RFID Administrator User Manual

By: Jim Schrempp, Bob Glicksman and Mike Calyer; v3, 6/24/2020

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https://github.com/TeamPracticalProjects/MN_ACL/blob/master/Terms_of_Use_License_and_Disclaimer.pdf

TABLE OF CONTENTS.

OVERVIEW.

RFID Administrators are responsible for:

1. Configuring RFID Stations and RFID Locks to be a specific type (check-in, administration, woodshop etc).
2. Managing RFID cards that are issued to users/members of an organization.

Two Android apps are used by Administrators to perform these functions:

1. *Station Configurator App*: this app allows Administrators to configure RFID Stations/Locks to become a specific type of station, including configuring one or more RFID Stations to become Admin stations. An Admin station works alongside the second app – "*Card Administration App*" – to provide the ability to make RFID cards for users, reset RFID cards to factory fresh condition, and to identify unknown RFID cards. This app also allows Administrators to configure RFID Locks to respond to events published by specific RFID Station types (e.g. to open a cabinet when a user successfully taps into some specific location/equipment within their facility).

2. *Card Administration App*: this app works alongside an RFID Station that has been configured as an Admin station to provide RFID card administration capabilities.

These two apps can run on pretty much any Android tablet or phone; even very old ones. Administrators can use their own Android phones to host these apps or can be provided with a device dedicated for this purpose that is kept alongside an Admin RFID Station. We have found that a very cheap Kindle Fire 7" tablet ($50 list, $30 on sale) works fine for this purpose.

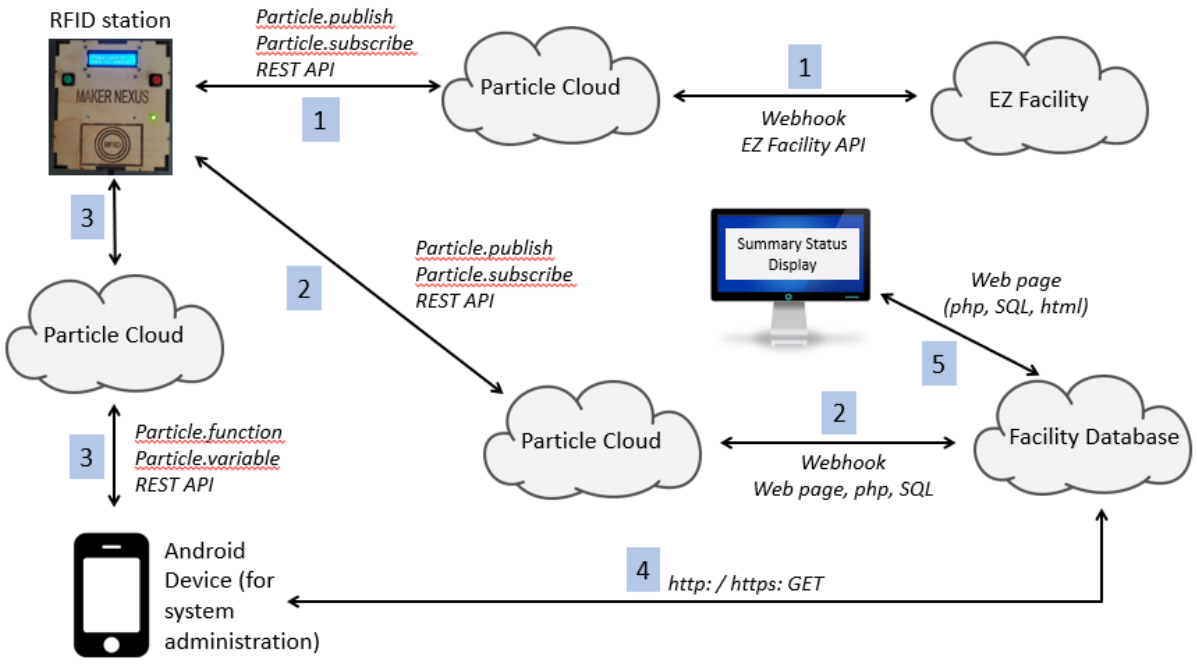


Figure 1-1. RFID System Architecture.

Figure 1-1 depicts the overall RFID system architecture. The Android device is shown in the lower left part of this figure. The Android device that hosts these two apps must have Internet access; usually via WiFi (but cellular will work equally well).

The *Station Configurator App* running on this device communicates with a web server/PHP script that returns a list of station type names and associated station type codes that are specifically tailored for the facility or organization that uses this RFID Access Control System. The *Station Configurator App* communicates with a selected RFID Station (it's Argon processor) over the Internet (via the Particle cloud) to command the Station to become a certain type and to query the Station for the type that it is currently configured to be. The *Station Configurator App* also communicates with a selected RFID Lock device[1] (it's Photon processor) over the Internet (via the Particle cloud) to command the Lock device to become a certain device type and to listen for unlock events from a specific RFID Station type. The *Station Configurator App* can also query RFID Lock devices for their current device type and "Lock Listen type code".

The *Card Administration App* running on this device communicates with a selected RFID Station (it's Argon processor) over the Internet (via the Particle cloud) to command the Station to query the CRM system for user/membership information. This information is then used to make a factory fresh RFID card into a Maker Nexus formatted card specific to that user. Other functions performed by this App are: reset a Maker Nexus formatted card back to factory fresh condition; query an unknown RFID card about its formatted type and owner (if the card is Maker Nexus formatted).

[1] See "https://GitHub.com/TeamPracticalProjects/RFID_Lock"

We suggest that at least one RFID Station be configured as an Admin station and kept in a secure location alongside an Android device that has these two apps installed on it. Although the Android device containing these two apps can be secured via biometrics, password and/or PIN, we strongly recommend adding a layer of physical access security so that only properly credentialed Administrators can manipulate RFID Stations, RFID Locks, and RFID cards.

Further information about RFID card formats, RFID system architecture, EZ Facility, the Facility database, security, etc. can be found in the document “RFID_ACS_Overview_Document” that is in the “Docs” folder in this repository.

STATION CONFIGURATOR APP.

The *Station Configurator App* is used to command an RFID Station/Lock to become a certain station type. The station types (their type names and type codes) are stored in a table in the *Facility Database* and can be tailored specifically to the needs of your Facility or Organization.

Every RFID Station and RFID Lock must be configured with a station type. The station type defines the criteria for an RFID Station to accept or reject a tapped RFID card. The station type defines the application (e.g. cabinet location) for an RFID Lock. RFID Station types are assigned type codes 0 – 999 and RFID Lock types are assigned codes >= 1000.

RFID Stations publish an *event* to the Particle cloud whenever a successful user card tap-in occurs; i.e. when the RFID Station green "OK" light comes on. This event publication contains the station type code of the RFID Station that published the event. RFID Lock devices subscribe to these events and determine if they should unlock based upon the RFID Station type code that is encoded in the event. The RFID Station code that any specific RFID Lock should respond to is called the "Lock listen code" and must be configured into every RFID Lock in the facility. Since "Lock Listen codes" are RFID Station types, these codes will be in the range of 0 – 999.

