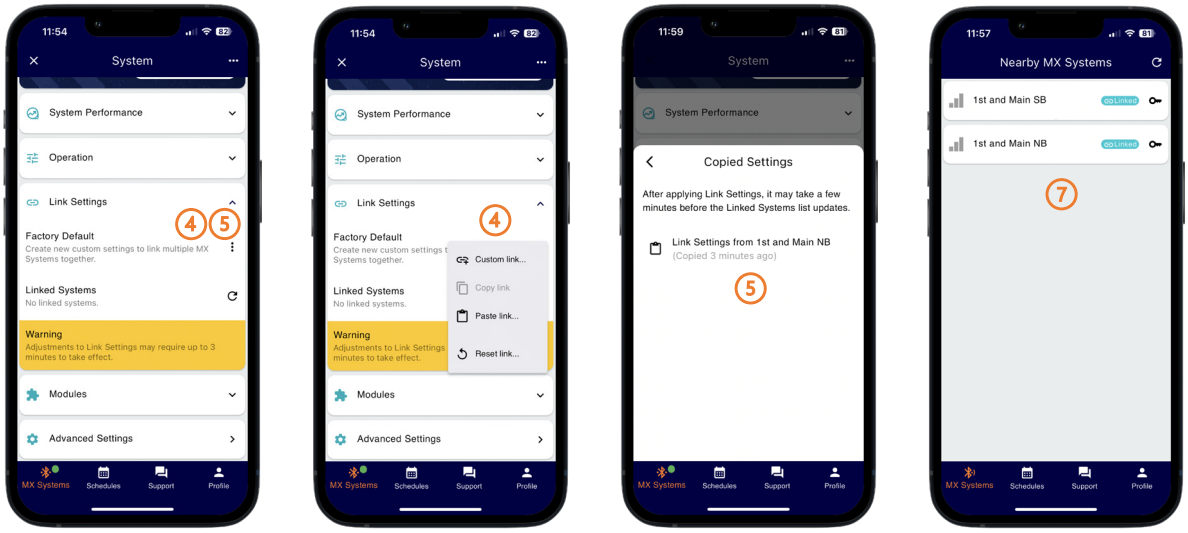
Linking Systems

RRFB flasher modules are unique. Once a system detects that it is operating an RRFB flasher module, the system will apply default RRFB link settings. All RRFBs within range (line of sight up to 1000') will be automatically linked together and activate each other when using these default RRFB link settings. Establishing a new link is recommended for each unique crossing to avoid crosstalk with other nearby crossings using MX systems.

Creating a New Link

To link MX systems together, follow the steps below:

1. Pair with one of the systems to link.
2. Tap on Link Settings.
3. Confirm there are no linked systems currently. Making any changes will break an existing link.
4. Tap on vertical ellipsis, Custom Link and then Apply Link Settings.
5. Disconnect from the system and pair with the next system to link to. Navigate to Link Settings, tap on the vertical ellipsis and then Paste Link. The app will list all systems you have copied settings from. Choose the one you wish to link to.
6. Perform step 5 for all additional systems to link.
7. The Linked Systems list will take a few minutes to show all linked systems. There will also be a color-coded linked label for these systems on the Nearby MX Systems screen. All systems linked will now have synchronized flashing.



NOTE To break a link, create a new custom link as per the instructions above. It will take a few minutes to update and reflect that the system is no longer linked with any other system.

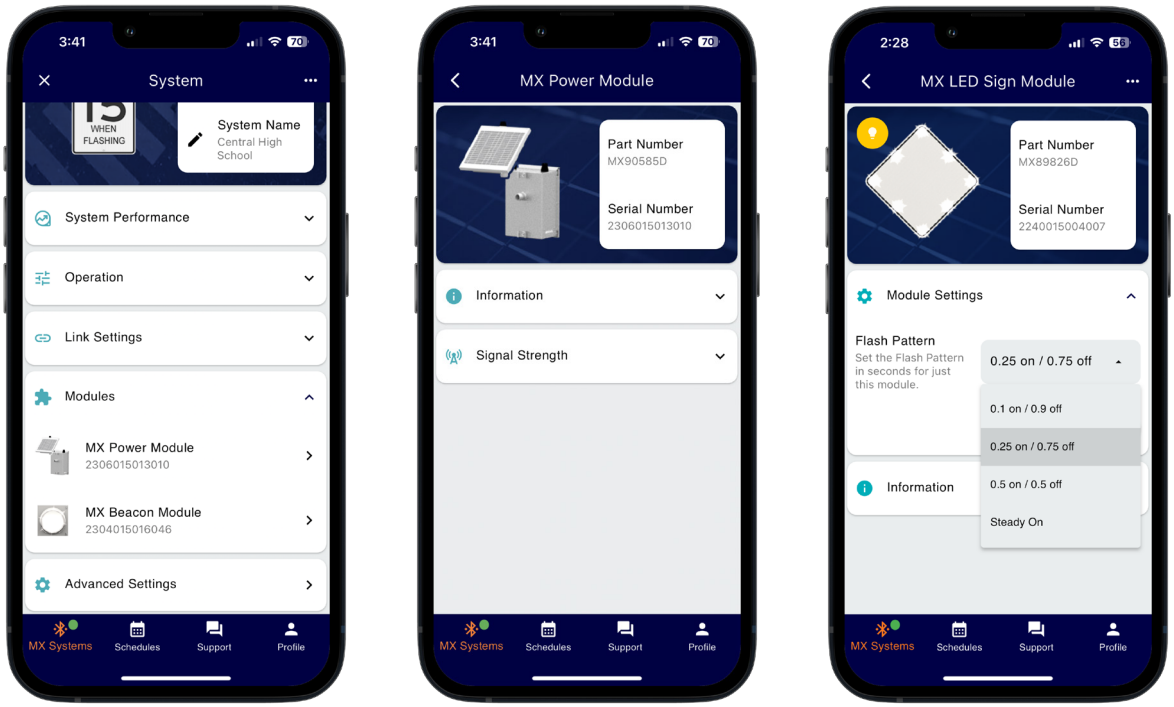
NOTE RRFBs are unique and automatically link to all available local RRFB systems. While this is convenient, we still **strongly recommend** you manually link every individual RRFB crosswalk. Manual linking will also help with accurate activation data in MX Cloud across all systems at the crossings.

3.5 Modules Drop-Down

The Modules drop-down menu lists the power module and flasher module(s) connected to form the system:

- Power module – solar or AC power module.
- Flasher module – flasher type connected to the system (e.g., RRFB, round beacon, LED sign, chevron).

Tapping on a power module or flasher module will bring up their individual information screens. This will display a list of general information regarding that module.



NOTE System time and location (latitude/longitude) can be found under MX Power Module. This is useful to confirm the system has a proper GPS fix with date/time from the cellular network.

LED Signs Only

Tap on Module Settings and select the flash pattern as desired for your application.

- 0.1s on / 0.9s off
- 0.25s on / 0.75s off (default)
- 0.5s on / 0.5s off
- Steady on

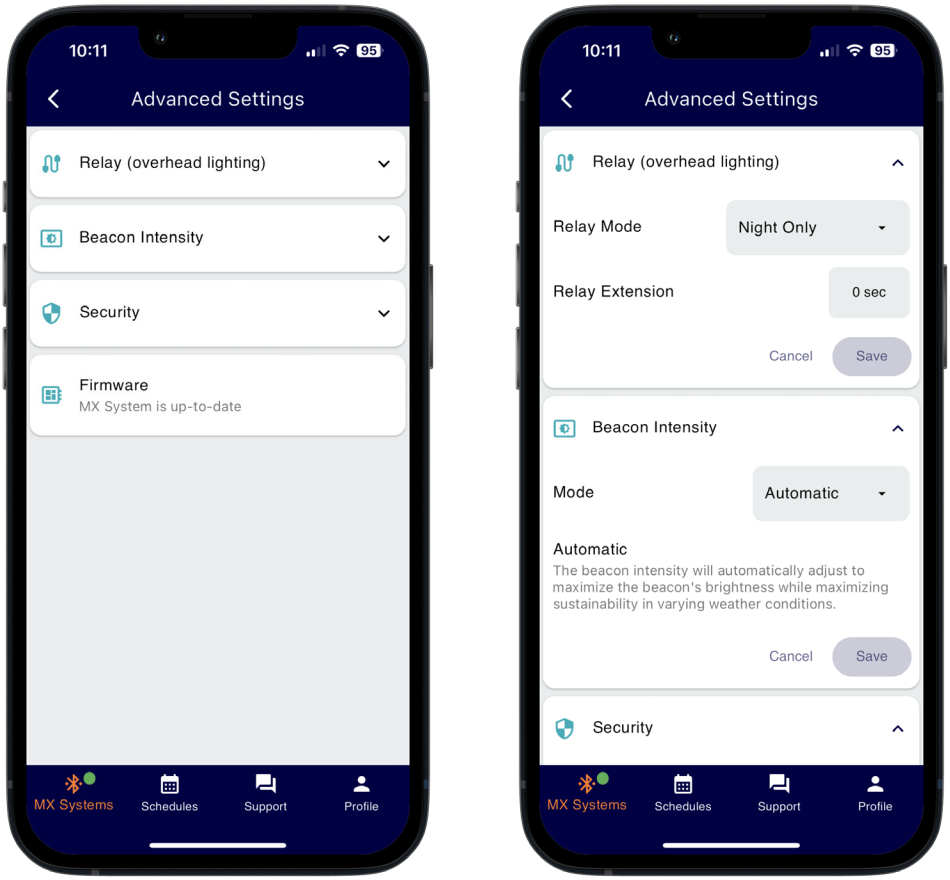
NOTE To reset the LED sign flash pattern back to factory default, tap on the ellipsis in the upper right hand corner when on the MX LED Sign Module screen and select Factory Reset.

3.6 Advanced Settings Screen

The Advanced Settings screen contains the following additional functions:

- Relay (for overhead lighting or other third-party devices)
- Beacon Intensity
- Security
- Firmware

Tapping on any drop-down menu will expose additional functionality.



3.7 Relay Drop-Down

The Relay drop-down menu provides settings meant for overhead lighting use (typically for crosswalks). This utilizes the integrated DC relay in all power modules. When the beacon is flashing, the relay output becomes active depending on which mode is selected.

Relay Mode

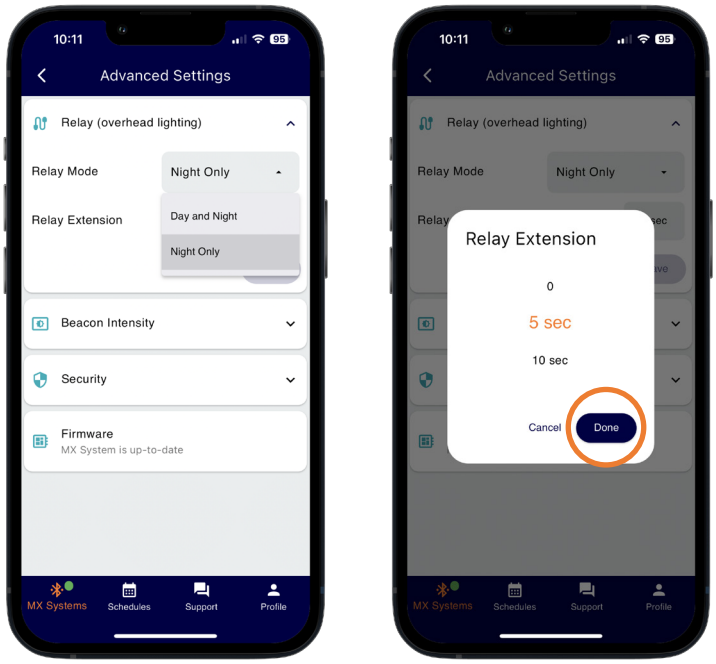
Choose between the following:

- Day and Night – the overhead light is active at all times, when the beacon(s) is flashing.
- Night Only – the overhead light is active at night only, when the beacon(s) is flashing.

Relay Extension

This is the amount of time to keep the overhead light active after the beacon(s) stops flashing. Extension duration can be set between 0 – 60 seconds.

To confirm the changes, tap Done and then Save to complete.



NOTE It is recommended to leave the relay mode in Night Only. This ensures the lighting fixture only comes on at night when the beacon(s) is flashing. For solar systems, this reduces the power requirements.

NOTE The integrated DC relay uses the 12V OUT (5A MAX) terminals on the power module board. Refer to the appropriate **LEVEL 2** install guide for more information.

NOTE Check the date/time to ensure it is accurate under the System Performance drop-down. Refresh the screen by swiping down to load the latest parameters. If require, perform a soft reboot to have the system reacquire new date/time settings (see Section 3.1 and Section 3.2).

3.8 Beacon Intensity Drop-Down

The Beacon Intensity drop-down menu provides settings to adjust daytime and nighttime intensity values. By default, the system will be in Auto mode.

Intensity Setting

Most users will benefit from leaving the system in Auto mode. In Auto mode the system will dynamically adjust brightness to retain system sustainability, while attempting to achieve factory default brightness.

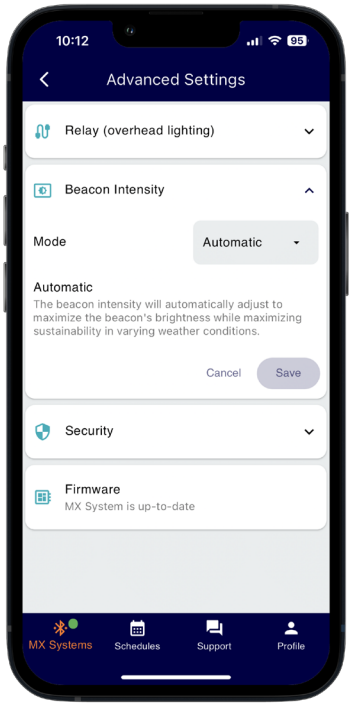
The main function of Manual mode is to override the Auto settings to force a specific intensity (a percentage of the factory default value). This is typically to reduce the intensity if it is too bright. Using Manual mode may compromise sustainability for solar-powered systems.

NOTE In Manual mode, parameters that are visible to the user for adjustment are specific to the flasher module(s) connected to the system.

Auto Mode

The beacon output intensity will automatically adjust to maximize the beacon's brightness while ensuring sustainability in varying weather conditions.

- Meets MUTCD Standards.
- Automatic Light Control (ALC) enabled – allows the system to reduce the beacon brightness in response to low battery states of charge. RRFBs will not use ALC to ensure that SAE J595 standards are adhered to.
- Applies sustainable daytime intensity based on flasher module connected.
- Applies sustainable nighttime intensity based on flasher module connected.

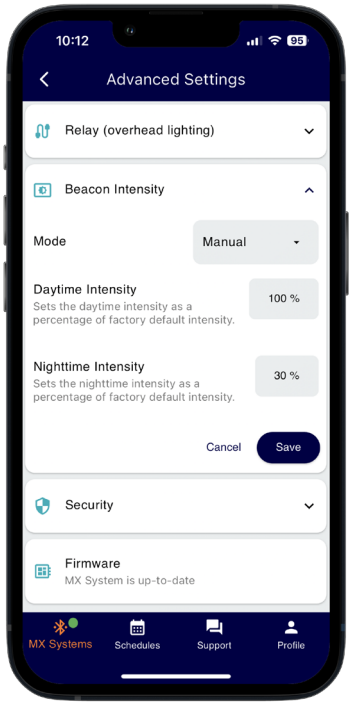


Manual Mode

The beacon output intensity will be fixed at the percentage set by the user. This is a percentage of the factory default value.

