# RapidScan

## RiSL Programming Guide

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# Table of Contents

## Introduction

This guide describes how to use the **Ri**ng **S**canner **L**anguage (RiSL). The language is comprised of a set of commands that allows a remote system to customize what is displayed on the screen of a HaloRing running our off-the-shelf RapidScan application.

The commands can be used to customize the size, color, and content of each message while additional functionality like buttons, vibration and sound can provide the user with advanced feedback and gather data input.

## Pre-Requisites

- HaloRing with RapidScan application installed
- Connection to a supported remote system. This can be either:
    - REST server via Wi-Fi
    - MQTT server via Wi-Fi
    - GATT server via BLE
    - iOS or Android application w/ companion framework
    - SPP server via Bluetooth
- Alternatively, connection to one of the following demo systems:
    - MQTT dashboard via Wi-Fi **(demo purposes only)**
    - iOS/Android companion demo via BLE **(demo purposes only)**

# About the Programming Guide

## How the Commands are Documented

**Name:** Name of the command

**Description:** Each command will come with a paragraph describing how the command is used. This section will explain the command's capabilities and how it can be used in conjunction with other commands. Examples are sometimes also included to further elaborate on how the command can be used.

**Format:** The format section details how the command is called, what parameters it takes and the order of the parameters.

**Parameters:** If a command has input parameters, they will appear in a table like the one below. Each parameter will have a details section that describes the values that can be passed and will often come with an accompanying note.

| Parameters | Details |
|---|---|
| **y** = y coordinate | **Values:** 1 to 200<br><br>This number is in pixels with 200 being the maximum height of a RiSL card. |
| **text** = text to be written | **Values:** Any string |

## RiSL Examples

After the RiSL Commands section is the RiSL Examples section. This section will include sample cards with screenshots that will demonstrate the use of every command found in this document.

If you are unclear about how to use of any of the RiSL commands, be sure to check out how they are being used in this section.

## ^StartCard

### Starts the current card

The **^StartCard** command starts a new card using the size parameters supplied. Any commands sent after a card is “started” will apply to the current card. Only until **^ShowCard** or **^SaveCard** are called will the current card be “ended”. When a card has been “ended” any commands that are received will be ignored until a new card is “started”.

**Format:** ^StartCard|width|height

| Parameters | Details |
|---|---|
| **width** = card width (in pixels) | **Values:** 1 to 290<br><br>This number is in pixels with 290 being the maximum width of a RiSL card. |
| **height** = card height (in pixels) | **Values:** 1 to …<br><br>This number is in pixels. There is no maximum height of a RiSL card. |

## ^Font

### Sets the current font

The **^Font** command sets the current font that any Text (**^Text**, **^TextC**, **^TextL**, **^TextR**) or Button (**^Button**) command will adhere to. The command can take a list of attributes that will be applied to the current font. The current font can be set multiple times in a single RiSL card allowing you to have text and buttons that use different fonts.

For example, the command ^Font|24|Bold|Underline|#FFFFFF would set the current font to be size 24, Bold and Underlined with the white hex color (#FFFFFF). Any **^Text** command that follows would use this font when writing to the current card. In addition, any **^Button** that had text would use this font as well.

**Format:** ^Font|size|attribute|attribute|…

| Parameters | Details |
|---|---|
| **size** = font size | **Values:** Any integer |
| **attribute** = font attribute | **Values:** Attributes can be any of the following:<br>• Bold<br>• Underline<br>• Italic<br>• A hex color with the format: #FFFFFF<br>**Note:** There can potentially be 0 – 4 attributes listed at any one time. |

## ^Text

### Writes text using the current font

The **^Text** command writes text at the given x,y coordinate. The text will be written using whatever the current font is set to. If no font was set before the **^Text** command, then the default font will be used. The default font is size 24 in white.

**Format:** ^Text|x|y|text

| Parameters | Details |
|---|---|
| **x** = x coordinate (in pixels) | **Values:** 1 to 290<br><br>This number is in pixels with 290 being the maximum width of a RiSL card. |
| **y** = y coordinate (in pixels) | **Values:** 1 to …<br><br>This number is in pixels. There is no maximum height of a RiSL card. |
| **text** = text to be written | **Values:** Any string |

## ^TextC

### Writes centered text using the current font

The **^TextC** command writes centered text at the given y pixel row. The text will be written using whatever the current font is set to. If no font was set before the **^TextC** command, then the default font will be used. The default font is size 24 in white.