Every RFID Lock must be configured with its own, unique station type; codes 1000 and higher. Every RFID Lock must also be configured with a station type code to which it is to respond ("Lock listen code"; in the range of 0 – 999). Each RFID Lock can respond (e.g. unlock a cabinet) to one station type. That is to say, an RFID Lock must be configured with a designated device type (e.g. "laser cutter key cabinet", e.g. type code 1001) and a "Lock listen code" (e.g. "Lasers" RFID Station; e.g. type code 105). In this example, an RFID Lock is installed on a cabinet that contains a key to enable a laser cutter and miscellaneous laser cutter tools. When a card is tapped-in at the laser cutter RFID station (code 105 in this example), the RFID Station publishes an event which all RFID Locks subscribe to. The RFID Lock with station type code 1001 (defined to be the Lock on the laser cutter key cabinet) will unlock the cabinet when there is a successful tap-in at the laser cutter RFID Station because Lock device type 1001 has been configured to respond to events with device type code 105.

Many different RFID Locks may be configured to respond to one station type (i.e. successful tap-in on one RFID Station may unlock several cabinets), but any given RFID Lock can only respond to events from one station type[2].

[2] There can, of course, be multiple RFID Station of the same type; e.g. facility check-in stations at each entrance to the facility. Tapping in at any of these stations will trip the lock on all RFID Lock devices that listen for this station type code.

Station/Lock type codes and Lock listen codes are specific to a facility and are defined by the facility administration via a table in the Facility Database.

Figure 2-1 shows an overview of the *Station Configurator App:*

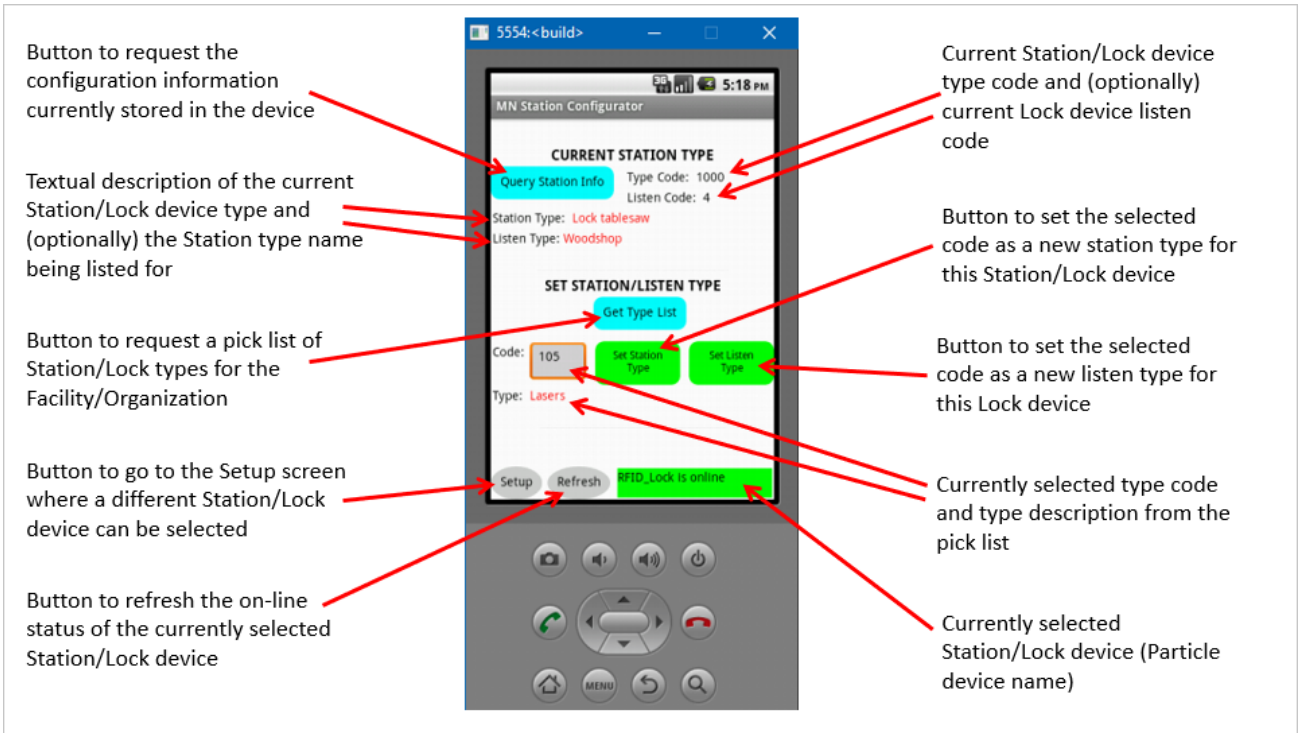


Figure 2-1. Station Configurator App Functional Overview.

The top section of this App is used to obtain the currently set station type of the selected RFID Station and the Lock listen code and type if it is an RFID Lock[3]. The name of the currently selected RFID Station/Lock (its Argon/Photon processor) is shown at bottom right of the App screen. Note that the RFID Station/Lock must be on-line (powered and communicating with the Particle cloud) in order for this App to be able to communicate with it. Tapping the "Query Station Type" button requests this information from the RFID Station/Lock. The RFID Station/Lock returns its current station type code (and, optionally, its Lock listen code), which is displayed next to the "Query Station Type" button (e.g. Type code = "1000", Lock code = "4"). The name of the Station Type (e.g. "Lock tablesaw") that is associated with the station type code and (optionally) the Listen type (e.g. "Woodshop") are displayed directly beneath the "Query Station Info" button. When an RFID Station (but not an RFID Lock) is queried for its type, it will also beep; this lets you be certain that you are communicating with the correct RFID Station.

The middle section of this App is used to request a pick list of Station/Lock listen types and the selected station type code and type name are displayed on the screen in the designated areas shown in figure 2-1. The "Set Station Type" button can then be used to command the selected

[3] If the device is an RFID Station type, then the Lock listen code and Lock listen types are blank.

RFID Station to change to the designated station type. Similarly, the "Set Listen Type" button can be used to command an RFID Lock to change to change to the designated Listen type[4].

Maker Nexus has currently defined five categories of RFID Stations and RFID Locks:

1. "Default" station type (type 0): This is the default type before any other type is commanded for the selected RFID Station. This type provides only hardware testing capabilities.

2. "Admin" station type (type 2): this station type provides RFID card administrative capabilities, in conjunction with the *Card Administration App* which is described further down in this document.

3. "Check-in" station type (type 1): this station type allows users/members to check in and check out of the facility. Several of these station types may be mounted at each entrance/exit to the facility.

4. "Location/Equipment" station type (various other type codes in the range 3 - 999): stations of this type are placed by specific items of equipment or equipment locations within the facility where users/members are expected to tap their membership RFID card to indicate their desire to use items of equipment associated with the RFID Station's location.

5. RFID Lock station types (codes 1000 and above): these type codes are assigned to RFID Locks. The fact that the code is >= 1000 defines that the device is an RFID Lock to the Station Configuration app. This is how the app knows to allow or disallow setting of a Lock listen code into the device.

The bottom section of this app contains two buttons and a display field. The "Setup" button is used to change over to the Setup screen of the App where a different RFID Station/Lock can be selected and where the URL of a script to return the station type name and code table is located. The "Refresh" button is used to ping the selected RFID Station/Lock for its current status – e.g. if it is off-line and then is brought on-line, "Refresh" can be used to verify that the Station/Lock is indeed on-line. The display field at the bottom right of the screen displays the name of the RFID Station/Lock (name of its Argon or Photon processor) and its current status. The device is on-line and OK if the background of this field is green; it is not on-line or otherwise not OK if the background of this field is red; it is waiting for a ping response from the device if the background is yellow.