- Automatic Light Control (ALC) disabled – system runs at a fixed intensity.
- User adjustable daytime intensity (percentage of factory default value).
- User adjustable nighttime intensity (percentage of factory default value).

NOTE Refer to the **LEVEL 1** System Planner for more information on MX Series default settings, such as flash patterns, intensity settings and out-of-the-box functionality at support.carmanah.com.



3.9 Security Drop-Down

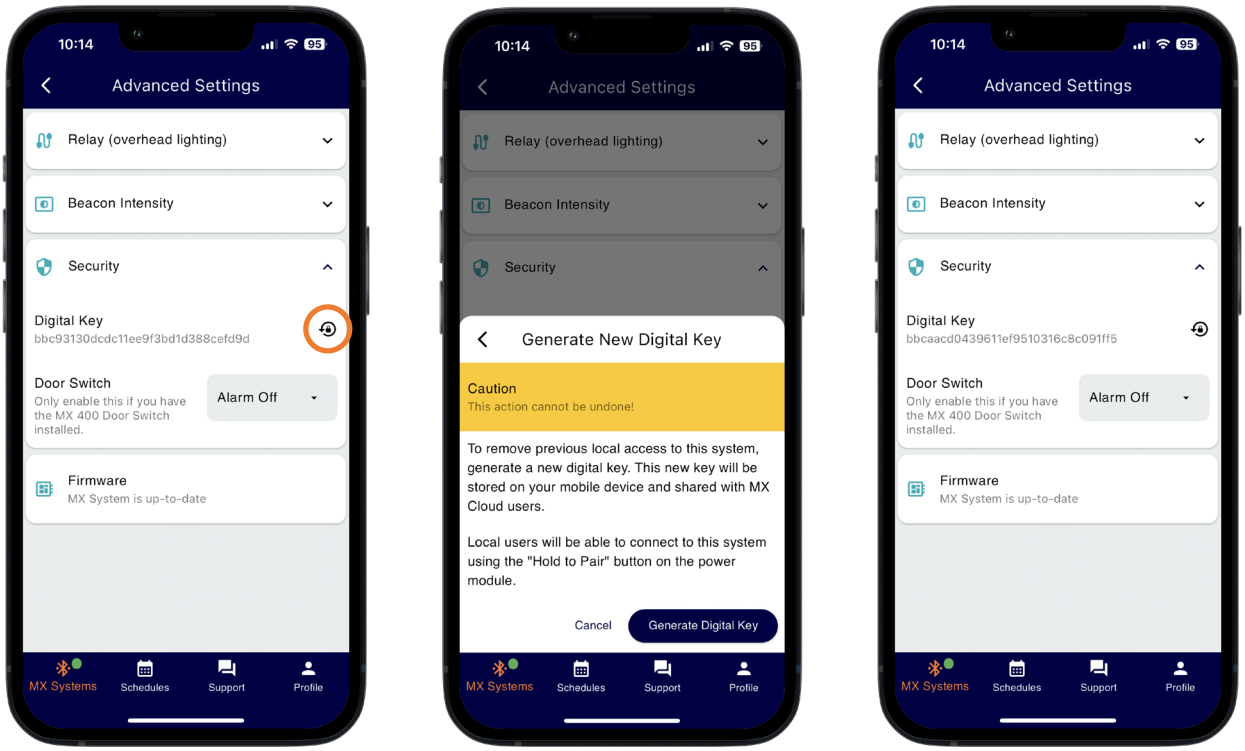
The Security drop-down menu contains the following additional functions:

- Digital Key – shows the unique digital key.
- Door Switch – shows whether the MX 400 Door Switch alarm is enabled or not.

Digital Key

Tap on the “generate” icon ( ) to the right to bring up a dialog box to obtain a new digital key. Generating a new digital key for any or all systems is a way to ensure your systems are secure. Use this function if there is a user that is no longer with your organization, or you would like to cycle the digital keys to ensure any unauthorized user(s) should not have local access.

- Tap on the Generate Digital Key button. You will now see a new key shown.
- The new digital key is updated on the MX system, your mobile device and MX Cloud (if applicable).
- Users with the old digital key will no longer be able to automatically pair with this system and will require physical access to the system for pairing using the pairing button on the power module. See Section 2.2 for more information.
- Authorized users on the MX Cloud account will automatically receive the new digital key through the app. This requires an active cellular or Wi-Fi connection on your mobile device.

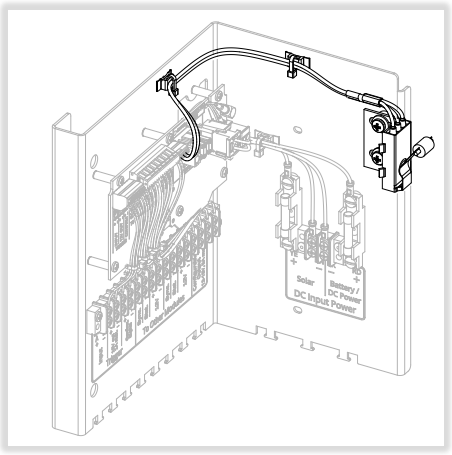


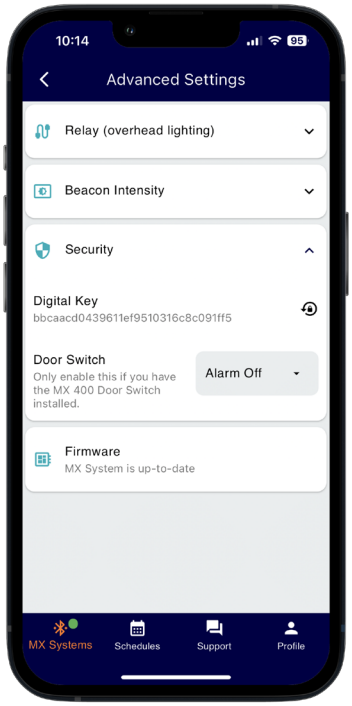
NOTE The digital key will be unique. Example above for illustrative purposes only.

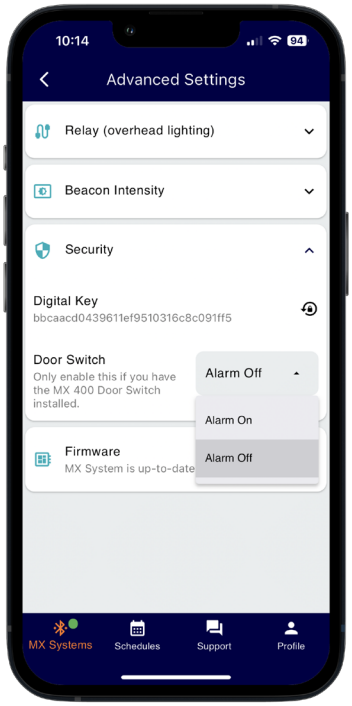
Door Switch

If you have the MX 400 Door Switch Kit, you need to enable its function under this menu. Tap on the menu to the right and change the setting to Alarm On.

This kit is intended specifically for MX Cloud users. The system will create an alert each time the cabinet door is opened and provide confirmation whether it was closed properly.







NOTE Do not enable this function if you do not have the door switch installed. Doing so will create an erroneous alert.

3.10 Firmware Screen

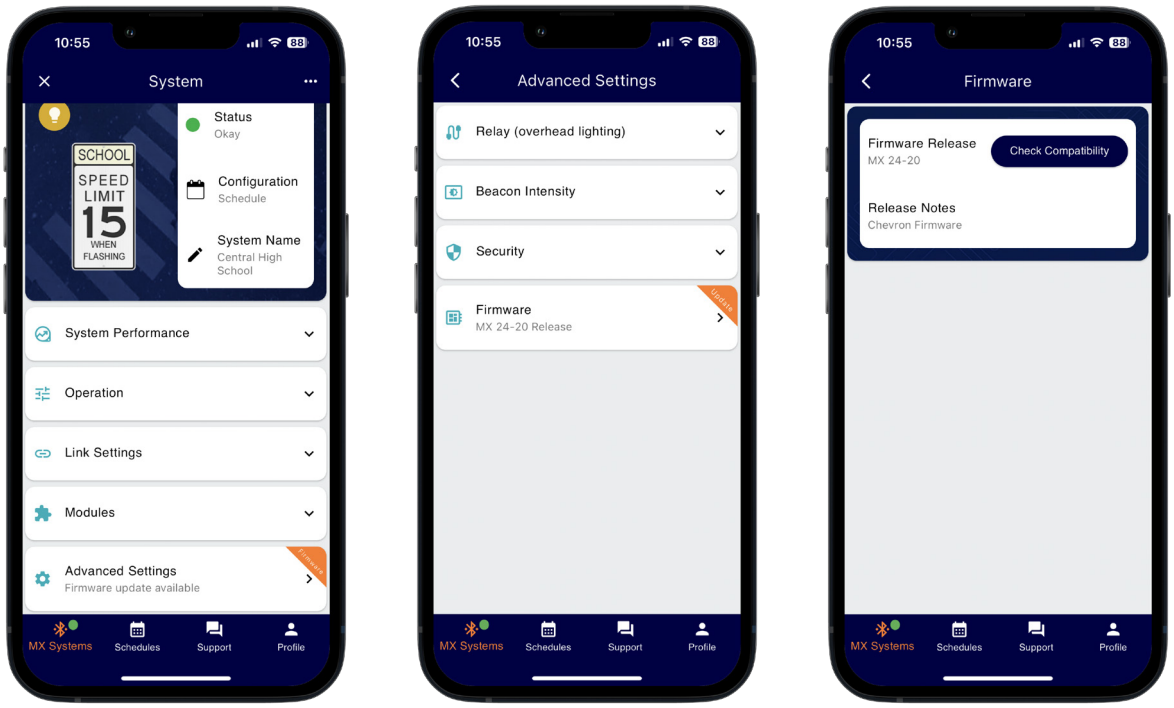
The Firmware screen provides the ability to apply firmware updates to the power module and flasher module(s) connected to the system.

If a firmware update is available the latest release will be shown. Tap on Firmware to proceed.

Firmware Update Procedure

The latest update will display release notes with information on feature additions or changes to the system. To proceed with updating the firmware, follow the steps below:

1. Tap on Check Compatibility. The app will establish a connection to each module wired to the system. The module will display its current firmware version and the newest version available.



NOTE

The beacon(s) will continually flash during the firmware installation procedure. This procedure can take up to five minutes per system to fully complete.

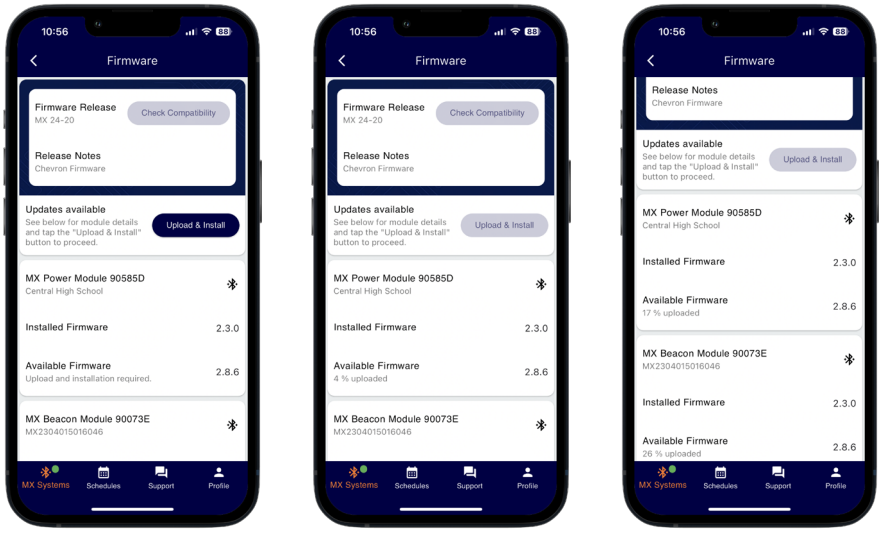
During the firmware update procedure, **do not** do any of the following:

CAUTION

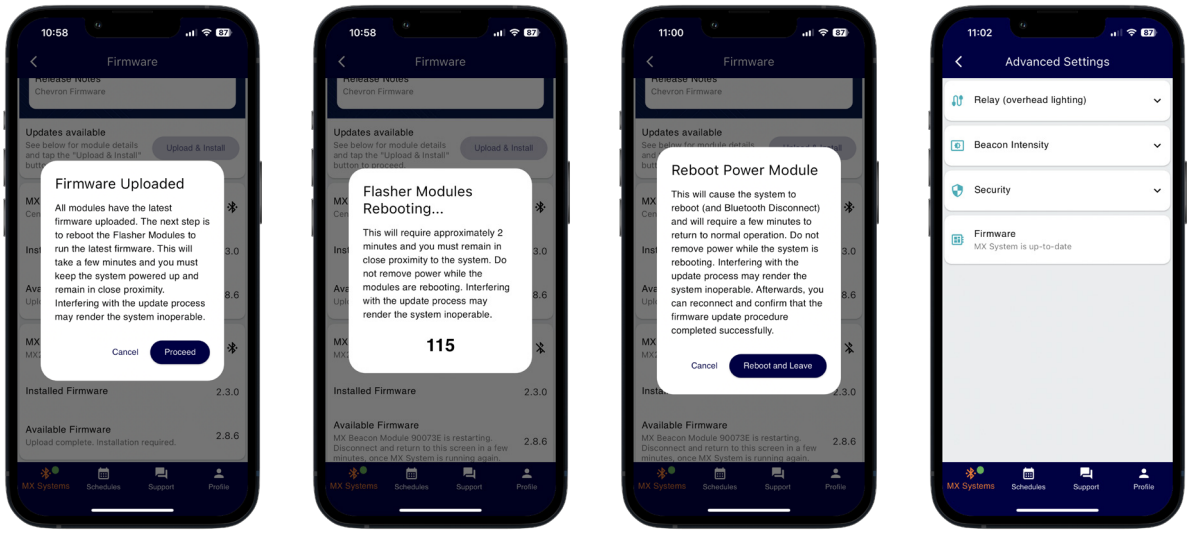
- Move away from the system
- Power down the system
- Minimize or close the app
- Allow your mobile device screen to lock
- Power down your mobile device
- Turn off Bluetooth on your mobile device

Interfering with the update process may render the system inoperable.

2. Ensure each module shows an available firmware. If this is not displayed the app has not established a connection to that particular module. Move closer to the system and try again.
    a. A successful connection will show an active Bluetooth connection icon ( ).
3. Tap on Upload & Install. This will start uploading the firmware file(s) from your mobile device to each module. **Do not move away from the system or minimize/close the app**.



4. Once complete tap on the Upload & Install button again to begin installation of the firmware. Read the warning prior to installing the firmware. Tap on Proceed to continue.
5. The system will now proceed with rebooting the flasher module(s), which will require two minutes.
6. After two minutes tap Reboot and Leave to reboot the power module. This will disconnect you from the system. It will take a few minutes before the system stops flashing before it has completed the update.
7. Reconnect to the system and ensure the firmware is up-to-date.