**Format:** ^TextC|y|text

| Parameters | Details |
|---|---|
| **y** = y coordinate | **Values:** 1 to …<br><br>This number is in pixels. There is no maximum height of a RiSL card. |
| **text** = text to be written | **Values:** Any string |

## ^TextL

### Writes left justified text using the current font

The **^TextL** command writes left justified text at the given y pixel row. The text will be written using whatever the current font is set to. If no font was set before the **^TextL** command, then the default font will be used. The default font is size 24 in white.

**Format:** ^TextL|y|text

| Parameters | Details |
|---|---|
| **y** = y coordinate | **Values:** 1 to …<br><br>This number is in pixels. There is no maximum height of a RiSL card. |
| **text** = text to be written | **Values:** Any string |

## ^TextR

### Writes right justified text using the current font

The **^TextR** command writes centered text at the given y pixel row. The text will be written using whatever the current font is set to. If no font was set before the **^TextR** command, then the default font will be used. The default font is size 24 in white.

**Format:** ^TextR|y|text

| Parameters | Details |
|---|---|
| **y** = y coordinate | **Values:** 1 to …<br><br>This number is in pixels. There is no maximum height of a RiSL card. |
| **text** = text to be written | **Values:** Any string |

## ^Button

### Draws a button capable of notifying the server it is clicked

The **^Button** command creates a button at the given x,y coordinate. The command takes in parameters that define size, title and color. The button title will use the current font that is set.

The parameter **id** allows the HaloRing to communicate back with the server that the button has been pressed. For example, look at the following button:

^Button|10|100|270|50|#FF0000|Package Damaged?|pkgDmgd

If this button was pressed, the server would receive the JSON {"buttonPressed": "pkgDmgd"}

**Format:** ^Button|x|y|width|height|color|text|id

| Parameters | Details |
|---|---|
| **x** = x coordinate | **Values:** 1 to 290<br><br>This number is in pixels with 290 being the maximum width of a RiSL card. |
| **y** = y coordinate | **Values:** 1 to …<br><br>This number is in pixels. There is no maximum height of a RiSL card. |
| **width** = width of button | **Values:** 1 to 290<br><br>This number is in pixels with 290 being the maximum width of a RiSL card. |
| **height** = height of button | **Values:** 1 to …<br><br>This number is in pixels. There is no maximum height of a RiSL card. |
| **color** = background color of button | **Values:** Hex color using the format: #FFFFFF |
| **text** = title of button | **Values:** Any string |
| **id** = identifier returned on button press | **Values:** Any string |

## ^Image

### Draws a base64 image

The **^Image** command draws an image at the given x,y coordinate. The command takes in parameters that define size, position and base64 content. Note that the base64 does not have a prefix string you would normally see in HTML i.e. “data:image/png;base64”. Just include the base64 string as is.

**Format:** ^Image|x|y|width|height|base64

| Parameters | Details |
|---|---|
| **x** = x coordinate | **Values:** 1 to 290<br><br>This number is in pixels with 290 being the maximum width of a RiSL card. |
| **y** = y coordinate | **Values:** 1 to …<br><br>This number is in pixels. There is no maximum height of a RiSL card. |
| **width** = width of image | **Values:** 1 to 290<br><br>This number is in pixels with 290 being the maximum width of a RiSL card. |
| **height** = height of image | **Values:** 1 to …<br><br>This number is in pixels. There is no maximum height of a RiSL card. |
| **base64** = base64 string | **Values:** Any valid base64 string |

## ^Rectangle

### Draws a rectangle

The **^Rectangle** command draws a rectangle at the given x,y coordinate. The command takes in parameters that define size, position and color.

**Format:** ^Image|x|y|width|height|color

| Parameters | Details |
|---|---|
| **x** = x coordinate | **Values:** 1 to 290<br><br>This number is in pixels with 290 being the maximum width of a RiSL card. |
| **y** = y coordinate | **Values:** 1 to …<br><br>This number is in pixels. There is no maximum height of a RiSL card. |
| **width** = width of rectangle | **Values:** 1 to 290<br><br>This number is in pixels with 290 being the maximum width of a RiSL card. |
| **height** = height of rectangle | **Values:** 1 to …<br><br>This number is in pixels. There is no maximum height of a RiSL card. |
| **color** = color of rectangle | **Values:** Hex color using the format: #FFFFFF |

## ^CardBackColor

### Sets the background color of the current card

The **^CardBackColor** command sets the background color of the current card using the given color. Make sure this color is in the hex format with the "#" included.