When the App is first installed on an Android device, it must be set up. Complete instructions for setting up the App are below.

[4] If the station type is in the range 0 – 999, then the "Set Listen Type" button will be inactive and grayed out.

Station Configurator App Installation and Setup.

Installation.

The installation file is called *MN_Station_Configurator.apk*. It can be found in this repository:

Software/Android_Apps/StationConfigApp/MN_Station_Configurator.apk

In order to install this app on your Android device, you must transfer this installation file to your device. There are several ways to do this; here are three suggestions:

- Downloading: Download the file *MN_Station_Configurator.apk* to your Android device using a web browser on the device. Make sure that you know the folder on the Android device where the browser stores downloaded files.

- Sideloading: Download the file *MN_Station_Configurator.*apk to your desktop or laptop computer. Attach a USB cable from your desktop/laptop to your Android device. The Android device's flash memory should appear as a drive on your computer. Drag and drop the installation file to a location on the Android device where you will be able to find it later.

- E-mail: Download the file *MN_Station_Configurator.*apk to your desktop or laptop computer. Email this file to yourself as an attachment. Open email on your Android device and download the attachment, making sure that you know where the email program/browser stores attachments.

Regardless of the method that you use to get the file *MN_Station_Configurator.apk* onto your Android device, you now use a file explorer on your device to locate the file and tap on it to start the installation. The App should now install on your Android device. NOTE: you may get a message on your Android device saying that the app is "untrusted" or "unverified". This means that Android knows that the App did not come from the Google play store. Go ahead and install it anyway – it is safe! The installer will list the permissions that the App needs to run. Go ahead and accept them. The App should install properly.

App Setup.

Once the App is installed on your Android device, tap on its icon to open it. You should see a screen similar to figure 2-2. Note the currently selected station message field at the bottom right of the screen. It will be yellow for some time and ultimately turn red with an error message. This is because the app needs to be set up the first time that it is used.

Figure 2-2. First Time Opening Screen.

You need not wait for the device message field to turn red.

Tap on the *Setup* button at the bottom left of the screen. This will take you to the SETUP screen of the app, as shown in figure 2-3.

Figure 2-3. Setup Screen.

Enter your Particle User ID and Particle User Password (PW) in the fields at the top of the Setup screen. The User ID and PW are for the Particle account where the Argon/Photon processors of your RFID Station(s)/Locks(s) are registered. If you do not know this information, then ask your System Administrator for it.

Once the Particle User ID and Particle User PW are entered, tap on the button “Request Device List” which is directly under the Particle User ID text field. If the information that you entered was correct, you will get a screen similar to figure 2-4.

Figure 2-4. Requesting Device List from Particle Cloud.

Note the following in figure 2-4:

- A long, hexadecimal string of characters will appear to the right of “user:”. This is the Particle OAUTH2 user access token from the Particle cloud for the Particle account that you just logged into.
- “Response:” should show “OK”
- “Response Code:” should show “200”
- The button immediately below “Response Code” should change from “No devices” to “Select device”

If you don't get this response information, then you probably typed in an incorrect User ID or PW. Triple check this; it is easy to make a mistake. Also, make sure that your Android device is connected to the Internet; otherwise, the Particle cloud is unreachable.

After getting the screen in figure 2-4, tap the button "Select device". You will now get a pick list showing all Particle devices in your Particle account; see figure 2-5.

Figure 2-5. Device List Picker.

Tap on the device that you want to configure. The screen will return to the Setup screen, similar to figure 2-6.

Figure 2-6. Device Selected.

Referring to figure 2-6, you should now see “name:” followed by the name of the device in the pick list that you selected and also “device id:” with a long hexadecimal string after it. The Particle device (Argon in an RFID Station, Photon in an RFID Lock board) has now been selected for access by the App.

Finally, you must type in the URL to access the devices table in your Facility Database. The URL must be fully constructed to return a JSON formatted list of device type names and associated device type codes. If your Facility Database is constructed as we have documented for Maker Nexus, then the URL will fire off a PHP script that queries the Facility database for this information and returns the proper JSON response. The format is similar to:

http://<theURLforYourFacilityDatabase>/fdbGetStationConfig.php?cmd=-1

Triple check that you have typed in this string correctly! Otherwise, you will get an error message when you return to the App screen.

Figure 2-7 depicts what the Setup screen should look like after typing in the URL. Now tap the button “Exit Setup” at the bottom left of this screen.

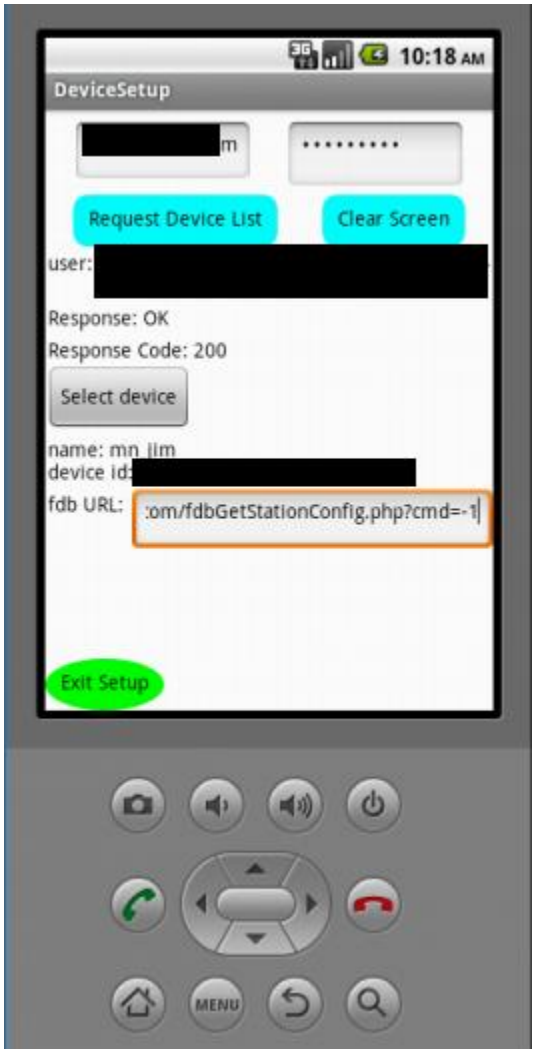


Figure 2-7. Entering Facility Database PHP Query URL.

The App should now return to the opening App screen as shown in figure 2-8, below.

Figure 2-8. Exit Setup.

Note that now the device message at the bottom right of the screen should be green (after a brief time in yellow) and should show the name of the device that you selected and the fact that it is currently online.

NOTE: The information that you provided on the Setup screen is now stored in the App. Hereafter, when you open the App, you should get the screen shown in figure 2-8 with the previously selected device showing at the bottom right of the screen.

Station Configurator App User Instructions.

The *Station Configurator App* need only be setup once. After initial setup, the Particle User ID, Particle User PW, Particle User Access Token, Device ID of the last device selected, and the URL for the station type list should all be saved in the App's data space on the Android device and the Setup screen need not be reentered unless any of this information needs to change. The most common change will be to select a different station device to configure.

Setting the Station Type for an RFID Station.