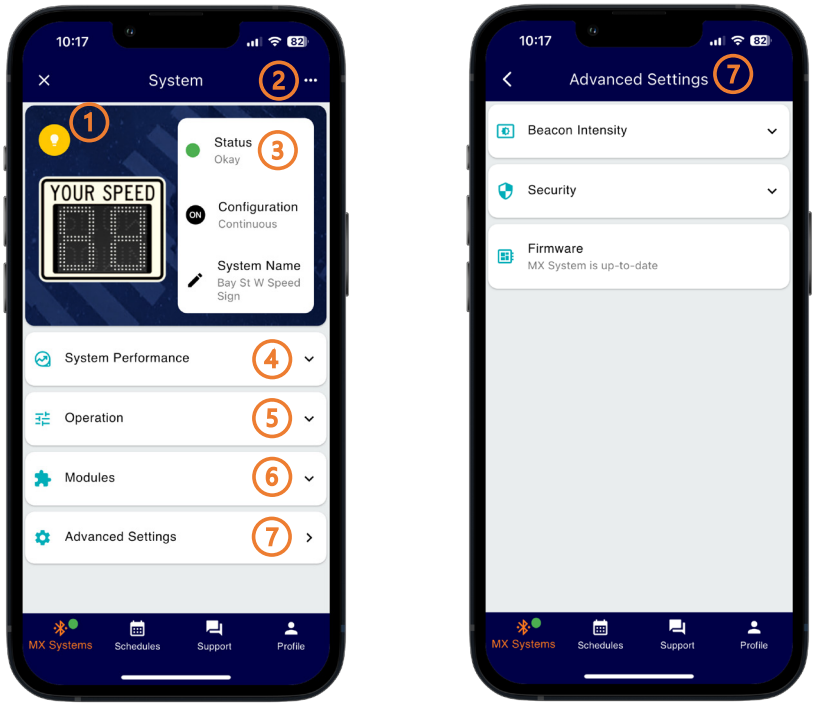


4.0 Radar Speed Signs

4.1 Overview

Beacon systems and radar speed signs share several of the same settings and options. Some functions will be explained in further detail within Section 3.

Below is a representation for radar speed signs:



1. Identify System – temporarily activates the display (beacons or strobes if equipped as well) to verify which system you are paired with.
2. Reboot System – performs a soft reboot on the system.
3. System Information:
    a. Status – displays current system status.
    b. Configuration – displays current sign mode.
    c. System name – displays system name.
4. System Performance drop-down – provides read-only performance data.
5. Operation drop-down – provides system type, operation level settings and vehicle data logs.
6. Modules drop-down – shows the power module and flasher module(s) connected to the system.
7. Advanced Settings – additional functions.

NOTE Swipe down on the screen to refresh the read-only values. Tap on the “close” button (✕) in the top left to disconnect from the system and return to the Nearby MX Systems screen.

Identify System

Tap on the yellow light bulb in the upper left corner to verify the system you are paired with. Display will temporarily activate including any equipped beacon(s) or strobe(s). See Section 3.1 for more information.

Reboot System

Tap on the horizontal ellipsis (•••) in the upper right corner to reboot the system. See Section 3.1 for more information.

System Status

System status is color-coded for quick and easy analysis. See Section 3.1 for more information.

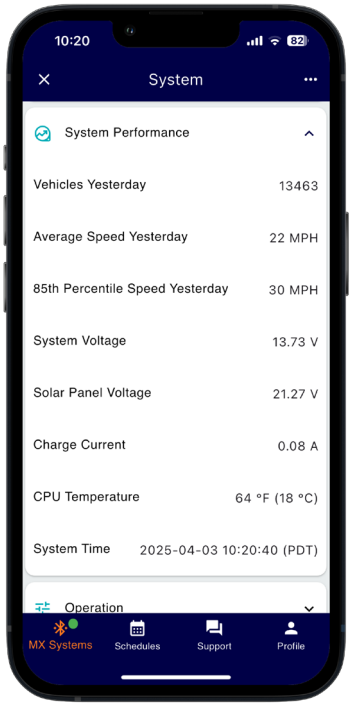
System Name

Tapping on the edit icon will allow you to edit system name. See Section 3.1 for more information.

4.2 System Performance Drop-Down

The System Performance drop-down menu provides the following unique information for radar speed signs:

- Yesterday's vehicle count
- Yesterday's average speed
- Yesterday's 85th percentile speed – The speed at or below which 85% of the vehicle speeds logged fall under in the data set.



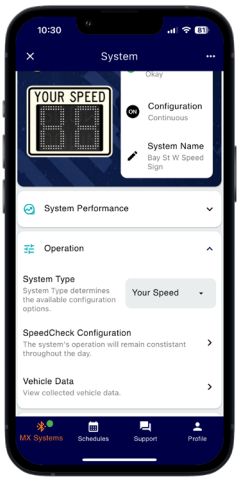
NOTE For more general information on System Performance, see Section 3.2.

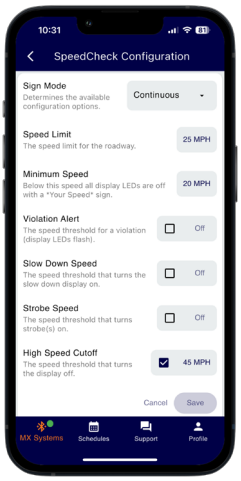
4.3 Operation Drop-Down

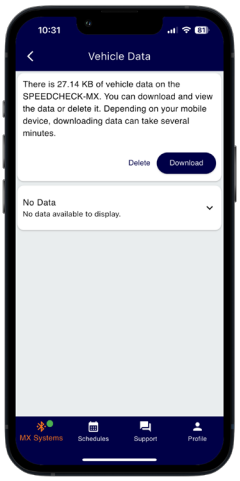
The Operation drop-down menu provides the following functions for configuring how the sign operates:

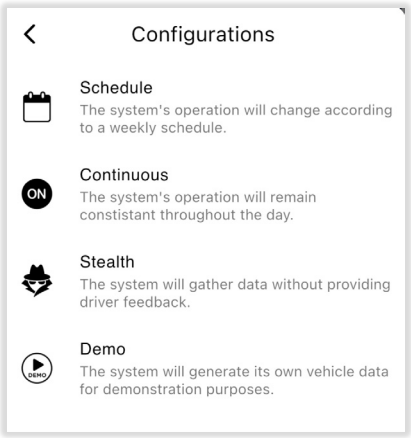
- System Type – this defaults to Your Speed and cannot be adjusted.
- SpeedCheck Configuration – sets the way the system will operate.
    - System Type
        - Your Speed – the default application type for radar speed feedback applications (cannot be adjusted).
    - Sign Mode
        - Continuous – vehicle speeds displayed based on configured settings.
        - Schedule – vehicle speeds displayed, and beacon(s) flash (if applicable) based on user generated schedule.
        - Stealth – display and beacon(s) off. Vehicle data is still being collected.
        - Demo – used for demonstration/testing purposes only. Will display simulated vehicle speeds based on configuration programmed. Will also store simulated vehicle speeds as vehicle data to be downloaded and analyzed.
    - Speed Settings
        - Speed Limit – the speed limit on the roadway. Reference for vehicle data compliance.
        - Minimum Speed – the lowest speed value that will be displayed.
        - Violation Alert Speed – the speed threshold for when the display LEDs begin to flash.
        - Slow Down Speed (if applicable) – the speed threshold for when the “slow down” message turns on. Option will not show unless equipped.
        - Strobe Speed (if applicable) – the speed threshold for when the strobe(s) will turn on. Option will not show unless equipped.
        - High Speed Cutoff – the highest speed value that will be displayed.
    - Unit of Speed
        - MPH (default) or KPH.
- Vehicle Data – allows you to download vehicle data, generate a vehicle report, and export the raw data for use with MX Traffic Analyzer.

See Section 5.8 for more information on radar speed sign programming.





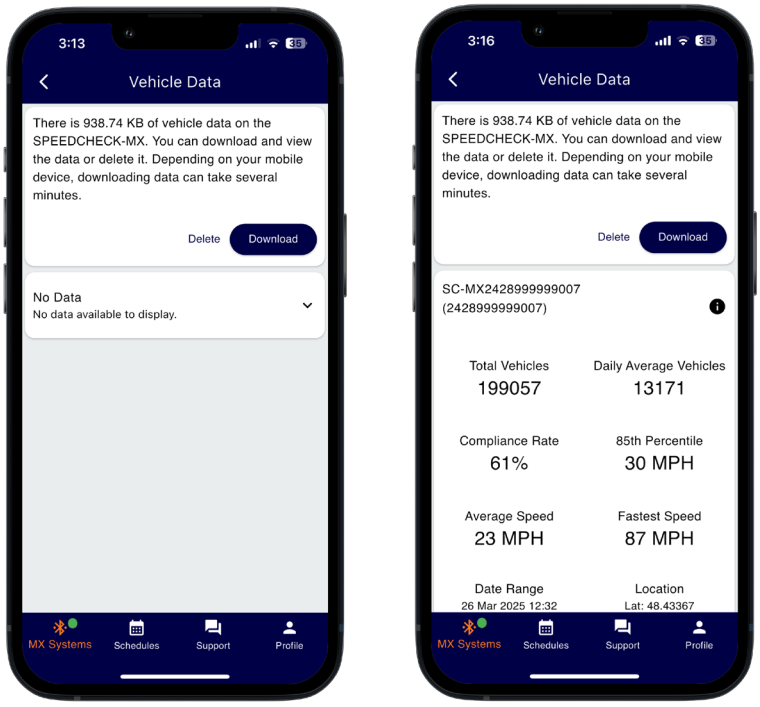




Vehicle Data

Vehicle data can be viewed and distributed as you see fit:

1. Download and view
2. Download and save report (PDF)
3. Download and save vehicle data (ZIP)



Raw vehicle data is saved as a ZIP file and is imported into MX Traffic Analyzer (see Section 8.4). This file contains the following information per vehicle detected

- Date
- Time
- Speed
- Speed limit

NOTE Vehicles are only logged if a valid date/time is acquired from the cellular network. This is to ensure accurate timestamping of the data collected.

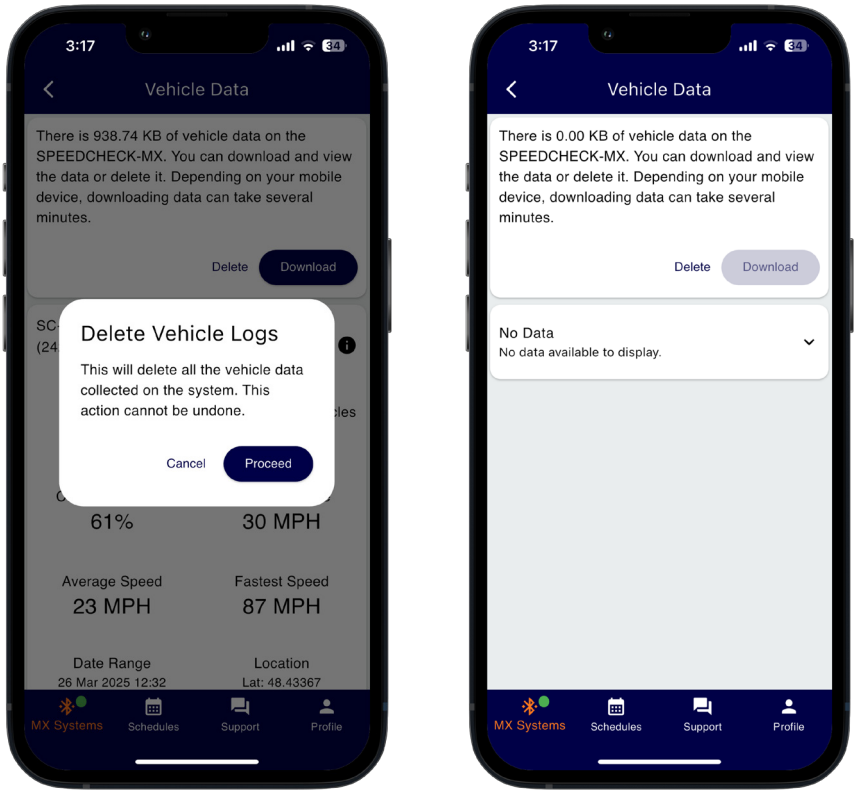
NOTE SPEEDCHECK-MX systems are not intended to be used as a tool for car volume analysis. The primary application is to provide data and feedback on speed compliance.

NOTE See Section 8 for more information on downloading vehicle reports and analyzing raw data.

Deleting Vehicle Data

Once you have the vehicle data downloaded, delete the vehicle logs:

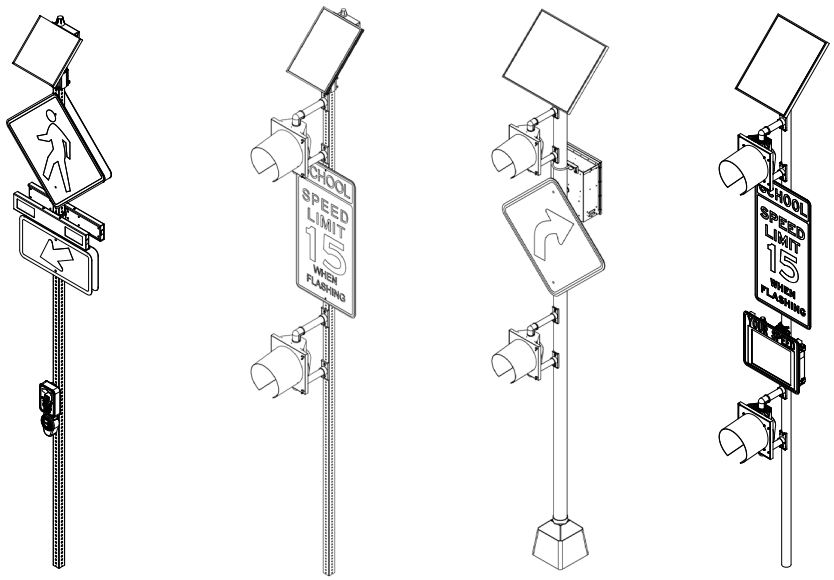
1. Tap on Delete.
2. Confirm operation and tap Proceed.



NOTE Once vehicle data is full, it will automatically begin to overwrite the oldest data on a first in, first out (FIFO) method.

5.0 System Application Settings

5.1 Applications Overview



Model	Application	Operation/Sign Modes
R920-MX	Crosswalk system (Section 5.2)	Trigger/Standby (pedestrian activated)
R829-MX	School zone system (Section 5.3)	Schedule
R247-MX	24-hour flashing system (Section 5.4) Vehicle detection system (Section 5.5)	Always On (24-hour) Trigger/Standby (vehicle activated) Dusk-to-Dawn (nighttime only)
CHEVRON-MX	Horizontal alignment (chevron) system (Section 5.6)	Always On (24-hour) Trigger/Standby (vehicle activated) Dusk-to-Dawn (nighttime only)
WWD-MX	Wrong-way driver warning system (Section 5.7)	Always On (24-hour) Trigger with Notification (vehicle activated with alert) Dusk-to-Dawn (nighttime only)
SPEEDCHECK-MX	Vehicle speed feedback (Section 5.8)	Continuous Schedule Stealth (display off) Demo

NOTE See Section 3.3 and Section 4.3 for an explanation of each activation/sign mode.