**Format:** ^CardBackColor|color

| Parameters | Details |
|---|---|
| **color** = hex color | **Values:** Hex color using the format: #FFFFFF |

## ^ShowCard

### Shows the current card

The **^ShowCard** command will display the current card to the HaloRing's screen. After this is done, the current card has effectively "ended". This means a new card must be "started" using the **^StartCard** or **^LoadCard** commands before you can start adding other RiSL commands. Any commands received before a new card is "started" are ignored.

**Format:** ^ShowCard

## ^SaveCard

### Saves the current card to the HaloRing’s memory

The **^SaveCard** command is a convenience command that allows you to save a RiSL card into the HaloRing’s memory, so you don’t need to rewrite it over and over. This command is used in conjunction with the **^LoadCard** command that loads a saved card to be the current card. **^SaveCard** is similar to **^ShowCard** in that when performed, the current card has effectively “ended”. This means a new card must be “started” using the **^StartCard** or **^LoadCard** commands before you can start adding other RiSL commands. Any commands received before a new card is “started” are ignored.

Here's an example use case: You have a RiSL card that is sent when a package is flagged and requires special attention. It is used many times a day, so to make easier you tell the HaloRing to save it into memory. Now that it is saved, instead of building the card from scratch, you can simply call ^LoadCard and it will be loaded as the current card as if all the commands that make up that card were just entered.

Cards saved in the HaloRing’s memory will last until they are replaced, or that app is deleted. To replace a previously saved card, just use the same name and call **^SaveCard** again.

**Format:** ^SaveCard|name

| Parameters | Details |
|---|---|
| **name** = name of card | **Values:** Any string<br><br>This serves as the card’s unique identifier when being saved into a HaloRing’s memory. |

## ^LoadCard

### Loads a card from the HaloRing’s memory

The **^LoadCard** command is used to load a previously saved card from the HaloRing’s memory and set it as the new current card. If no card matching the name is found the HaloRing will do nothing.

An easy way to think of this is to imagine all the commands that make up a card before you save it. When loading the card, it’s as if every one of those commands were processed when you called **^LoadCard**.

**Format:** ^LoadCard|name

| Parameters | Details |
|---|---|
| **name** = name of card | **Values:** Any string<br><br>This is the card’s unique identifier when it was saved into the HaloRing’s memory. |

## ^CardExists

### Checks to see if a specific card has been saved in the HaloRing’s memory

The **^CardExists** command allows the server to check if a card matching the provided name has been saved in the HaloRing’s memory.

This can be especially useful when new HaloRings are introduced that might not have saved your premade cards yet. When the command is received, the HaloRing will respond to your server with the following JSON {“cardExists”: true/false}.

**Format:** ^CardExists|name

| Parameters | Details |
|---|---|
| **name** = name of card | **Values:** Any string<br><br>This is the card’s unique identifier when being stored into the HaloRing’s memory. |

## ^Set

### Sets any placeholders in the current card to the given text

The **^Set** command leverages **placeholders** which can be added to any text or button command. A **placeholder** is any string surrounded by square brackets. Example: [packageNum]

As the name suggests, a **placeholder** is meant to be replaced by a different string by using the **^Set** command. If no string is set, the text or button will simply print the **placeholder** as is. This ability when used in conjunction with the **^SaveCard** and **^LoadCard** commands means you have the ability change text in previously saved cards.

For an example of this command in action, please see our Sample RiSL Cards section at the end of this document.

**Format:** ^Set|[placeholder]|text

| Parameters | Details |
|---|---|
| **[placeholder]** = name of the placeholder | **Values:** Any string<br><br>**Note:** The placeholder must follow the format: [string].<br><br>**Example:** ^Set\|[packageNum]\|12345 |
| **text** = text to replace placeholder | **Values:** Any string |

## ^Vibrate

### Vibrates the HaloRing

The **^Vibrate** command is used to vibrate the HaloRing to give the user haptic feedback. This command is unique in that it does not need to be included with a card to work and can be used standalone. If it is included in a card, the device will vibrate when the current card is displayed with the **^ShowCard** command.

**Format:** ^Vibrate|type

| Parameters | Details |
|---|---|
| **type** = type of vibration | **Values:** 1 to 4<br><br>There are currently 4 different vibration lengths ranging from 1 (shortest) to 4 (longest). |

## ^PlaySound

### Plays a sound from the HaloRing

The **^PlaySound** command is used to play sounds from the HaloRing to give the user audio feedback. This command is unique in that it does not need to be included with a card to work and can be used standalone. If it is included in a card, the sound will play when the current card is displayed with the **^ShowCard** command.