Here we assume that the device that was previously selected on the Setup screen is an RFID Station. We will want to set up the station type for this device. Instructions for an RFID Lock are in the next section of this document.

After the App is initially installed and set up, opening the App will show a screen similar to figure 3-1. The last Particle device (RFID Station) selected will be pinged and its on-line status displayed in the status area at the bottom right of this screen; see figure 3-1. The device status field should be green, indicating that the last selected device is on-line. If not, and if you want to configure this device, then check to make sure that the RFID Station of this device is powered up and connected to the Particle cloud via the Internet. If the RFID Station needs to be powered and/or rebooted, you can again ping the device for status by tapping the "Refresh" button at the bottom middle of the screen, after the RFID Station boots up and connects to the Particle cloud (Argon "breathing cyan").

If you need to select a different Particle device (i.e. a different RFID Station or RFID Lock to configure) than was previously selected, then tap "Setup" at the bottom of the screen to re-enter the Setup screen. Once in the Setup screen, you will see a display similar to figure 2-6. You do not need to re-enter the Particle User ID or Particle PW as long as the new device that you want to select is in the same Particle account. Likewise, you do not need to retype the "fdb URL" unless you need to change it. Just tap on "Select device" to get the device pick list, similar to figure 2-5, and then tap the device that you want to select. The setup screen will then look like figure 2-7, with the new device name and device ID displayed. If all is correct, tap "Exit Setup" to return to the main App screen, shown in figure 3-1.

Figure 3-1. Opening Screen (after first time setup).

Once your App screen shows the correct device and that this device is on-line (see figure 3-1), then you can use this screen to perform the main functions of the App:

- Find out what type the selected RFID Station is currently configured as
- Obtain the station type list for your facility/organization and select a new station type for the selected RFID Station.

The currently set station type in the device is automatically queried for when the app is opened or when the Setup screen is exited. If you need to execute a fresh query for the station type information, tap the “Query Station Type” button at the top left of the App screen. After a brief pause, the RFID Station will beep once and the App will display the current station type (name and code), as shown in figure 3-2. Note that the app “knows” that this is an RFID Station and not an RFID Lock by the station type code (codes < 1000). Therefore, it does not query for the Lock Listen code and it leaves the Listen code and Listen type text blank.

Figure 3-2. Query Current Station Type.

If you want to change the station type of the selected RFID Station, you should first obtain a pick list of the station types that are defined for your facility/organization. You can do this by tapping the “Get Station Type List” button in the middle of the screen. After a brief pause, you will be presented with a pick list, similar to figure 3-3, below.

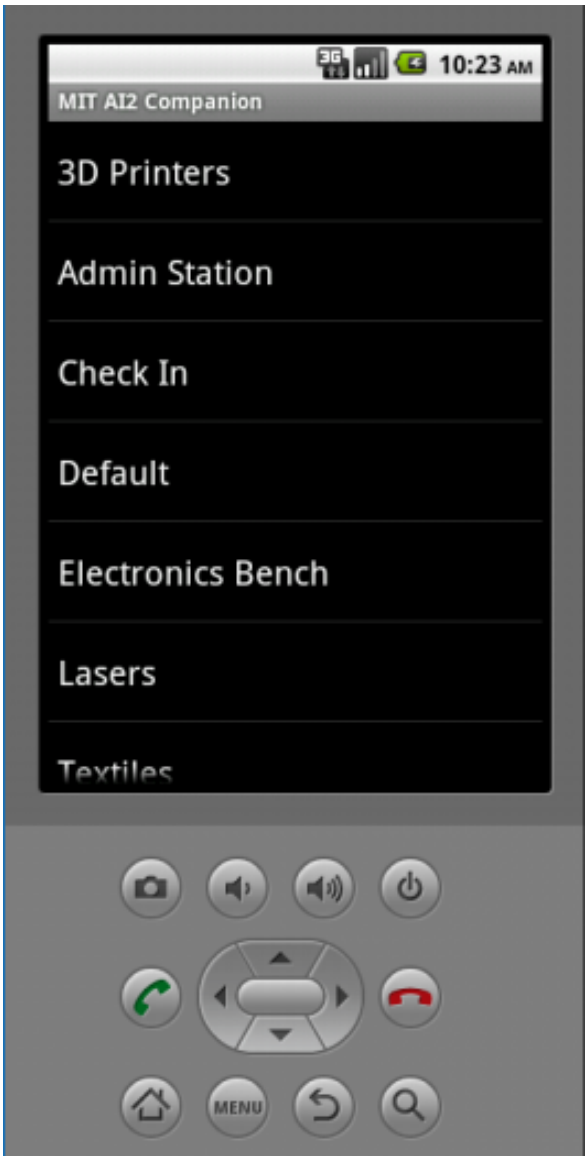


Figure 3-3. Station Type Pick List.

Tap on the station type that you want to configure the selected RFID Station to become. The pick list will disappear and the new station type name and type code will appear, as shown in figure 3-4.

Figure 3-4. Setting New Station Type.

At this point, you have selected the new station type to command the RFID Station to become. After verifying that the new station type name and station type code are what you want, tap the “Set Station Type” button in the middle left of the screen. The “Set Station Type” button will gray out briefly and then return green. When it returns to green, the RFID Station should be rebooting into the newly selected station type. Note: it will take some time for the RFID Station to reboot. *Wait until the RFID Station has fully rebooted before using it or before re-querying for its current type (figure 3-2).* The “Set Station Type” button returning to green is NOT an indication that the Station is fully rebooted – only an indication that the Station received the command to change its type.

Setting the Station Type and Lock Listen code for an RFID Lock.

If the selected device is an RFID Lock, the opening app screen will look similar to figure 3-5.

Figure 3-5. Opening Screen for RFID Lock.

Note that figure 3-5 looks very similar to figure 3-1 (RFID Station opening screen) except that the automatic query is for both the currently configured device type code and also for the current configured Lock Listen code. The app "knows" to query for the Lock Listen code because its current device type is >= 1000.

Changing the device type is exactly as described for changing an RFID Station device type; see the preceding section of this document. Note, however, that the "Set Listen Type" button is now

green and enabled. When you tap “Query Type List” you will get the same pick list as shown in figure 3-3. If you wish to change the Lock Listen code, select an RFID Station type to listen for.

Figure 3-6. Selected Code for a New Lock Listen Type.

Referring to figure 3-6, we have selected “Lasers” from the pick list because we wish this RFID Lock device to listen to successful tap-in on any RFID Station that has been configured for “Lasers”. Now tap the “Set Listen Type” button to configure the RFID lock to listen for “Lasers” tap-in events.

Note that setting a new station type or a new Lock Listen code on an RFID Lock will cause the Photon processor to reset. This process will take a little while. Make sure to wait for the Photon device to come back up on-line before proceeding to use the Lock device or querying to verify that the new RFID Lock configuration is correct.

Once the RFID Lock device is reset and back on-line, you can tap the “Query Station Info” button at the top of the app to verify that the new configuration is correct. In this example, the result will be a shown in figure 3-7.

Figure 3-7. Verification of New Lock Listen Type.

CARD ADMINISTRATION APP.

The *Card Administration App* is used to manage RFID cards. The App works in conjunction with an RFID Station that has been configured as an Admin station type. The App communicates with the Admin station and acts as an extended user interface for the Station.