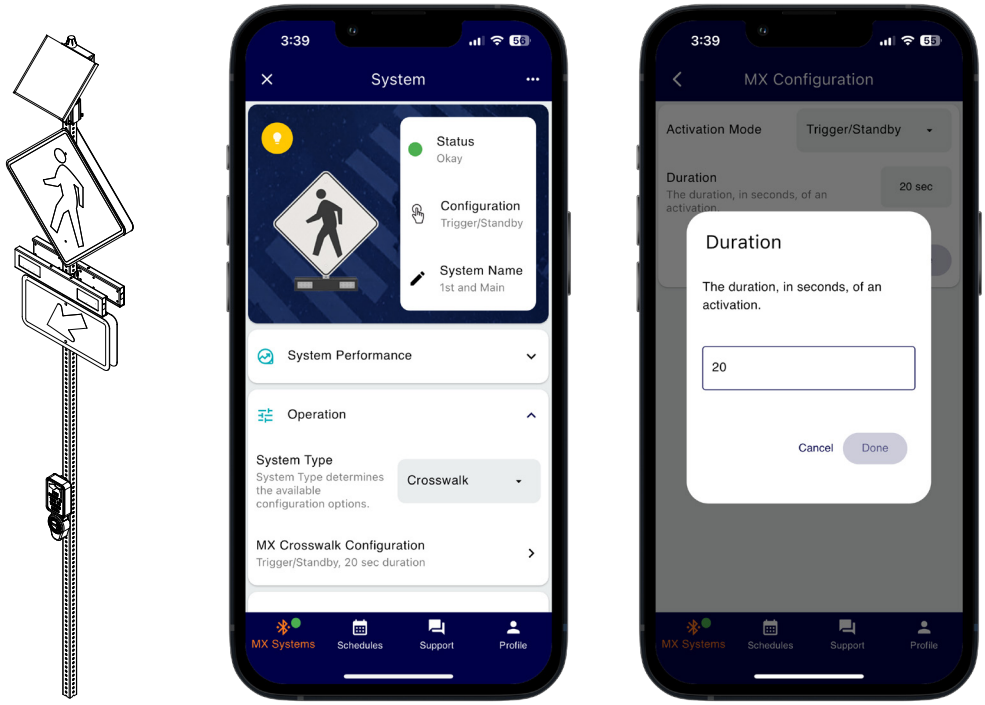
NOTE CHEVRON-MX systems can flash using a synchronized or sequential flash pattern.

5.2 Application 1 – R920-MX Crosswalk Systems

For crosswalk applications, follow the steps below for each system:

Rectangular Rapid Flashing Beacons (RRFBs)

1. Pair with the system as per Section 2.2.
2. Open the Operation drop-down menu. Set the System Type to Crosswalk.
3. Tap on MX Crosswalk Configuration.
    a. Activation mode will automatically be set to Trigger/Standby for RRFBs. **This cannot be changed by the end user**.
    b. Set Duration accordingly for the application. Ensure all systems are on the same duration setting. Changes to flash duration are not broadcast to other systems nearby, even if they are linked together. The default flash duration is 20 seconds.
4. Tap Done and then Save to complete.



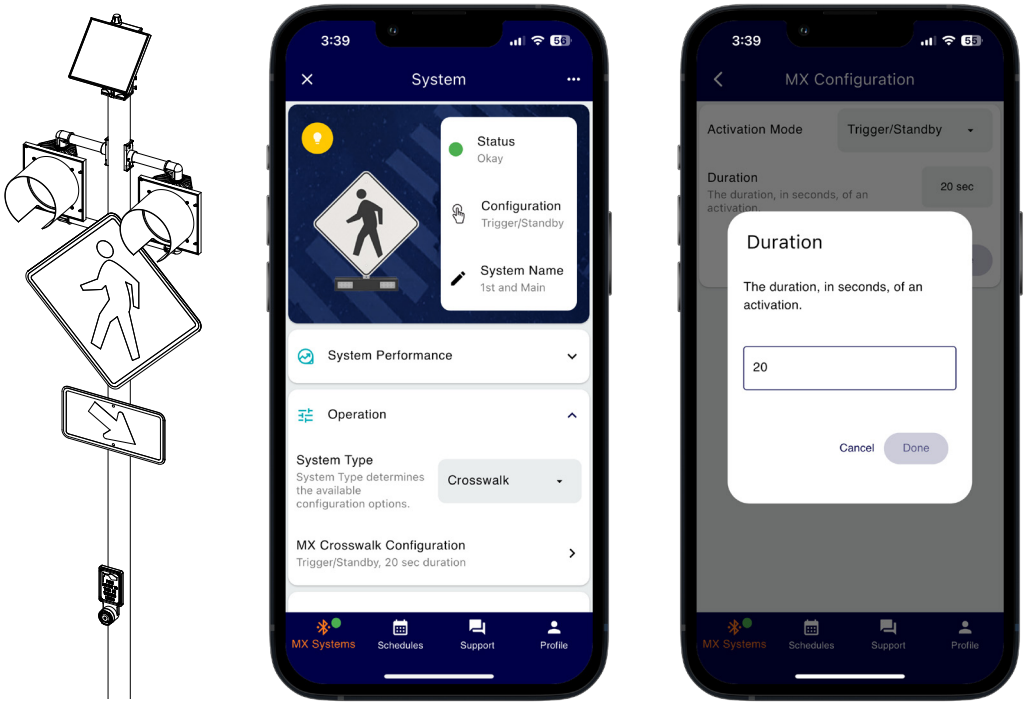
NOTE

RRFB flasher modules are unique. Once a system detects that it is operating an RRFB flasher module, the system will apply default RRFB link settings. All RRFBs within range (line of sight up to 1000') will be automatically linked together and activate each other when using these default RRFB link settings. Establishing a new link is recommended for each unique crossing to avoid crosstalk with other nearby crossings using MX systems.

If you have crosstalk between multiple crossings nearby you will want to follow the steps for breaking the link and creating a new one as shown in Section 3.4.

Beacon and LED Signs

1. Pair with the system as per Section 2.2.
2. Open the Operation drop-down menu. Set the System Type to Crosswalk.
3. Tap on MX Crosswalk Configuration.
    a. Set Activation mode to Trigger/Standby.
    b. Set Duration accordingly for the application. Ensure all systems are on the same duration setting. Changes to flash duration are not broadcast to other systems nearby, even if they are linked together. The default flash duration is 20 seconds.
4. Tap Done and then Save to complete
5. Link applicable systems together for flash synchronization. See Section 3.4.



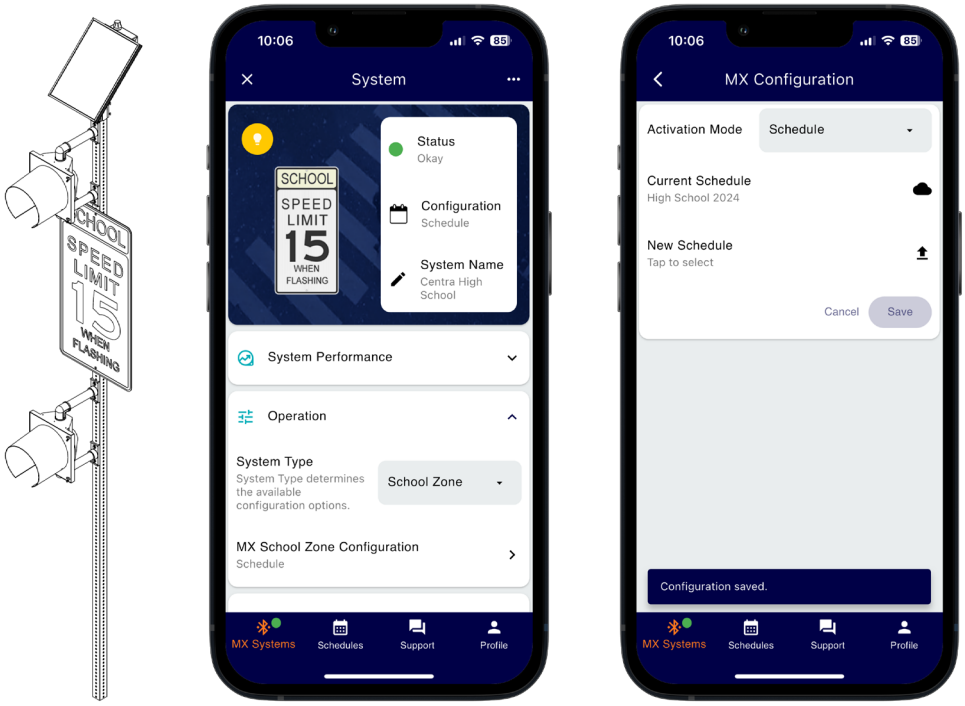
NOTE Beacons and LED signs will flash continuously by default using the Always On activation mode.

5.3 Application 2 – R829-MX School Zone Beacon Systems

For school zone applications, follow the steps below for each system:

School Zone Beacons

1. Pair with the system as per Section 2.2.
2. Open the Operation drop-down menu. Set the System Type to School Zone.
3. Tap on Schedules in the bottom dock. Create a schedule as per Section 6.
4. Open the Operation drop-down menu. Tap on MX School Zone Configuration. Set Activation mode to Schedule.
5. Tap on the “upload” button (⬆) next to New Schedule. Select the schedule you wish to upload to the system.
6. Tap Save to complete. The Current Schedule status will now show the uploaded schedule.



NOTE Beacons and LED signs will flash continuously by default using the Always On activation mode.

NOTE Schedules in MX Field App use a collection of events when beacons are on or off (unless pedestrian triggered). See Section 6 for more information.

School Zone Beacons with Pedestrian Activation

1. Pair with the system as per Section 2.2.
2. Open the Operation drop-down menu. Set the System Type to School Zone.
3. Tap on MX School Zone Configuration.
    a. Set Activation mode to Trigger/Standby.
    b. Set Duration accordingly for the application. Ensure all systems are on the same duration setting. Changes to flash duration are not broadcast to other systems nearby, even if they are linked together. The default flash duration is 20 seconds.
    c. Tap Save when complete.
4. Tap on Schedules in the bottom dock. Create a schedule as per Section 6.
5. Navigate back to MX School Zone Configuration. Set Activation mode to Schedule.
6. Tap on the “upload” button (⬆) next to New Schedule. Select the schedule you wish to upload to the system.
7. Tap Save to complete. The Current Schedule status will now show the uploaded schedule.
8. Link applicable systems together for flash synchronization. See Section 3.4.

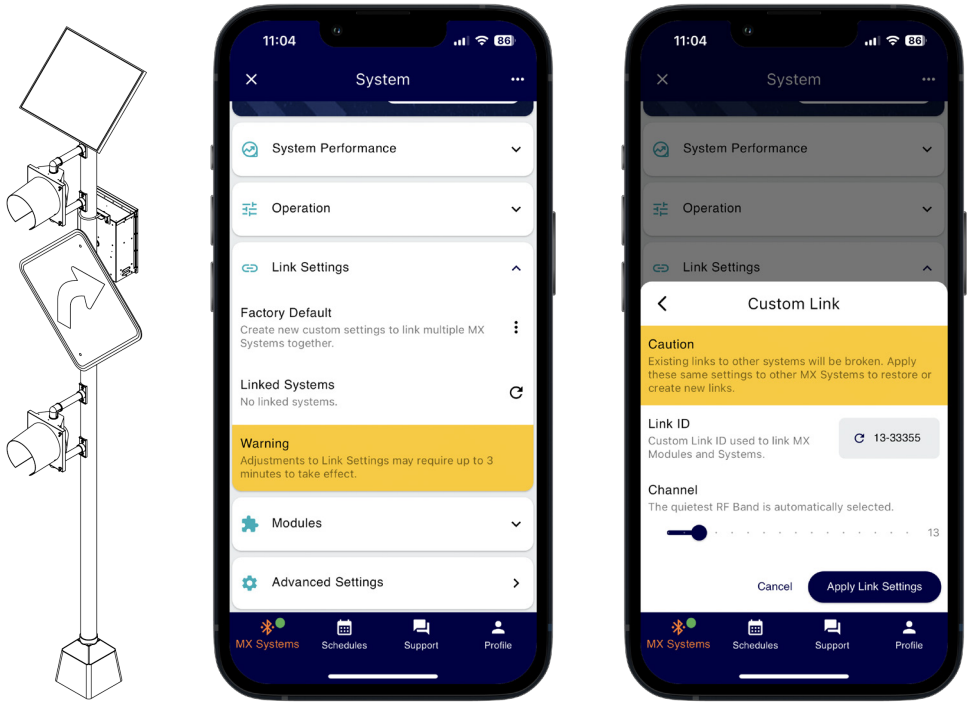
NOTE This configuration allows for scheduled operation of beacons or LED signs. When a system’s scheduled event is “Beacons Off”, pedestrian activation will be available to trigger the system.

NOTE All linked systems will need to be scheduled independently. These systems will synchronize with each other once flashing.

5.4 Application 3 – R247-MX 24-Hour Beacon Systems

For 24-hour beacon applications, the system will be functional out-of-the-box. To synchronize multiple systems, follow the steps below for each system:

1. Pair with the system as per Section 2.2.
2. Open the Operation drop-down menu. Set the System Type to Stop Sign or Warning Sign, whichever is most applicable based on your application.
3. Link systems together for flash synchronization. See Section 3.4.

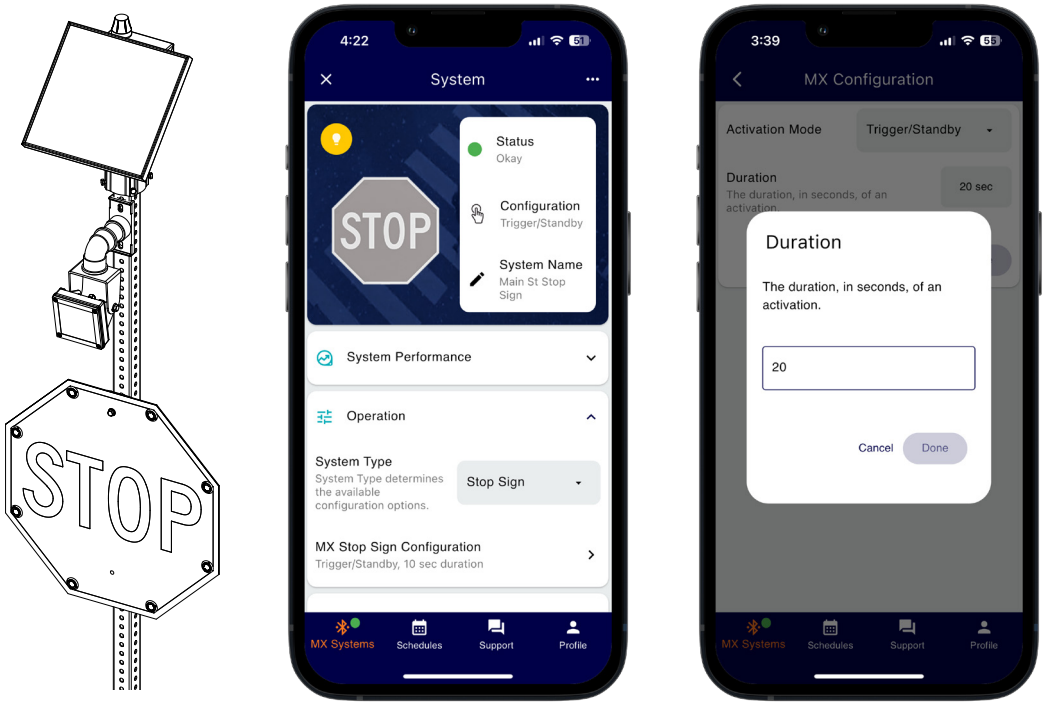


NOTE Beacons and LED signs will flash continuously by default using the Always On activation mode.