**Format:** ^PlaySound|type

| Parameters | Details |
|---|---|
| **type** = type of sound | **Values:** The current sounds supported are:<br>• Good (single beep)<br>• Good2 (two beeps)<br>• Bad (long beep)<br>• Alert (high pitch double beep) |

## ^Clear

### Clears all cards on screen

As RiSL cards are sent to the HaloRing, they are added to the end of a list of all cards received. This list allows the user to scroll up to see previous cards they received in case they need to view the information again. The **^Clear** command will erase all previous cards to give the user a new empty list.

**Format:** ^Clear

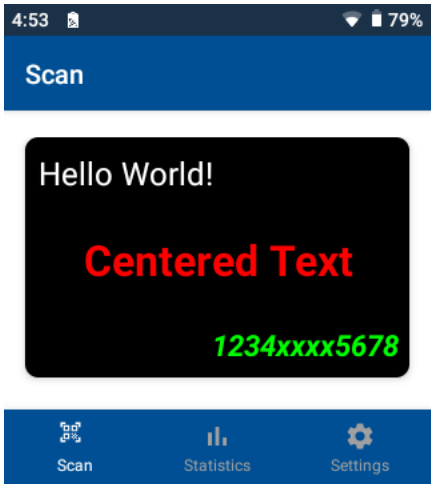
## RiSL Examples

The following is a list of RiSL examples that will cover every RiSL command in this document. The examples will be accompanied by screenshots from a HaloRing to give you a better understanding of each command and what the resulting card looks like.

### Basic Font & Text

This example creates a card with 3 different text commands. The first one occurs before any font is defined so it uses the default font. After the first text command, a red and bold font is defined which is applied to the following text command. Then again, a new font and text. Notice that each of these text commands use a different alignment (^TextC, ^TextL, ^TextR).

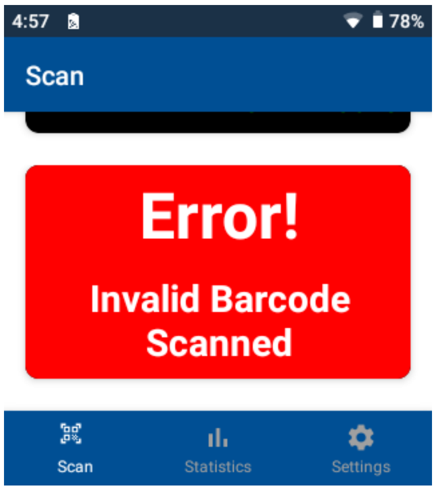
```
^StartCard|290|180^TextL|10|Hello World!^Font|32|Bold|#FF0000^TextC|70|Centered Text^Font|22|Italic|Bold|#00FF00^TextR|140|1234xxxx5678^ShowCard
```



## Color, Vibration and Sound

In this example, we are setting the background of the card to a bright red to get the user's attention while making sure our font is big and bold. Two other things we do to make sure we grab the user's attention are vibrate the device and play a sound.

```
^StartCard|290|160^CardBackColor|#FF0000^Font|48|Bold|#FFFFFF^TextC|4|Error!^Font|28|
Bold|#FFFFFF^TextC|80|Invalid Barcode Scanned^Vibrate|2^PlaySound|Bad^ShowCard
```


4:57 78%

Scan

Error!

Invalid Barcode Scanned

## Adding Save & Load Card

To add to this example, let's assume invalid barcodes get scanned often and we want to save this card so in the future we can call it with a simple load command. By changing **^ShowCard** into **^SaveCard** we now save the card in memory for future use.

```
^StartCard|290|160^CardBackColor|#FF0000^Font|48|Bold|#FFFFFF^TextC|4|Error!^Font|28|
Bold|#FFFFFF^TextC|80|Invalid Barcode
Scanned^Vibrate|2^PlaySound|Bad^SaveCard|invalidBC
```

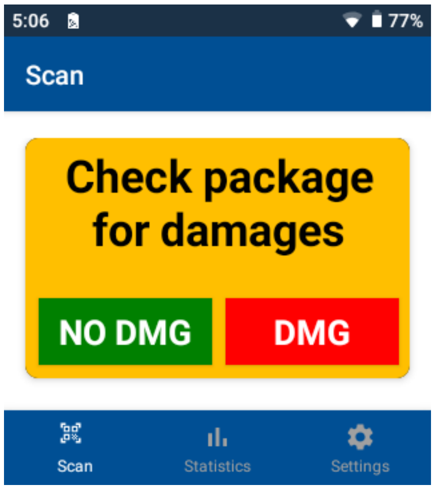
To load this saved card, we simply call load card with our identifier then show the loaded card. The output will be the exact same as the screenshot above.

```
^LoadCard|invalidBC^ShowCard
```

## Buttons

This example utilizes buttons to ask the user for input. Remember that the "id" of the button that is pressed is sent back to the server so they can be notified if the package is damaged.