Figure 4-1 depicts an overview of the *Card Administration App:*

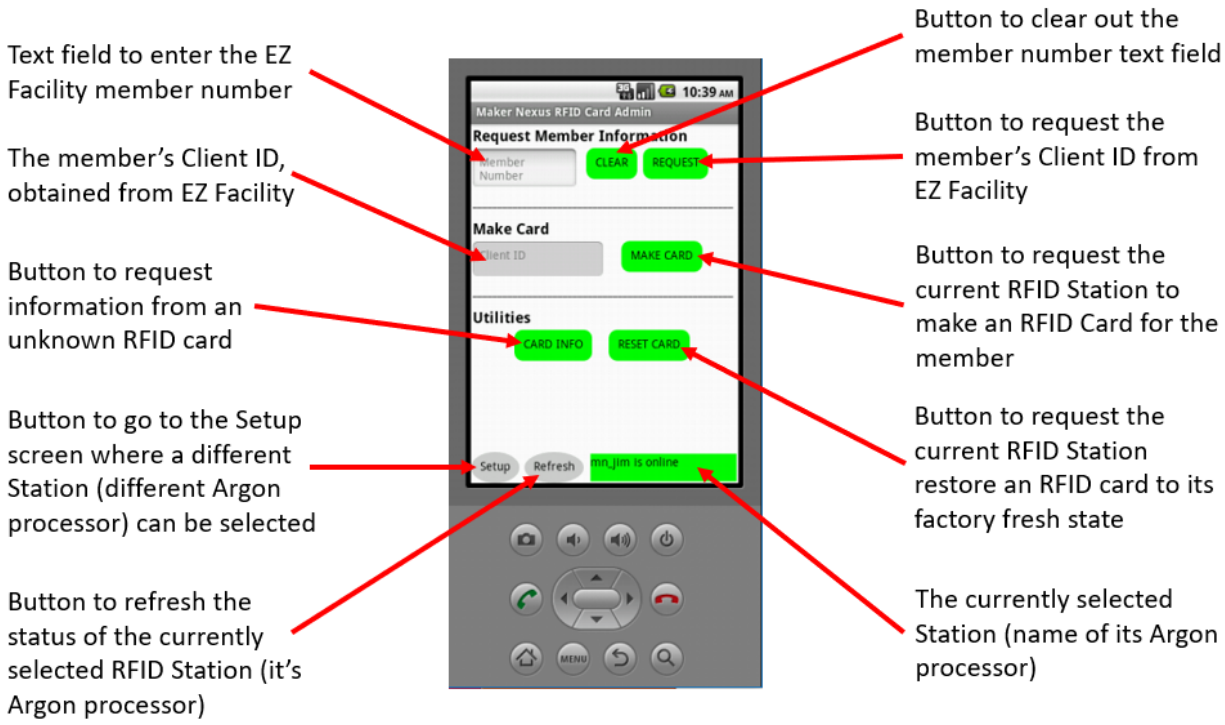


Figure 4-1. Overview of Card Administration App

The top section of this App is used to obtain member information from the CRM system (in our case EZ Facility) that is needed to make a membership card for a member. The App does not communicate directly with EZ Facility; rather it communicates with the Admin station and the Station then communicates with EZ Facility. The LCD display on the Admin station, as well as the LED indicators and buzzer on the Station, act as additional user interface elements of the RFID card management process.

The user of the *Card Administration App* must type the member's membership number into the text box at the top left of the App screen. If a mistake is made, the "CLEAR" button at the top

center of the screen may be used to clear out the current data from the member number text field. When the correct member number is entered in the text field, the “REQUEST” button may be tapped to request that the Admin station obtain member information from EZ Facility. The specific member information that is needed to make an RFID card is the EZ Facility “Client ID” and the “Custom Field 1” information for that member from EZ Facility. When this information is retrieved from EZ Facility, the “Client ID” field is populated with the Client ID from EZ Facility.

The middle section of this App is used to actually make a factory fresh RFID card into a membership card. The user of the App should check the Client ID to verify that it is correct and then use the “MAKE CARD” button to command the Admin station to make the card. The LCD display on the Admin station, along with the LED indicators and buzzer, further prompts the user to place a factory fresh RFID card on the RFID area on the Station and when the card may be removed.

The “Utilities” section of the App contains two additional buttons. The “CARD INFO” button is used to identify an unknown RFID card and the “RESET CARD” button is used to reset a formatted card back to the factory fresh condition for reuse at a later time (e.g. to recycle a card after member resigns).

The bottom section of this app contains two buttons and a display field. The “Setup” button is used to change over to the Setup screen of the App where a different RFID Station can be selected. The “Refresh” button is used to ping the selected RFID Station for its current status – e.g. if it is off-line and then is brought on-line, “Refresh” can be used to verify that the Station is indeed on-line. The display field at the bottom right of the screen displays the name of the RFID Station (name of its Argon processor) and its current status. The device is on-line and OK if the background of this field is green; it is not on-line or otherwise not OK if the background of this field is red; it is waiting for a ping response from the device if the background is yellow.

When the App is first installed on an Android device, it must be set up. Complete instructions for setting up the App are below.

Card Administration App Installation and Configuration.

Installation.

The installation file is called *MN_Card_Administration.apk*. It can be found in this repository:

Software/Android_Apps/AdminGUIApp/MN_Card_Administration.apk

In order to install this app on your Android device, you must transfer this installation file to your device. There are several ways to do this; here are three suggestions:

- Downloading: Download the file *MN_Card_Administration.apk* to your Android device using a web browser on the device. Make sure that you know the folder on the Android device where the browser stores downloaded files.

- Sideloading: Download the file *MN_Card_Administration.apk* to your desktop or laptop computer. Attach a USB cable from your desktop/laptop to your Android device. The Android device's flash memory should appear as a drive on your computer. Drag and drop the installation file to a location on the Android device where you will be able to find it later.

- E-mail: Download the file *MN_Card_Administration.apk* to your desktop or laptop computer. Email this file to yourself as an attachment. Open email on your Android device and download the attachment, making sure that you know where the email program/browser stores attachments.

Regardless of the method that you use to get the file *MN_Card_Administration.apk* onto your Android device, you now use a file explorer on your device to locate the file and tap on it to start the installation. The App should now install on your Android device. NOTE: you may get a message on your Android device saying that the app is "untrusted" or "unverified". This means that Android knows that the App did not come from the Google play store. Go ahead and install it anyway – it is safe! The installer will list the permissions that the App needs to run. Go ahead and accept them. The App should install properly.

App Setup.

Once the App is installed on your Android device, tap on its icon to open it. You should see a screen similar to figure 4-1, except that the currently selected station message field at the bottom right of the screen will be yellow for some time and ultimately turn red with an error message. This is because the app needs to be set up the first time that it is used. Tap the "Setup" button at the bottom left of the App screen to go to the App's Setup screen. The Setup screen looks like the picture in figure 4-2, with no information in the text boxes at the top.

Figure 4-2. Admin App Setup Screen.

Enter your Particle User ID and Particle User Password (PW) in the fields at the top of the Setup screen. The User ID and PW are for the Particle account where the Argon processors of your RFID Station(s) are registered. If you do not know this information, then ask your System Administrator for it.

Once the Particle User ID and Particle User PW are entered, tap on the button “Request Device List” which is directly under the Particle User ID text field. If the information that you entered was correct, you will get a screen similar to figure 4-3.

Figure 4-3. Request Device List.