5.5 Application 4 – R247-MX Radar-Triggered Warning Signs

For radar-triggered applications, follow the steps below for each system:

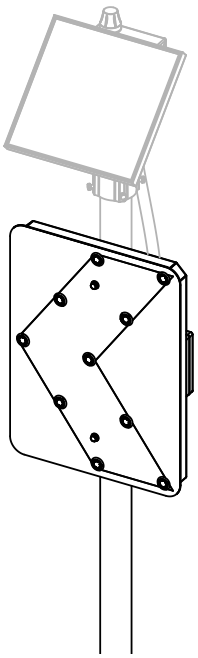
1. Pair with the system as per Section 2.2.
2. Open the Operation drop-down menu. Set the System Type to Stop Sign or Warning Sign, whichever is most applicable based on your application.
3. Tap on MX Stop Sign/Warning Sign Configuration.
    a. Set Activation mode to Trigger/Standby.
    b. Set Duration accordingly for the application. Ensure all systems are on the same duration setting. Changes to flash duration are not broadcast to other systems nearby, even if they are linked together. The default flash duration is 20 seconds.
    c. Tap Save when complete.
4. If applicable, link systems together for flash synchronization. See Section 3.4.
5. Ensure the radar has been programmed accordingly. Refer to the appropriate **LEVEL 4** install guide for more information.

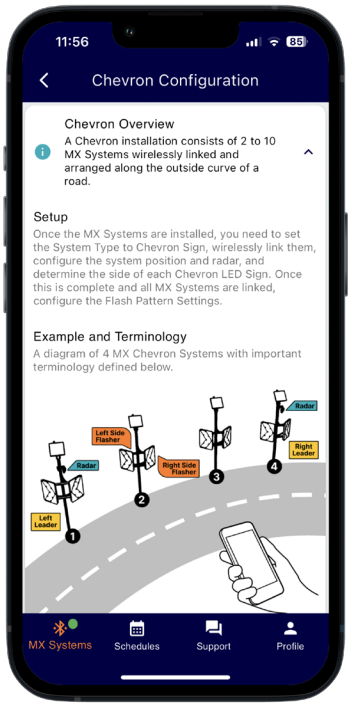


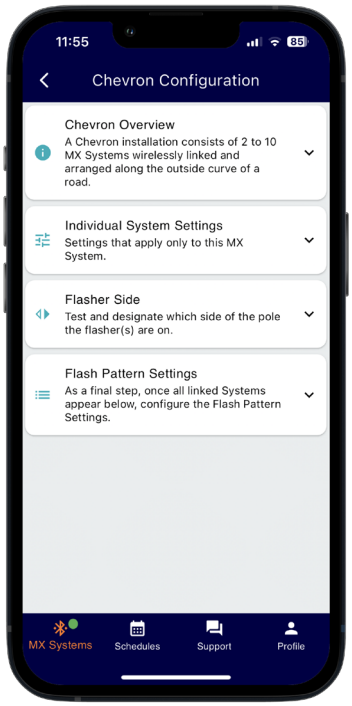
NOTE LED signs will flash continuously by default using the Always On activation mode.

5.6 Application 5 – CHEVRON-MX Chevron Warning Signs

For chevron warning sign applications, follow the Chevron Commissioning Guide included with each chevron order, or available at support.carmanah.com.







NOTE Chevron warning signs will flash continuously by default using the Always On activation mode. The Chevron Configuration flash pattern settings will allow for programming sequential or synchronized flashing.

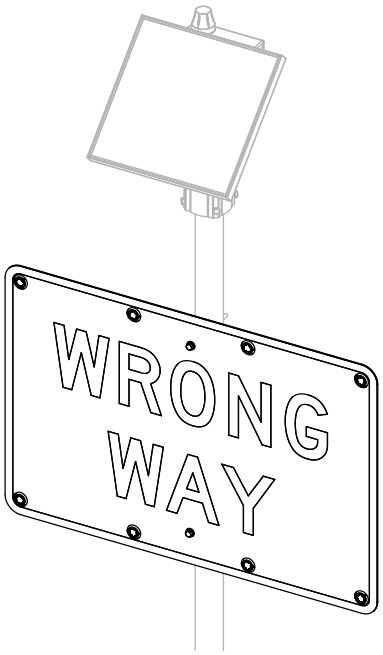
NOTE The Chevron Commissioning Guide must be followed for proper setup and operation.

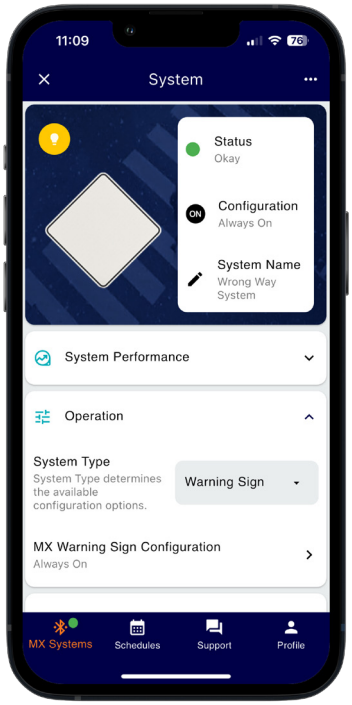
5.7 Application 6 – WWD-MX Wrong-Way Driver Warning Signs

For wrong-way driver warning applications, follow the steps below for each system:

Continuous Flashing

1. Pair with the system as per Section 2.2.
2. Open the Operation drop-down menu. Set the System Type to Warning Sign.
3. If applicable, link systems together for flash synchronization. See Section 3.4.

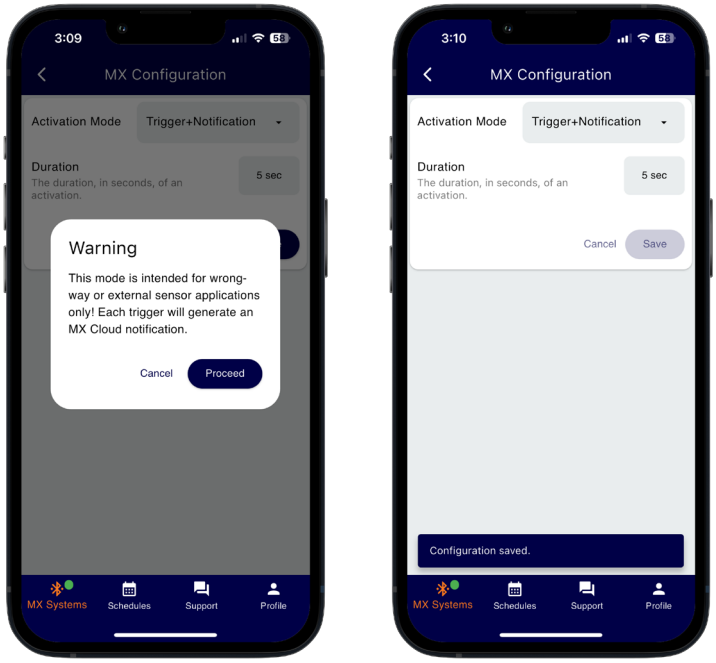




NOTE Wrong-way LED signs will flash continuously by default using the Always On activation mode.

Radar-Triggered

1. Pair with the system as per Section 2.2.
2. Open the Operation drop-down menu. Set the System Type to Warning Sign.
3. Tap on MX Warning Sign Configuration.
    a. Set Activation mode to Trigger+Notification.
    b. Set Duration accordingly for the application. Ensure all systems are on the same duration setting. Changes to flash duration are not broadcast to other systems nearby, even if they are linked together. The default flash duration is 20 seconds.
    c. Tap Save when complete.
4. If applicable, link systems together for flash synchronization. See Section 3.4.
5. Ensure the radar has been programmed accordingly. Refer to the appropriate **LEVEL 4** install guide for more information.



NOTE Trigger with Notification will send an SMS and/or email alert after a trigger has occurred, such as a wrong-way vehicle detection, to all opted-in users on the MX Cloud account. Ensure you have opted-in to notifications from within MX Cloud. Requires an active MX Plus/Pro subscription. Contact Carmanah for more information.

NOTE Radar is fully adjustable to help eliminate unwanted or false activations, such as: pan and tilt, minimum detectable speed, maximum detectable speed, detection sensitivity and range.

NOTE Set advanced systems linked to radar equipped system to Trigger/Standby.

5.8 Application 7 – SPEEDCHECK-MX Radar Speed Signs

For radar speed sign applications, the following default settings are programmed:

Setting	Default Value	Description	Comments
Sign Mode	Continuous	The mode the system is set to.	Continuous (24/7 operation) Schedule (time-based operation) Stealth (data collection only; display off) Demo[3] (demonstration mode)
Speed Limit	25	The speed limit for the roadway.	This acts as a reference for vehicle data compliance.
Minimum Speed	20	Below this speed turns the display off.	Disabling this setting will detect all vehicles up to the High Speed Cutoff value.
Violation Alert	Off (26[1])	The speed threshold for a violation (display LEDs flash).	Disabling this setting will prevent the display from flashing.
Slow Down Speed*	Off (30[2])	The speed threshold that turns the slow down message on.	Disabling this setting will turn off slow down message if installed.
Strobe Speed*	Off (30[2])	The speed threshold that turns the strobe(s) on.	Disabling this setting will turn off strobe(s) if installed.
High Speed Cutoff	45	The speed threshold that turns the display off.	Disabling this setting will detect all vehicles up to 99 (MPH or KPH).
Unit of Speed	MPH	Sets the radar unit of speed.	MPH or KPH

*option available if installed

[1]default value if setting is enabled

[2]default value if option is installed and enabled

[3]only for demonstration purposes

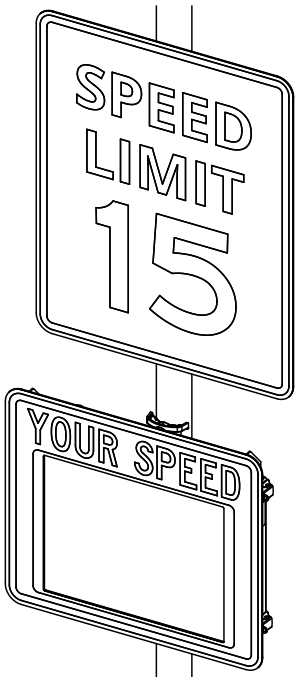
NOTE For MUTCD-compliant operation, Violation Alert/Slow Down Speed/Strobe Speed should be disabled. As per the MUTCD 11th Edition, the sign shall not flash or strobe during operation.

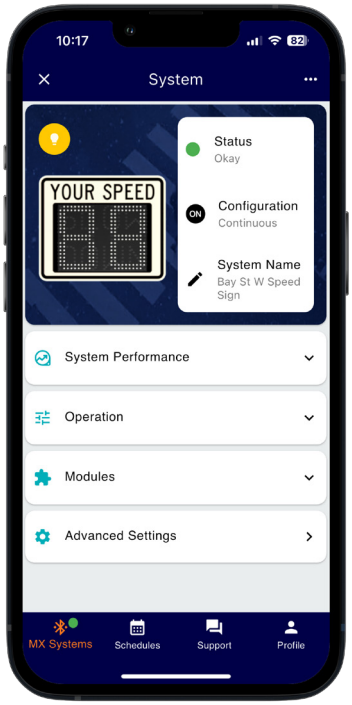
NOTE Adjusting the unit of speed will affect vehicle data already collected. Delete the existing data when making the adjustment when prompted (see Section 4.3).

To adjust the default settings follow the steps below based on your sign mode:

Continuous (24/7 Operation)

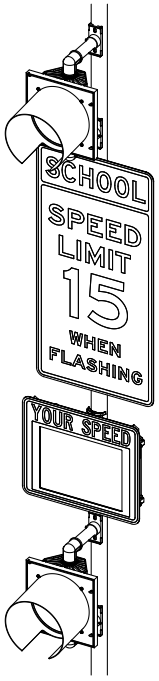
1. Pair with the system as per Section 2.2.
2. Open the Operation drop-down menu and tap on SpeedCheck Configuration.
3. Set applicable speed values for your application:
    a. Adjust Unit of Speed for installations requiring the radar set to KPH.
4. Tap Save to complete.

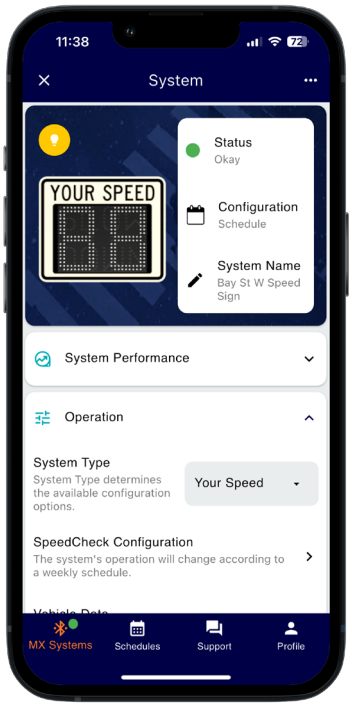




Schedule (School Zones)

1. Pair with the system as per Section 2.2.
2. Tap on Schedules in the bottom dock. Create a schedule as per Section 7.
3. Open the Operation drop-down menu. Tap on SpeedCheck Configuration and set sign mode to Schedule.
4. Tap on the “upload” button (⬆) next to New Schedule. Select the schedule you wish to upload to the system.
5. Adjust the Unit of Speed to KPH as required.
6. Tap Save to complete. The Current Schedule status will now show the uploaded schedule.



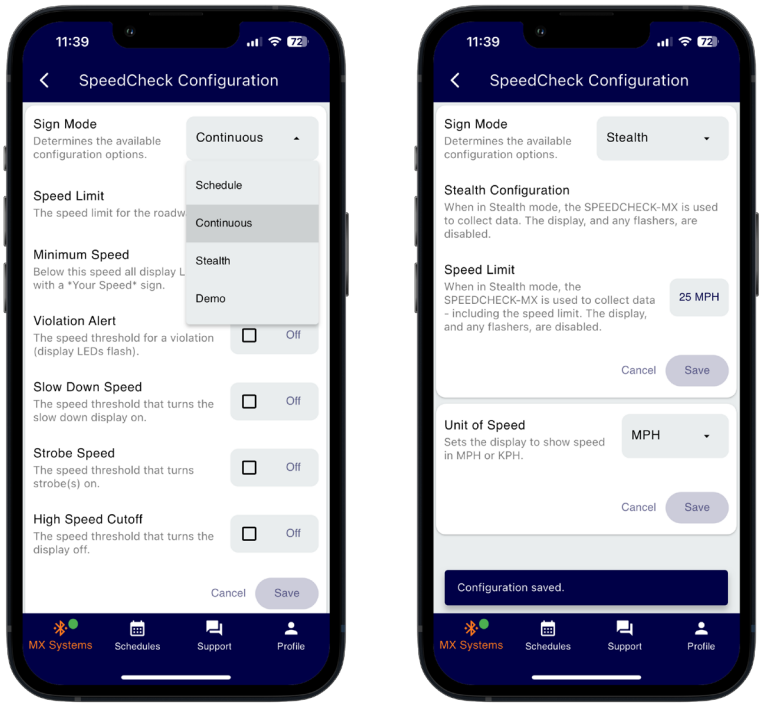


NOTE SPEEDCHECK-MX schedules in MX Field App use a collection of events which contain different Operating Modes. This is typically scheduling the display/beacon(s) to be on or off. See Section 7 for more information.