^StartCard|290|180^CardBackColor|#ffbf00^Font|34|Bold|#000000^TextC|5|Check package for damages^Font|26|Bold|#FFFFFF^Button|10|120|130|50|#008000|NO DMG|noDmg^Button|150|120|130|50|#FF0000|DMG|yesDmg^Vibrate|1^ShowCard


5:06 77%

Scan

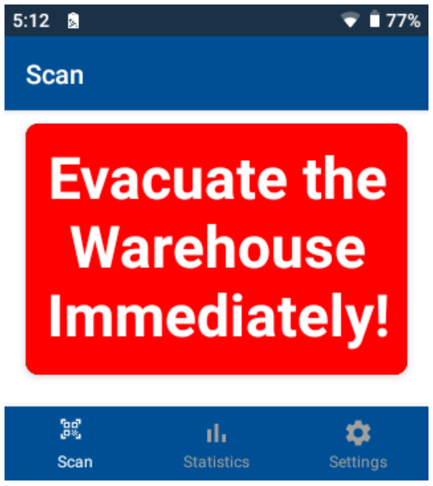
Check package for damages

NO DMG DMG

## Clear

In this example, we are imagining a scenario where there is an emergency at the warehouse. We don't want the user to see anything on the screen besides the current message, so we call the clear command, then send out alert with vibrations and sound.

^Clear^StartCard|290|190^CardBackColor|#FF0000^Font|44|Bold|#FFFFFF^TextC|10|Evacuate the Warehouse Immediately!^Vibrate|4^PlaySound|Alert^ShowCard


5:12 77%

Scan

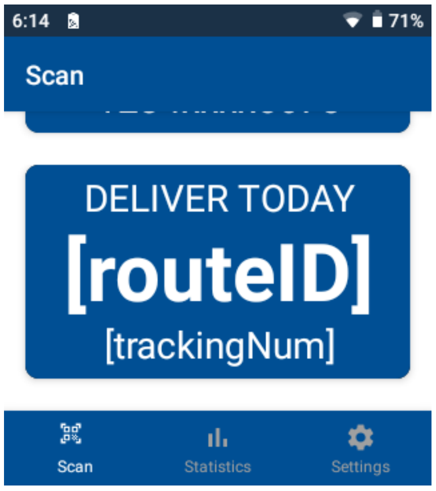
Evacuate the Warehouse Immediately!

## Placeholders & Set

If you look closely at this example, you will notice there are two placeholders within text commands: [routeID] and [trackingNum]. The below command is not to show but to save the card. Now if we were to send the command below it, then the place holders would show as is.

```
^StartCard|290|160^CardBackColor|#004F94^Font|28|#FFFFFF^TextC|5|DELIVER TODAY^Font|60|Bold|#FFFFFF^TextC|38|[routeID]^Font|28|#FFFFFF^TextC|115|1234xxxx5678
^SaveCard|deliverToday
```

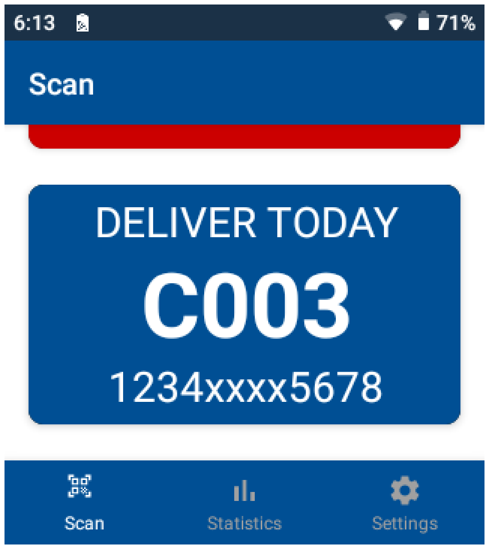
```
^LoadCard|deliverToday^ShowCard
```



DELIVER TODAY
[routeID]
[trackingNum]

Now instead of just showing the card, let's set our two placeholders to real values.

```
^LoadCard|deliverToday^Set|[routeID]|C003^Set|[trackingNum]|1234xxxx5678^ShowCard
```



DELIVER TODAY
C003
1234xxxx5678