Note the following in figure 4-3:

- A long, hexadecimal string of characters will appear to the right of “user:”. This is the Particle OAUTH2 user access token from the Particle cloud for the Particle account that you just logged into.
- “Response:” should show “OK”
- “Response Code:” should show “200”
- The button immediately below “Response Code” should change from “No devices” to “Select device”

If you don’t get this response information, then you probably typed in an incorrect User ID or PW. Triple check this; it is easy to make a mistake. Also, make sure that your Android device is connected to the Internet; otherwise, the Particle cloud is unreachable.

After getting the screen in figure 4-3, tap the button “Select device”. You will now get a pick list showing all Particle devices in your Particle account; see figure 4-4.

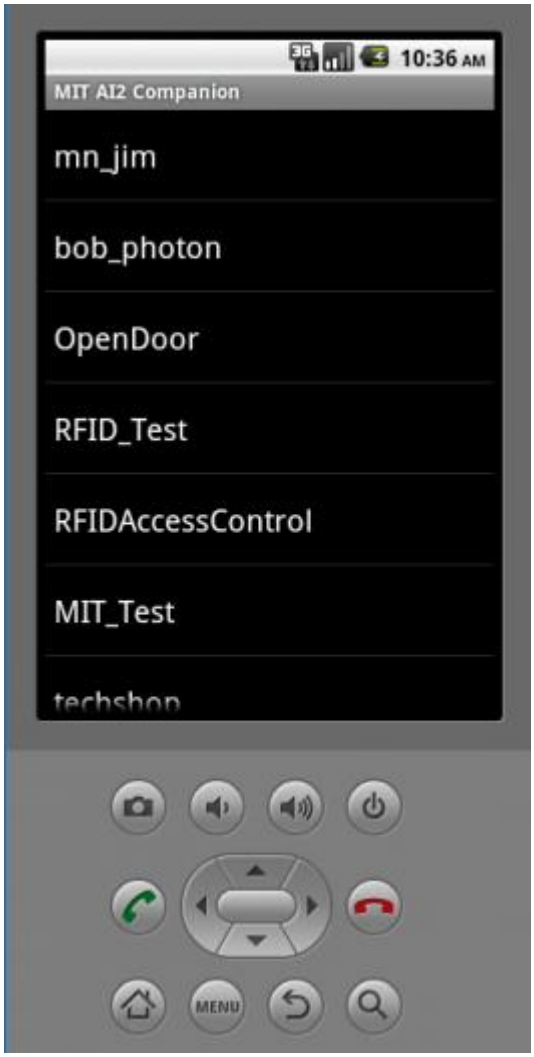


Figure 4-4. Device List Picker.

Tap on the device that you want to configure. The screen will return to the Setup screen, similar to figure 4-5.

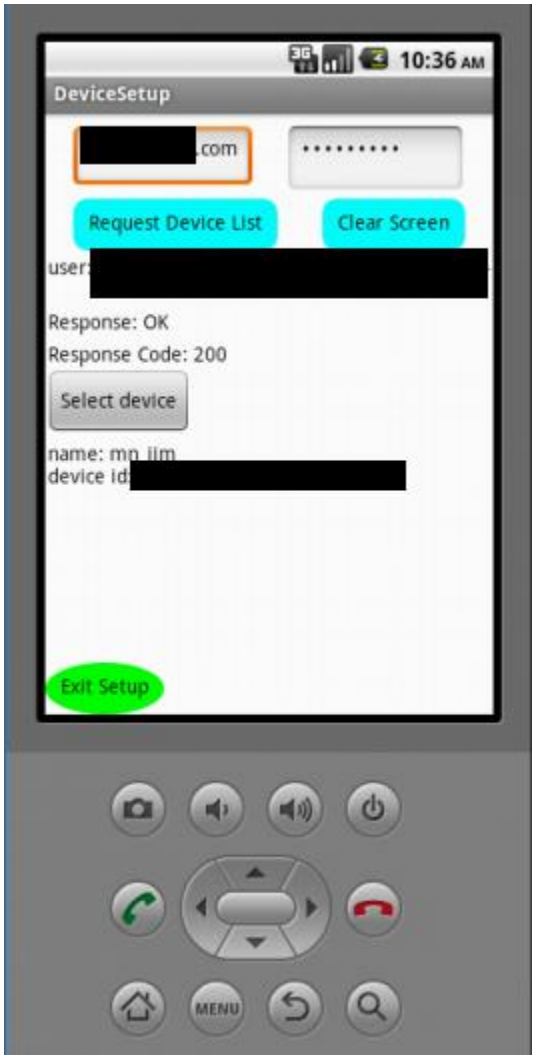


Figure 4-5. Device Selected – Exit Setup.

Referring to figure 4-5, you should now see “name:” followed by the name of the device in the pick list that you selected and also “device id:” with a long hexadecimal string after it. The Particle device (Argon in an RFID Station) has now been selected for access by the App. Now tap the button “Exit Setup” at the bottom left of this screen. The App should now return to the opening App screen as shown in figure 5-1, below.

Note that now the device message at the bottom right of the screen should be green (after a brief time in yellow) and should show the name of the device that you selected and the fact that it is currently online.

NOTE: The information that you provided on the Setup screen is now stored in the App. Hereafter, when you open the App, you should get the screen shown in figure 5-1 with the previously selected device showing at the bottom right of the screen.

Card Administration App User Instructions.

The Card Administration App need only be setup once. After initial setup, the Particle User ID, Particle User PW, Particle User Access Token, and Device ID of the last device selected will all be saved in the App's data space on the Android device and the Setup screen need not be reentered unless any of this information needs to change.

After the App is initially installed and set up, opening the App will show a screen similar to figure 5-1. The last Particle device (RFID Station) selected will be pinged and its on-line status displayed in the status area at the bottom right of this screen; see figure 5-1. The device status field should be green, indicating that the last selected device is on-line. If not, and if you want to use this RFID Admin Station, then check to make sure that this device is powered up and connected to the Particle cloud via the Internet. If the RFID Admin Station needs to be powered and/or rebooted, you can again ping the device for status by tapping the "Refresh" button at the bottom middle of the screen, after the RFID Station boots up and connects to the Particle cloud (Argon "breathing cyan").

If you need to select a different Particle device (i.e. a different RFID Admin Station) than was previously selected, then tap "Setup" at the bottom of the screen to re-enter the Setup screen. Once in the Setup screen, you will see a display similar to figure 4-3. You do not need to re-enter the Particle User ID or Particle PW as long as the new device that you want to select is in the same Particle account. Just tap on "Select device" to get the device pick list, similar to figure 4-4, and then tap the device that you want to select. The setup screen will then look like figure 4-5, with the new device name and device ID displayed. If all is correct, tap "Exit Setup" to return to the main App screen, shown in figure 5-1.

Figure 5-1. Admin App Opening Screen (after first time setup).

In order to make an RFID card for a member, the member's membership number must be known. If necessary, the Administrative user should look up this number in EZ Facility. The App user should then enter the membership number in the "Member Number" text field at the top left of the screen and then tap the "REQUEST" button. The button will turn gray for a short time while the RFID Station is requesting member information from EZ Facility. When the information is retrieved from EZ Facility and returned to the App from the Admin station, the member information will appear in a popup window, similar to figure 5-2. This information can be used by the Administrator to make sure that the correct member has been selected and that the member is in good standing (membership active and paid up). See figure 5-2 for such a result.