NOTE Beacon(s) will not flash by default and will only run based on schedule programmed. For testing purposes, tap on the Identify System button. See Section 4.1 for more information.

Stealth Mode (Display Off)

1. Pair with the system as per Section 2.2.
2. Open the Operation drop-down menu. Tap on SpeedCheck Configuration and set sign mode to Stealth.
3. Adjust Unit of Speed for installations requiring the radar set to KPH.
4. Tap Save to complete.

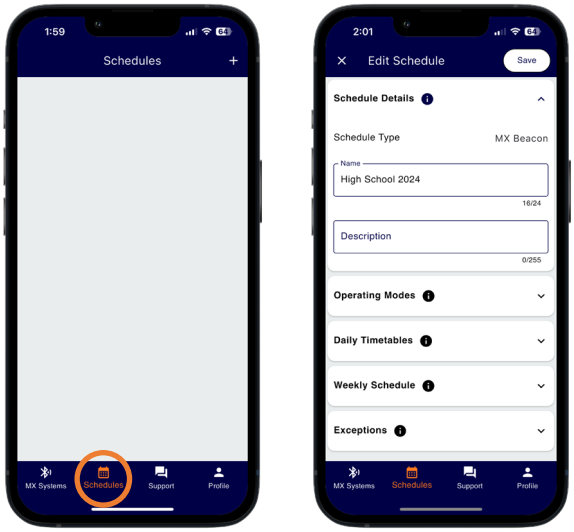


NOTE Stealth mode is used to collect vehicle data while disabling the display. This is useful for comparing data before and after the sign display turned on (Continuous mode).

6.0 Schedules – Beacon Systems

6.1 Schedules Screen

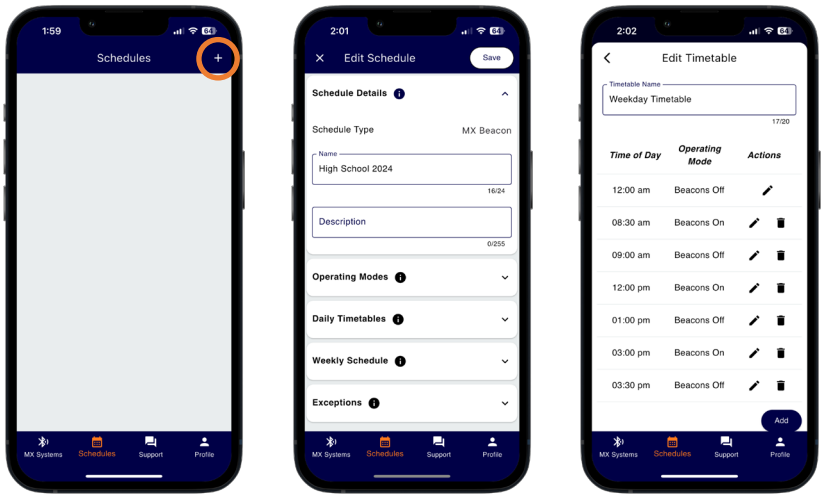
The Schedules screen is accessed by tapping on the Schedules button in the bottom dock and provides access to create and edit schedules, primarily for school zone systems. Schedules can be created at any time without requiring on-site access to a system. Schedules are saved locally to your mobile device.



NOTE An event can be either Beacons On or Beacons Off (unless pedestrian triggered). Most applications will not use pedestrian activation when scheduling.

Creating a Schedule

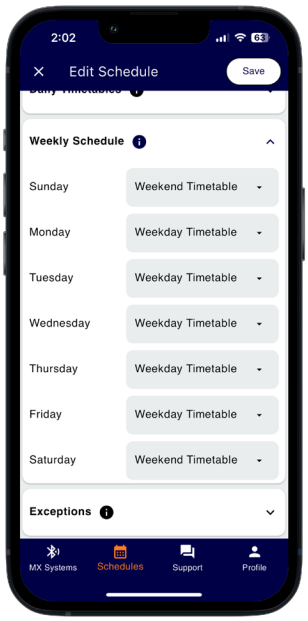
Tap on the “create” button (+) and select School Zone Beacon to generate a new schedule. Enter a name and description for your schedule. The schedule will automatically assign a sample set of timetables and populate into a weekly schedule. The sample timetables and weekly schedule can be edited, or new timetables may be created. Schedules or timetables can be copied by tapping on the vertical ellipsis and then Copy.



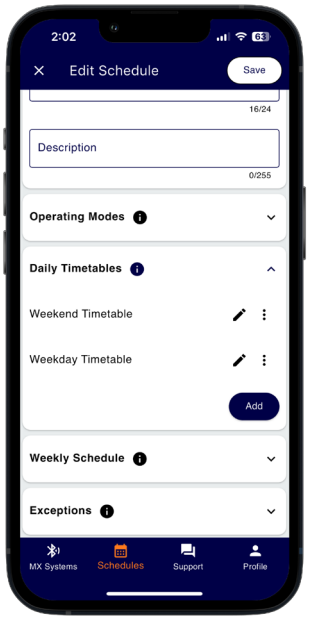
Weekly Schedule

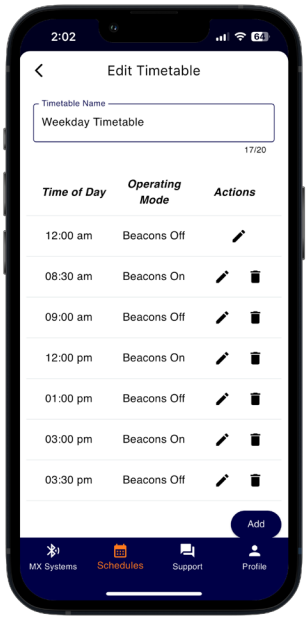
The weekly schedule runs from Sunday to Saturday with each day assignable to a timetable. Build the schedule for the typical weekly events throughout the year. For any days that fall outside of this schedule, such as an early release day that occurs each month, create a separate timetable to supersede this schedule for those dates. This will be used under the Exceptions function.

Each schedule will automatically be populated with sample weekday and weekend timetables.



Timetables are able to be edited, deleted, copied or replaced. Tap on the loaded timetable to change to a different available timetable or add a new timetable. See Daily Timetables for more information.





Daily Timetables

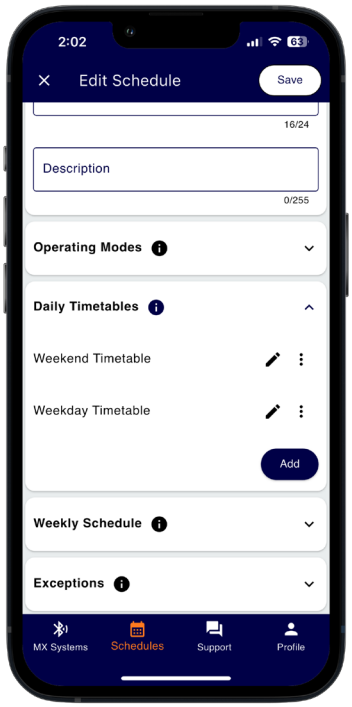
Timetables are a collection of events over a 24-hour period. Events are periods when the system's beacon(s) are either on or off (unless pedestrian activated).

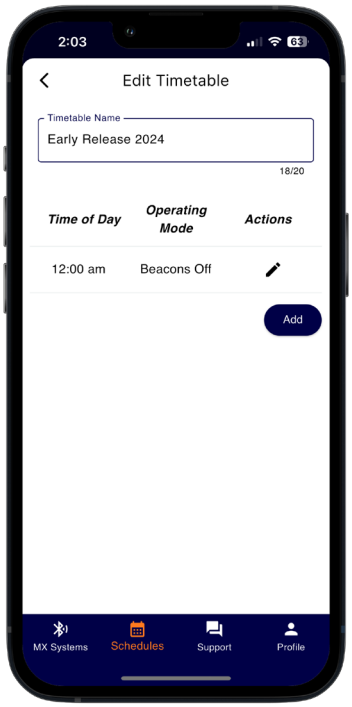
The sample set of daily timetables will populate as follows:

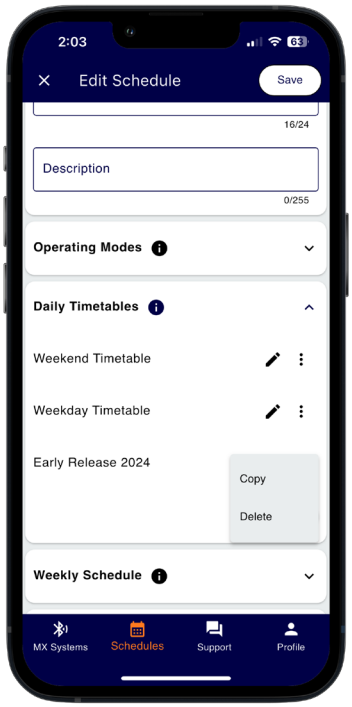
- Weekday Timetable:
  - 8:30 – 9:00 AM (beacons on)
  - 12:00 – 1:00 PM (beacons on)
  - 3:00 – 3:30 PM (beacons on)
- Weekend Timetable – beacons off all day unless triggered

In the Daily Timetables drop-down menu, you have the following options:

1. Add a new timetable
2. Edit an existing timetable
3. Copy a timetable
4. Delete a timetable



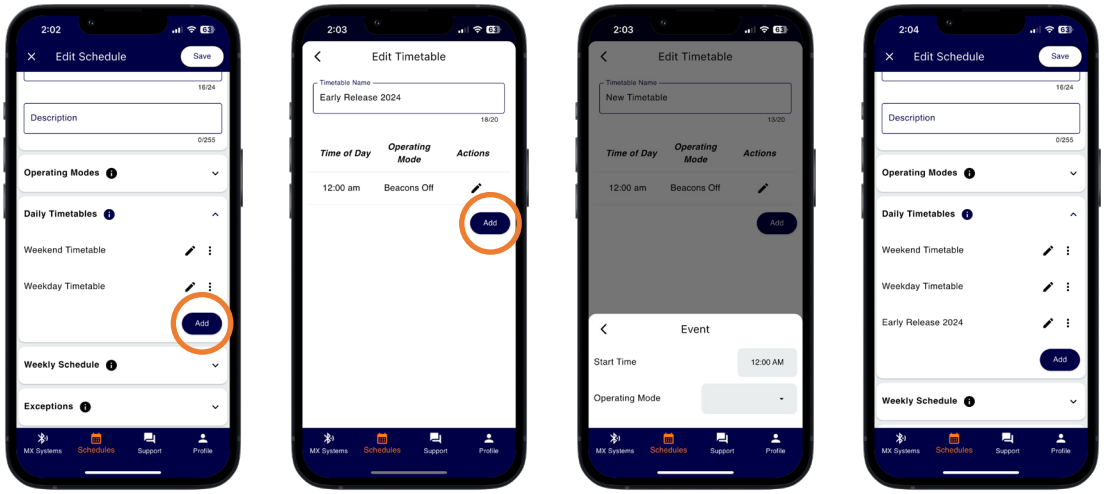




Add Timetable and Events

To add a timetable, follow the steps below:

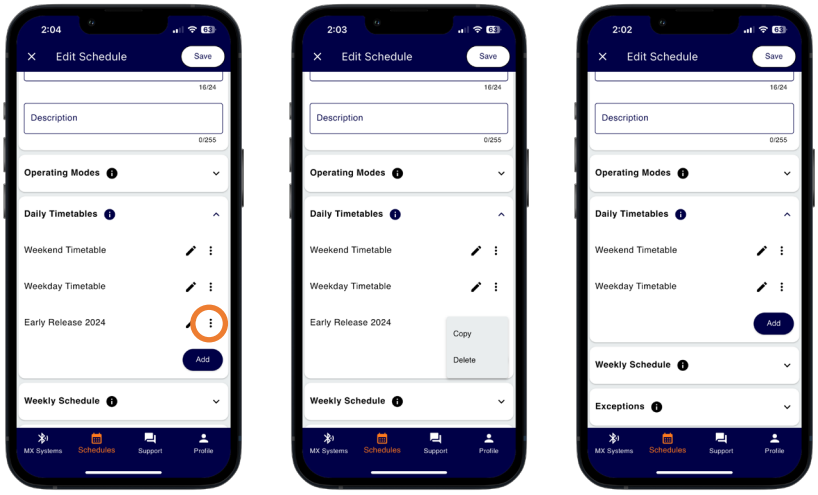
1. Tap on the Add button.
2. Rename the timetable.
3. Add events as required. Tap on the Add button to add an event:
    a. Tap on the start time and select the desired time. Select AM or PM and then tap OK.
    b. Tap on the operating mode to the right and select Beacons On/Off based on your application.
4. Once complete, tap on the left chevron button in the upper left to save.



NOTE The first event of the day will default to Beacons Off at 12:00 AM. If this is not correct for your application, simply tap on the edit button to adjust the operating mode and time as required.

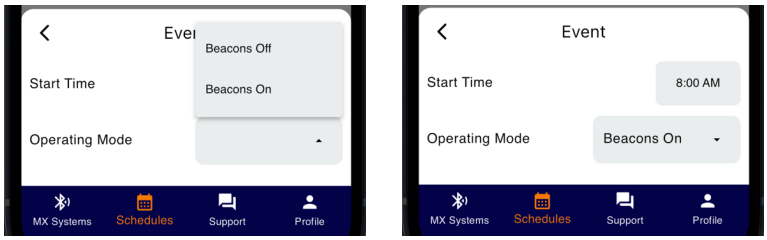
Delete Schedule/Timetable/Event/Exception

To delete a schedule/timetable/event/exception, tap on the vertical ellipsis and then tap Delete.