Figure 5-2. Request member Information.

The pop-up message can be dismissed by tapping “OK”.

After tapping “OK”, the message will disappear and the “Client ID” text field will be filled in with the EZ Facility Client ID for the member. If the name presented in the pop up was correct, the App user can then tap on the “MAKE CARD” button and follow the directions on the Admin station to make the RFID membership card.

Referring back to figure 5-1, tapping the “CARD INFO” button will cause the Admin station to display prompts for presenting an unknown RFID card to the Admin station. After the card is presented and read, the App will show the results; e.g. figure 5-3.

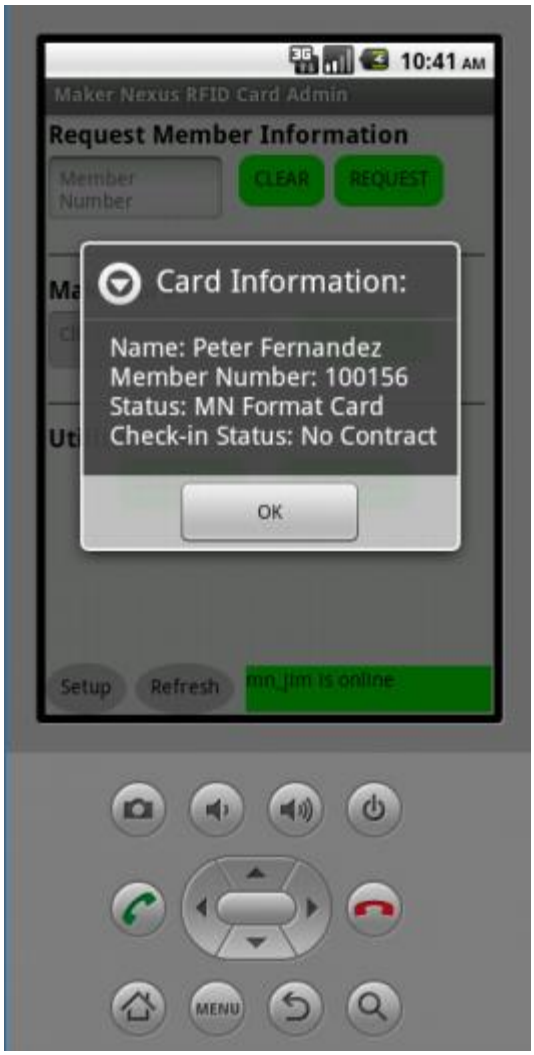


Figure 5-3. Request Card Information.

The card information message in figure 5-3 can be dismissed by tapping “OK” on the message.

Referring back to figure 5-1, tapping the “RESET CARD” button will cause the Admin station to display prompts for presenting a formatted membership RFID card to the Station, after which the card will be reset to the factory fresh state. All prompts for this operation are on the Admin station itself, not on the App

Making an RFID Card for a Member.

The process of making an RFID membership card for a member involves accessing EZ Facility first and then using the App and the Admin station as described above. Before an RFID card can be made for a member, the member’s information must be in EZ Facility and a facility/organization specific membership number assigned to the member. EZ Facility will ensure that the membership member is unique, but otherwise it is entirely up to the

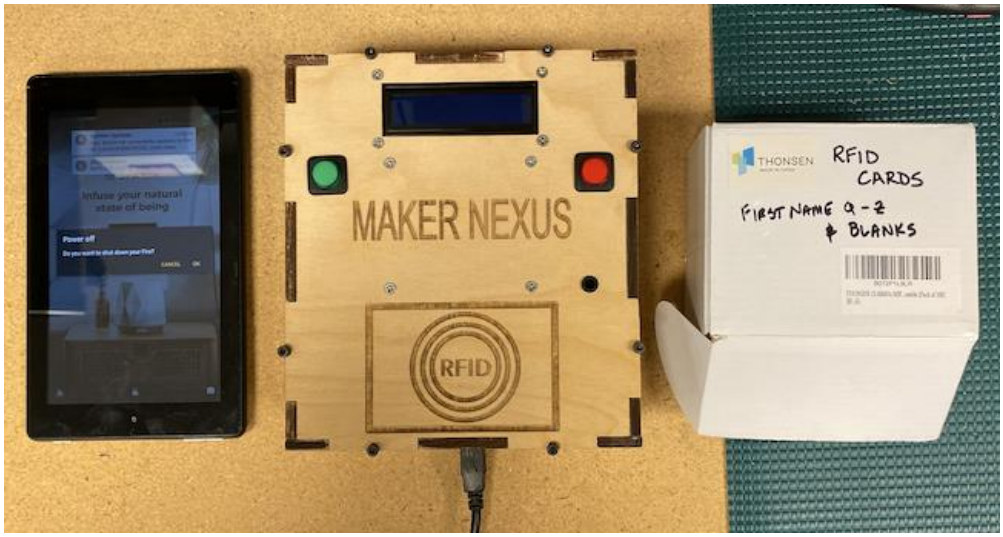
facility/organization's rules as to how these numbers are created. The *Card Administration App* uses this number to lookup the Client ID for that member. Client ID is an index into the member's EZ Facility data that is generated by EZ Facility itself.

Two items of data are retrieved from EZ Facility and written (encrypted) to the RFID card: (1) the Client ID assigned by EZ Facility, and (2) the contents of "Custom Field 1" of the member's record in EZ Facility. Initially, Custom Field 1 is blank, and it may be left so for the first issuance of an RFID card to a member. However, if the member needs a replacement RFID card, the administrator should enter some arbitrary, random number into Custom Field 1 in EZ Facility prior to making the new RFID card. The RFID Access Control System uses this number to make sure that the card presented to any RFID Station is the latest card and not an older one; i.e. it provides for automatic card revocation.

The following is excerpted from Maker Nexus' Administration Instructions. The specifics may vary for your facility or organization:

Get Ready

Assemble all the tools and supplies you will need.



Android Tablet, Maker Nexus ADMIN box, blank RFID card(s)

Android Tablet

Marked on back

Kept in drawer at front desk

Should be charged up

Maker Nexus ADMIN Box

Marked on the side.

This is kept in the drawer at the front desk

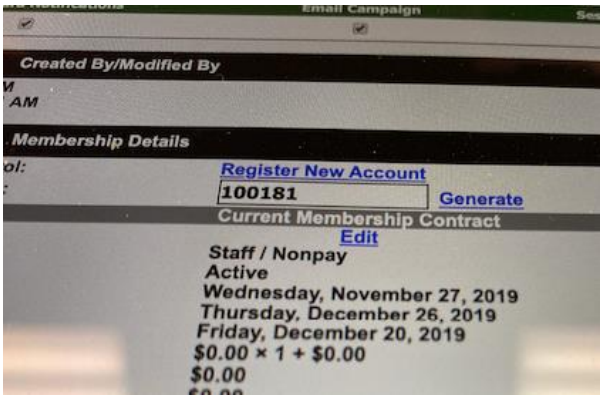
Blank RFID Cards

These are NOT the same cards as the ones we print id badges on. They look identical but they are not. Our system uses “13.56MHz MIFARE Classic 1K RFID Smart Cards ISO14443A Sublimation Printable”.

A box with blank cards in it.

When I buy a new pack of cards, I mark the edge so, hopefully, people will know they are different.