Operating Modes

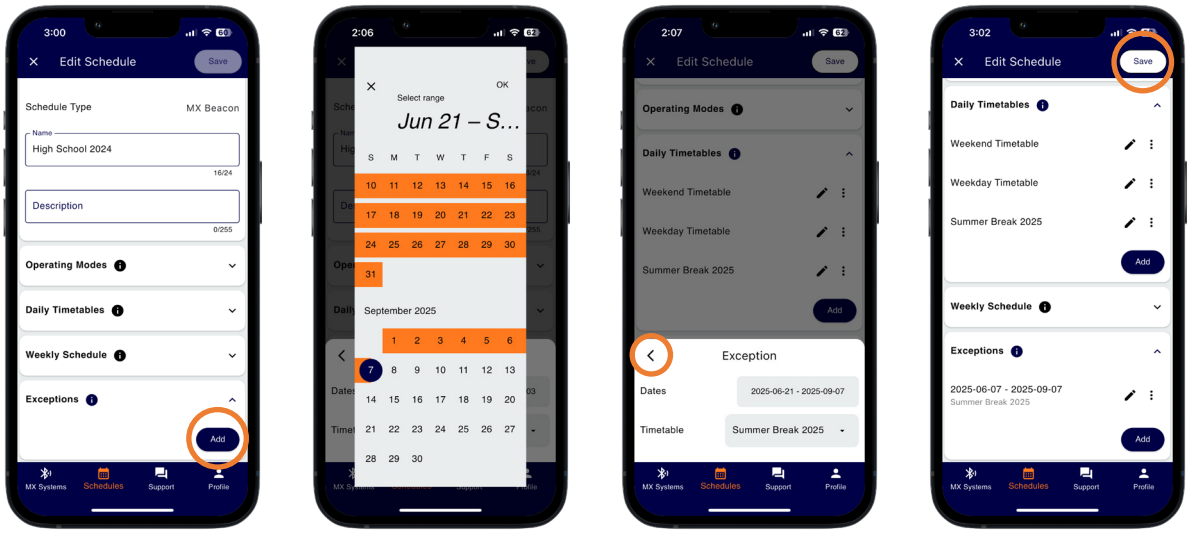
Operating Modes are configurations that determine how the system will function when scheduled. This only includes beacon control (on or off).



Exceptions

Exceptions override the existing day's timetable on the date(s) chosen for the exception. They differ from schedules as they are date-based instead of day-of-the-week based. While an exception is active, the system will follow the new timetable chosen.

1. Tap on Add button.
2. Tap on the date range and choose a start and end date. Tap OK when complete.
    a. If your exception is for one day only choose the same date twice.
3. Tap on the empty timetable and choose the new timetable for the date(s) chosen.
4. Once complete, tap on the left chevron button in the upper left to save.
5. Tape Save to complete.



In the example above, the *Summer Break 2025 (Beacons Off)* timetable will be active between June 21, 2025, and September 7, 2025. In this instance the timetable sets the beacon(s) off all day during this period. On September 8, 2025, the system will resume its normal weekly schedule.

NOTE Exceptions can be used to run different timetables, such as early release days or holidays.

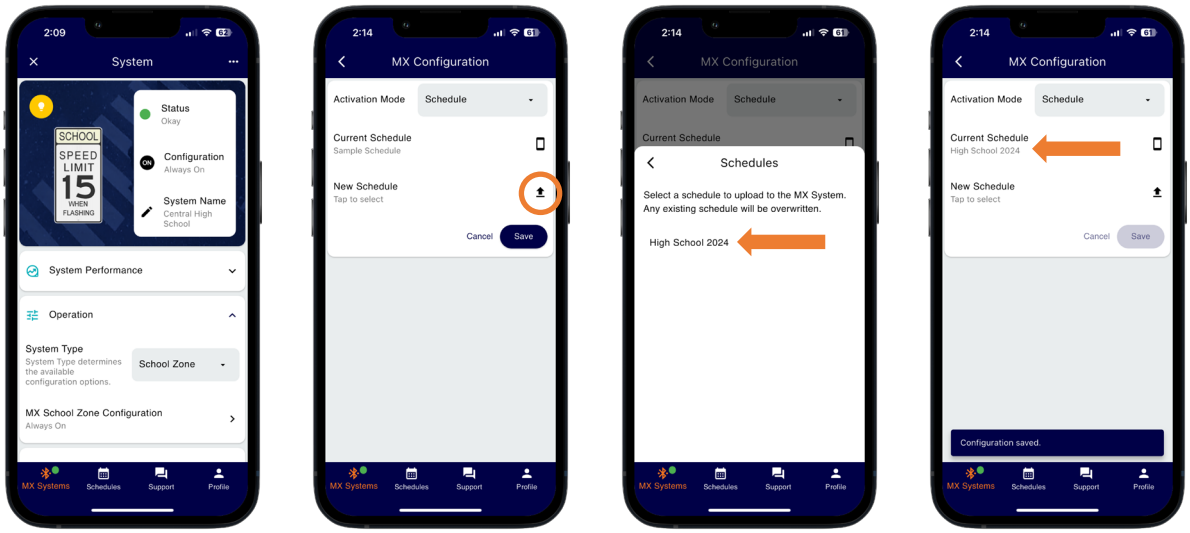
NOTE Tap on the edit button to modify an existing exception. Only one exception per date range can be applied. Any edits are saved locally until you upload the schedule to the system.

6.2 Uploading Schedule To System

NOTE Any changes made to your schedule will remain local on your mobile device until you upload it to a system.

To upload a schedule to a system, follow the steps below:

1. Tap on the Operation drop-down menu.
2. Change the activation mode to Schedule.
3. Tap on the “upload” button (⬆) next to New System.
4. Choose the appropriate schedule from the list.
5. Tap on Save to upload. The schedule will now show under Current Schedule.

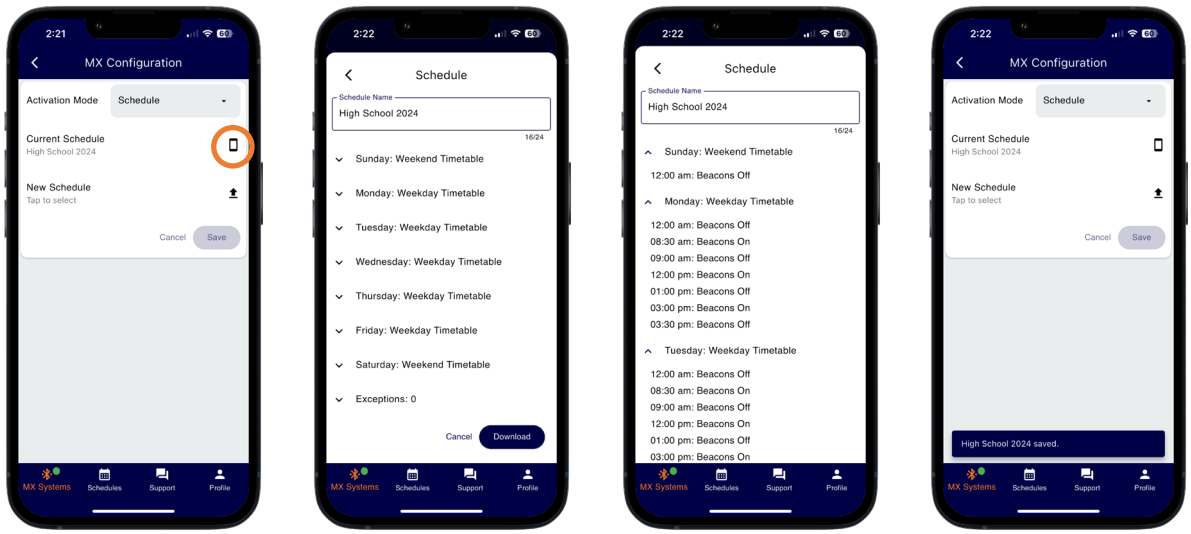


NOTE Check the System Time to ensure it is accurate under the System Performance drop-down. Refresh the screen by swiping down to load the latest parameters. If required, perform a soft reboot to have the system reacquire new date/time settings (see Section 3.3).

6.3 Downloading Schedule From System

To download a schedule from a system to your mobile device, follow the steps below:

1. Tap on the Operation drop-down menu.
2. Change the activation mode to Schedule if not already done.
3. Tap on the button (or) next to Current System.
4. Review the schedule currently uploaded to the system as needed.
5. Tap the Download button to save to your mobile device. This schedule will now appear in the Schedules screen.



NOTE There will be a “mobile device” icon ( ) for locally programmed or “cloud” icon ( ) for remotely programmed schedule.

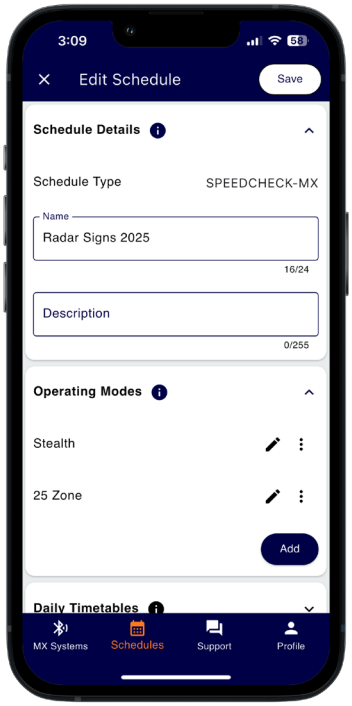
7.0 Schedules – Radar Speed Signs

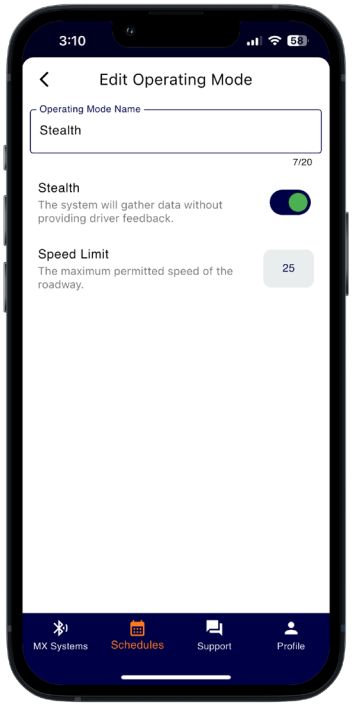
7.1 Overview

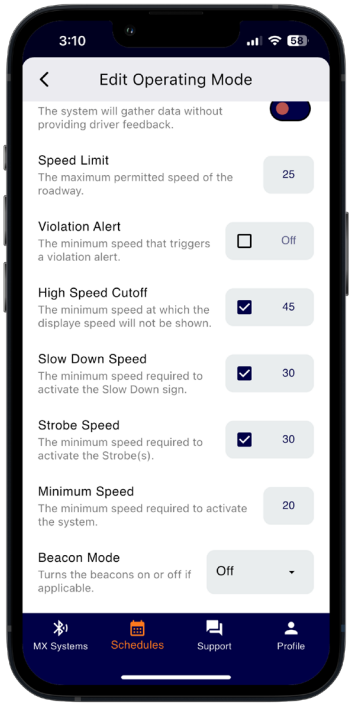
Radar speed signs and beacon systems share several of the same scheduling settings and options. Refer to Section 6 for an explanation of all scheduling functions.

Below is a specific example for scheduling radar speed signs:

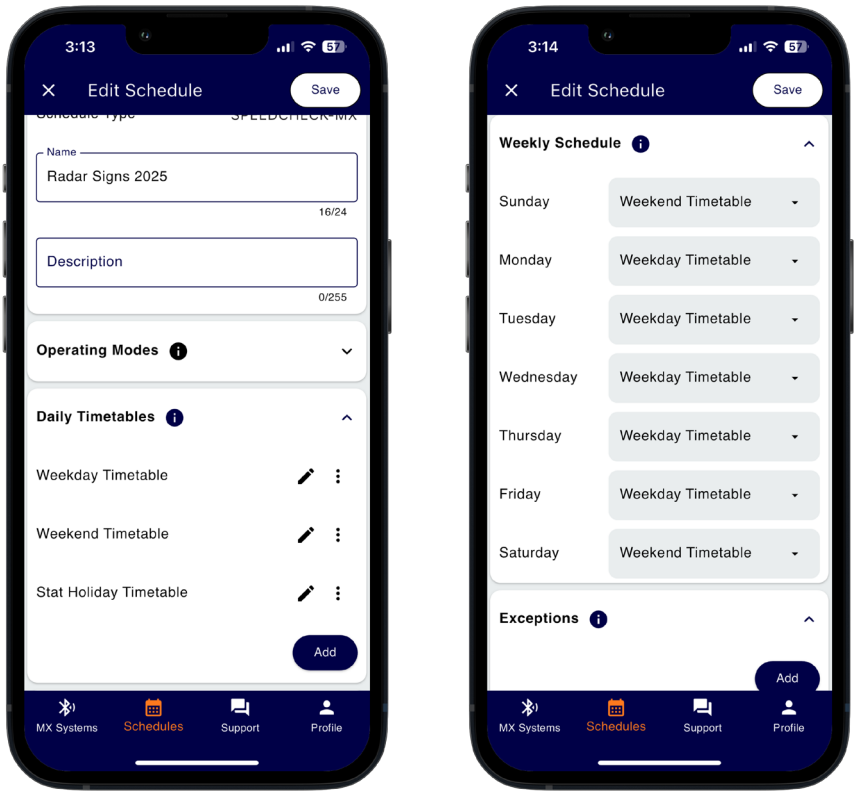
1. Tap on the create button (+) and choose Radar Speed Sign.
2. Edit the schedule name.
3. Create your Operating Modes or edit the default templates. This follows the same speed settings as Section 5.8 with the addition of Beacon Mode (on or off, if applicable). Enable Stealth if you wish to have the display off in any given mode.
    a. Typically you will have two or more, such as:
        i. One to have the display off, which is available by default (All Off).
        ii. One for enforcing the normal speed limit, which is available by default (25 Zone).
        iii. One for reduced speed, such enforcing speed limits in school zones.







4. Create your Daily Timetables or edit the default templates. Typically you will have two or more, such as:
    a. Weekday Timetable, which is available by default.
    b. Weekend Timetable, which is available by default.
    c. Stat Holiday Timetable, which is available by default.
5. Assign Daily Timetables to each applicable day of the week in Weekly Schedule.
6. Create Exceptions for dates which do not follow the Weekly Schedule. Additional Daily Timetables may be required.
7. Tap on Save.



NOTE

Operating Modes are configurations that determine how the system will function when scheduled. This includes vehicle speed thresholds and beacon control. See Section 4.3 and Section 5.8 for more details.

NOTE

Default Operating Modes, Daily Timetables, and the Weekly Schedule can be used as a template or you can create your own.

The default Stealth Operating mode has a speed limit value of 25. This value acts as a reference for calculating vehicle compliance. Change this value as required based on your application.