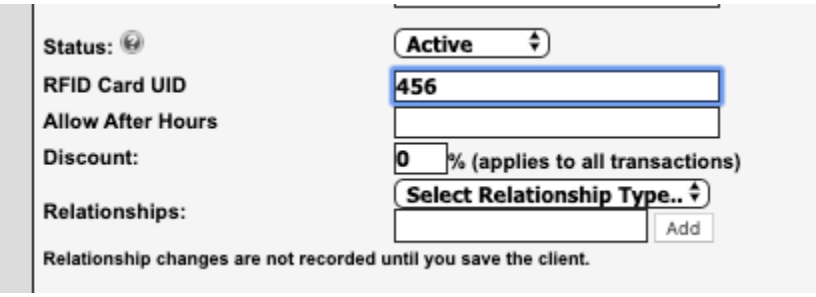
Get the Member Number



Member Number of each person you want to make a card for. This is found on the Personal info tab of the client in EZFacility.

The Process

1. OPTIONAL: If you are replacing a card and want to invalidate the old card, then you must update a field in EZ Facility. On the client’s “personal” information tab, about half way down on the left is the “RFID Card UID” field (Custom Field 1, renamed). It is usually blank. To invalidate an old RFID card, change this field in some way. It does not matter what you put in the field, so just put in three or four random characters.

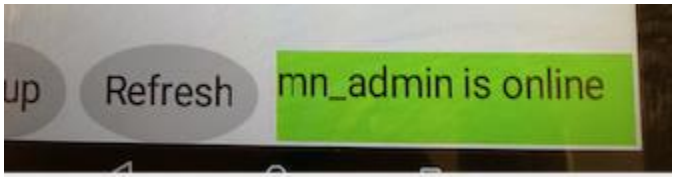


2. Make sure the Maker Nexus ADMIN box is running. The display should look like this:

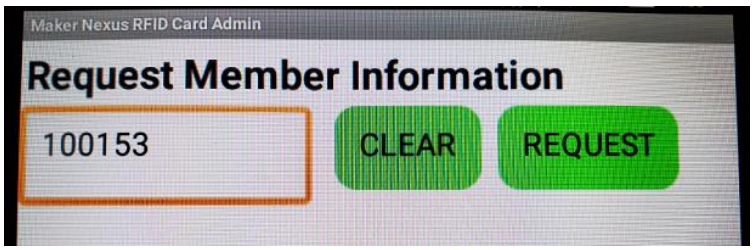
3. Turn on the Android tablet. Scroll to the bottom and tap on the MN app icon.

This will bring up the MN Administration App, which looks like this:

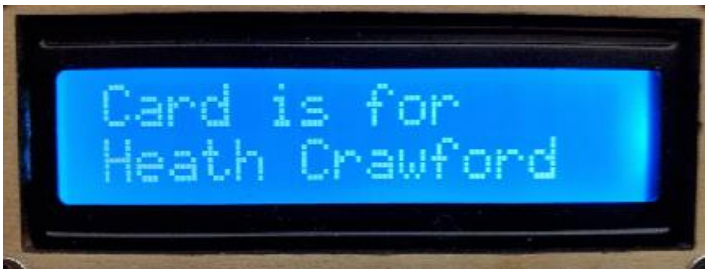
4. Make sure the app is set up. If the lower right corner is not green, then something is wrong. Try tapping the REFRESH button once. If that doesn't fix it, make sure that the RFID Admin Station is plugged in and connected to the Particle cloud (the Argon processor is "breathing cyan"). A green indicator that the system "is online" is good.



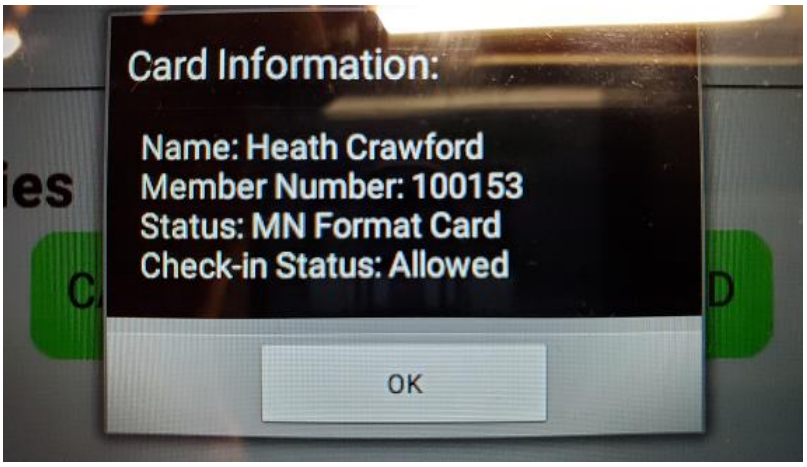
5. Enter the member number. In this case we entered 100153. Tap the REQUEST button.



6. Watch the LCD screen on the MN ADMIN box. It will eventually show the name associated with the member number you entered.

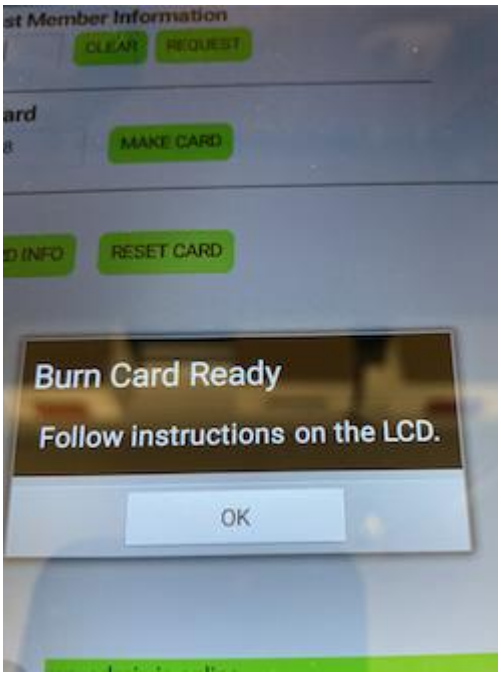


7. After a few seconds, the Android app will display information about the member.



   a. Verify that the member name is the person you want to make a card for.
   b. The ClientID is different than the Member Number, don't worry about this.
   c. Status shows if they have an active membership.
   d. Check-in Status shows what will happen if they try to check-in.
      i. Allowed means they will get a green light
      ii. Any other message should give you an indication of why the system would not allow them to check-in. Perhaps their membership has expired. Perhaps the credit card on their account did not process correctly.
   e. No matter the status, you can still create an RFID card for this person.
   f. Tap OK to dismiss this information box.

8. Tap MAKE CARD. A message shows up telling you to look at the MN ADMIN box. Note that you must do this within 15 seconds of when you tapped the REQUEST button. If time expired the system will reset and you will have to tap REQUEST again.



9. The MN ADMIN box should now be ready to create the card.

Place a blank card on the square:

This message will appear immediately followed by two beeps. That's it, the card has been created.

10. Wrap up
    a. Either give the card to the member.
    b. Or put a piece of tape on it with their name and file the card in the office. Then use EZ Facility to send the member a note that their card is ready (there is a template message in EZ Facility for this.)

11. Clean up
    a. Unplug the MN ADMIN box and put it on the shelf.
    b. Return the Android tablet to the drawer and plug it in.
    c. Return unused RFID cards to the office.