8.0 Radar Speed Signs - Vehicle Data

8.1 Downloading Vehicle Data

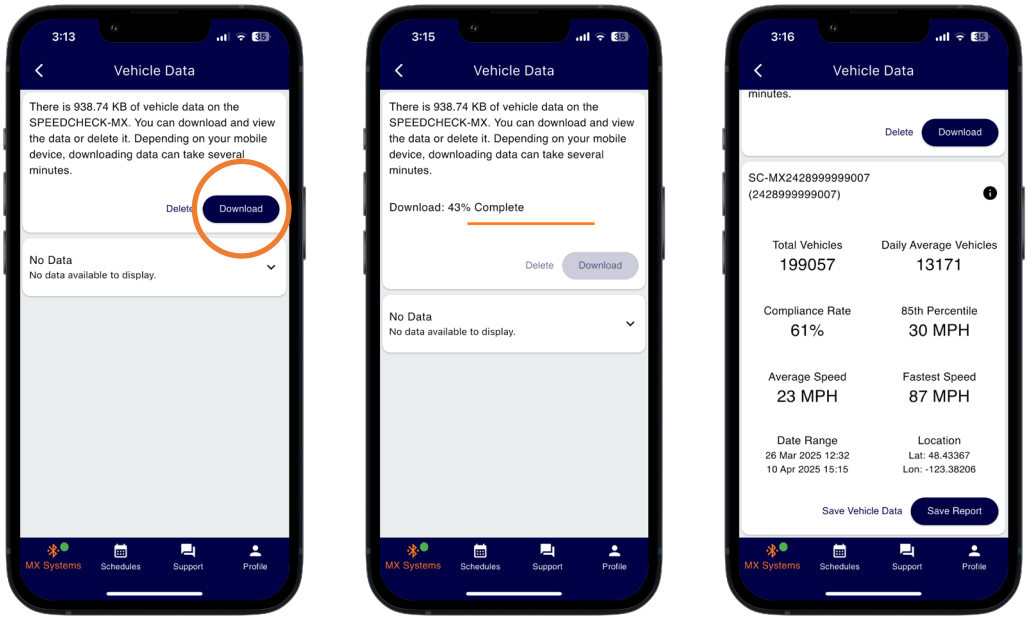
SPEEDCHECK-MX radar speed signs log each vehicle detected with date, time, speed, and speed limit. The speed limit value programmed acts as a reference for calculating vehicle compliance.

1. Tap on Operation.
2. Tap on Vehicle Data.
3. Tap on Download. Wait for the data to download. This may take a few minutes depending on how much data is stored. A breakdown of the data will appear on screen for you to view.

Data Point	Description
System Name	Name of radar speed sign as set in MX Field App.
System Serial Number	Serial number of radar speed sign.
System Location	Estimated physical address based on GPS location (lat/long).
Total Vehicles	Total number of vehicles in the data set.
Compliance Rate*	Compliance rate calculated based on speed limit(s) programmed in MX Field App. This is the percentage of vehicles that were logged at or below the speed limit value(s) set.
Average Speed	Average speed in the data set.
Date Range	Date range of the data set.
Daily Average Vehicles	Average daily vehicles calculated based on total vehicles divided by date range.
85th Percentile	The speed at or below which 85% of the vehicle speeds logged fall under in the data set.
Fastest Speed	Fastest speed logged in the data set.
Location (lat/long)	Latitude and longitude of the radar speed sign based on GPS.

NOTE *It is possible to have more than one speed limit programmed when in Schedule mode. This means that the speed limit changes based on time of day, therefore giving you more accurate compliance data.

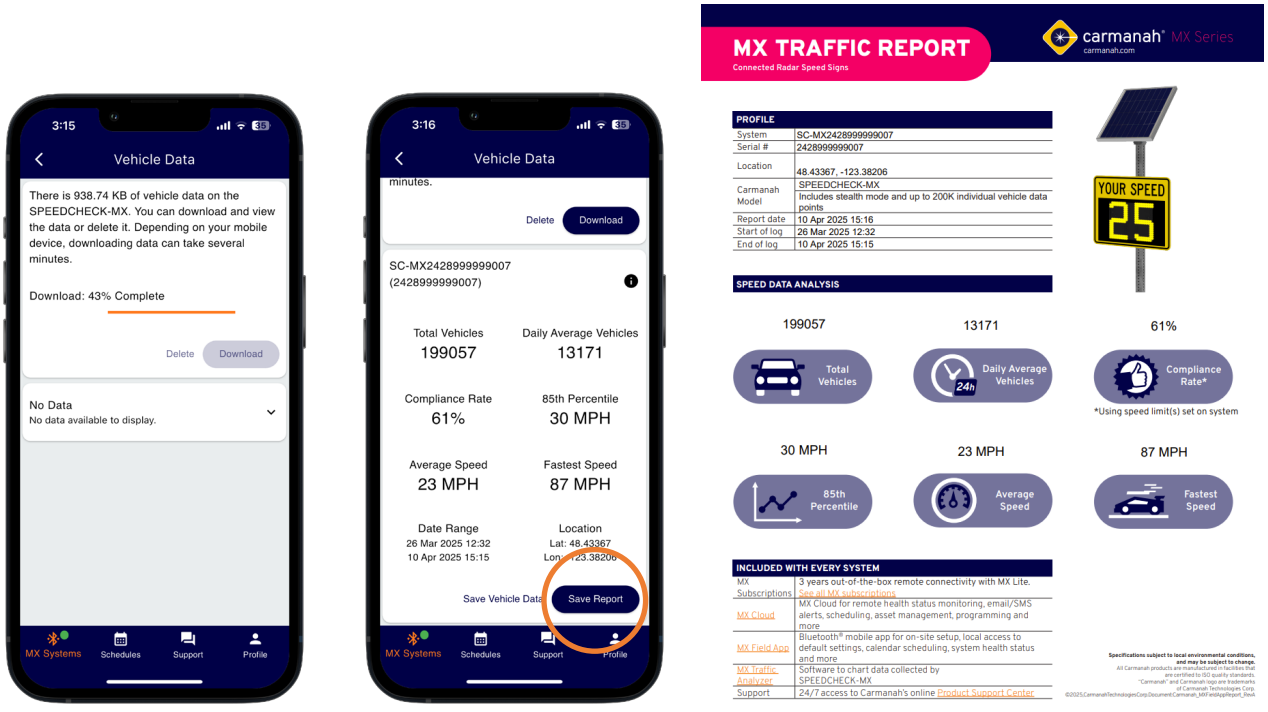
NOTE Android devices will download vehicle data faster versus iOS. This is a limitation set by iOS.



NOTE Once you have exported the data via a PDF report or raw data ZIP file, it is recommended to delete the vehicle data as per Section 4.3.

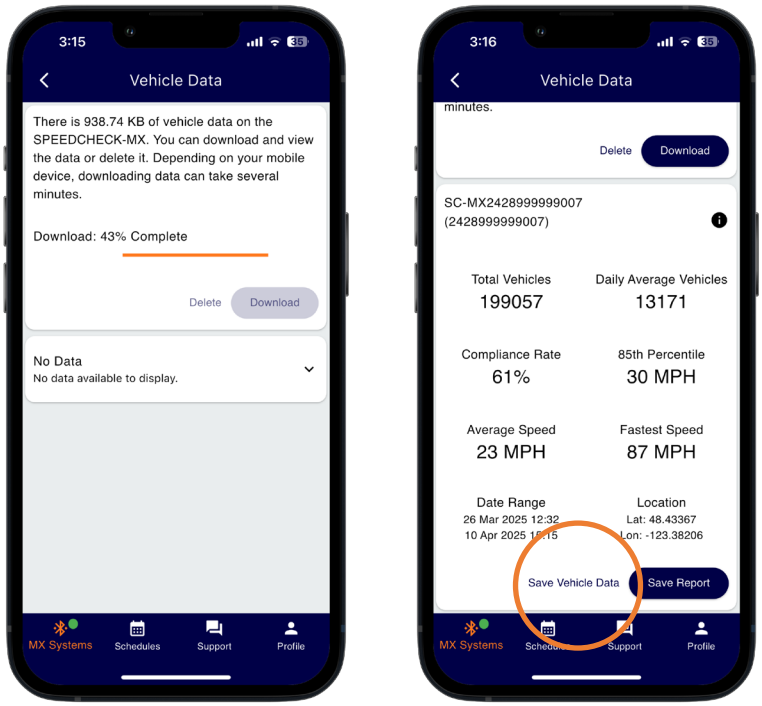
8.2 Save Vehicle Report (PDF)

1. Download vehicle data (Section 8.1).
2. Tap on Save Report to export the data as a PDF report. This is typically shared through email.



8.3 Save Vehicle Data (ZIP)

1. Download vehicle data (Section 8.1).
2. Tap on Save Vehicle Data to export raw data as a ZIP file. This is typically shared through email. This file is used for filtering and analyzing the data within MX Traffic Analyzer (Section 8.4).



8.4 MX Traffic Analyzer

MX Traffic Analyzer is Carmanah's web-based tool for reviewing, filtering, and reporting vehicle speed data collected by SPEEDCHECK-MX signs. With this application, users can:

- Load and review downloaded vehicle data
- Analyze vehicle compliance against posted speed limits
- Filter data by specific dates, days of the week, or times of day
- Exclude unusually low or high speeds to refine reports
- Generate charts to visualize traffic patterns and trends
- Export reports as PDFs or raw data as CSV files for further analysis

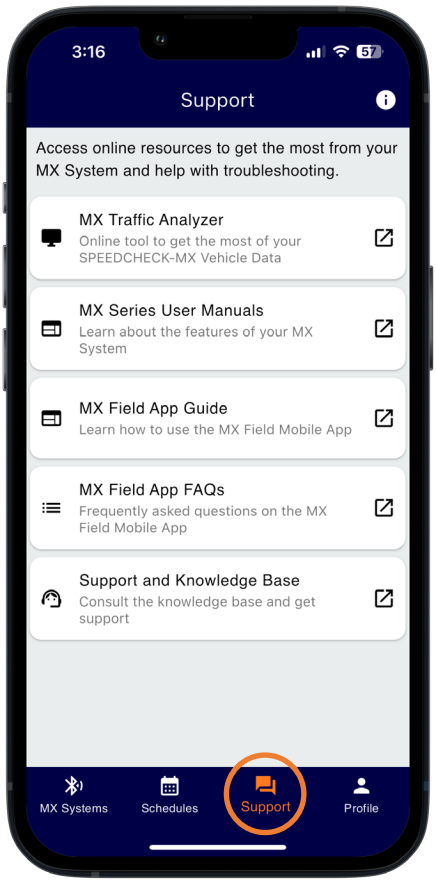
For more information, and to gain access to MX Traffic Analyzer, please visit https://carmanah.com/traffic-analyzer/ or support.carmanah.com.

9.0 Support

9.1 Support Screen

The Support screen is accessed by tapping on the Support button in the bottom dock and contains access to the following:

- MX Traffic Analyzer
- MX Series User Manuals
- MX Field App Guide (this guide)
- MX Field App FAQs
- Support and Knowledge Base
- MX Field App Version – tap on the "information icon" (ⓘ) to check the app version installed



NOTE The items above contain links to the Carmanah website and will require an Internet connection.

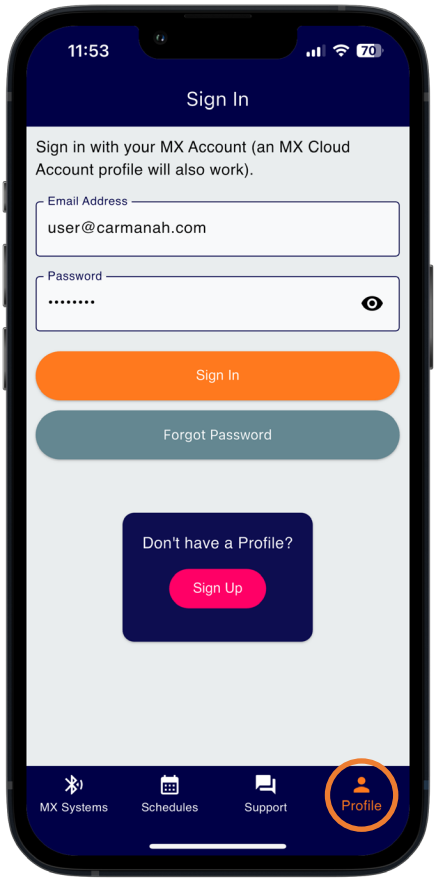
10.0 Profile

10.1 Profile Screen

The Profile screen is accessed by tapping on the Profile button in the bottom dock and contains access to the following:

When Signed Out

- Sign Up – if you have not yet created a profile, tap the Sign Up button to create your own Profile.
- Sign In – sign in with your own Profile.
- Forgot Password – use your email address to receive instructions to reset your password.

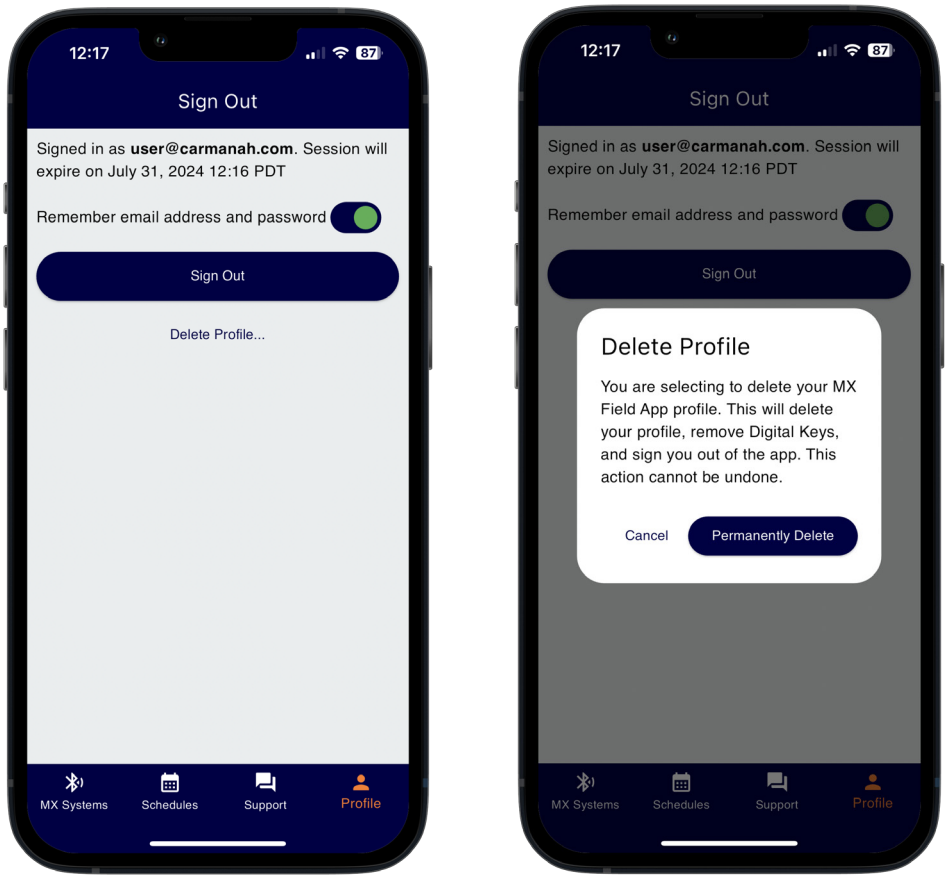


NOTE A cellular or Wi-Fi connection is required to sign into your Profile. Ensure that your session is not set to expire soon if you are using a mobile device on-site without an Internet connection. Using a mobile hotspot is useful in such situations as required.

When Signed In

- Shows your Profile's email address and when your session will expire. Your session will last for 14 days and then requires signing in again. See Section 2.1. Upon signing in again the app will download the digital key for any system that you have paired with previously. This requires an Internet connection.
- Ability to retain your email and password the next time you sign in.
- Sign out.
- Delete Profile.

Tapping on Delete Profile will give you the option to delete your Profile. Tap on Permanently Delete to complete this process and take you back to the Sign In screen.



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MX Series

Technical Support:

Email: customersupport@carmanah.com
Toll Free: 1.877.722.8877 (US & Canada)
Worldwide: 1.250.380.0052
Fax: 1.250.380.0062
Web: carmanah.com