KEZAR

WIRELESS TICKET READER

User Guide

Statement of Regulatory Compliance

FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications made to this equipment that are not expressly approved by Synapse Product Development may void the FCC authorization to operate this equipment.

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About This User Guide

This User Guide provides installation, operation, maintenance, and configuration instructions for the Kezar wireless ticket reader. Selected specifications are also included.

Device Overview

The Kezar ticket reader is a battery-operated, wireless device that can read barcodes and QR codes that are printed on paper or displayed on smartphone screens. It is also capable of reading RFID tags.

Once a ticket is scanned, the device communicates via WiFi with a server (Foreman) to determine whether the ticket is good or bad. Colored lights and sounds provide distinctive feedback for good tickets, bad tickets, VIP tickets, and others.

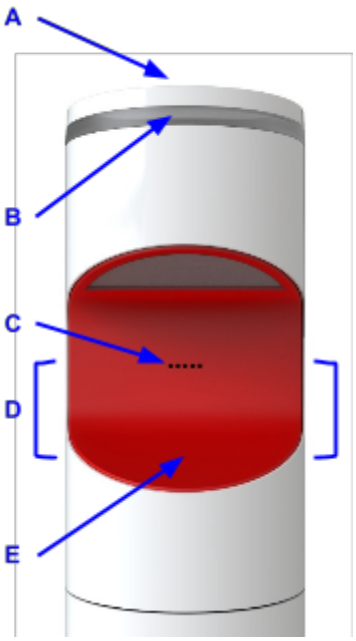
Safety Warnings

- Although designed to be splash-resistant, do not operate, charge, or store the device in direct contact with rain or other moisture.
- Avoid exposing the underside of the device to moisture.
- This device contains high intensity LED lights. To prevent damaging your eyesight, whenever the device is powered on do not stare at the lights at close range.
- This device emits sounds at high volume. To prevent damaging your hearing, whenever the device is powered on do not place your head in close proximity to the speaker.
- Do not lean on the device.
- Do not place objects on the top of the device.
- Do not charge or power the device using an unapproved power supply (charger).
- Do not charge the device outdoors.
- Do not power the device outdoors with a power supply that is not certified for outdoor use.
- Do not operate, charge, or store the device in explosive or hazardous areas.
- Do not attempt to repair or disassemble the device.
- This device contains a battery and other electronic components. Follow all local laws and regulations when disposing of the device.

Device Parts

Front View

A. Cap with WiFi antenna
B. LED light ring
C. Speaker output
D. Scan area
E. RFID tap area

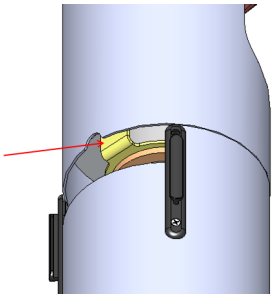


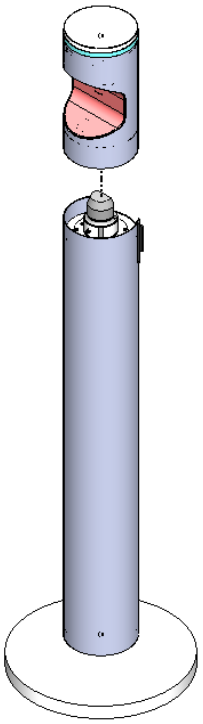
Installation

Kezar is normally installed on a portable base (pole).

To install Kezar on its base:

- Position the base at the desired location in the stadium.
- Line up the recessed receptacle on the bottom of Kezar device with the plug on the top of the base. Rotate the Kezar device so its bottom-rear notch is centered on the base's top-rear gap.
- Press down and the device will snap into place.





To remove Kezar from its base:

- Apply inward pressure to the flange just inside the notch at the bottom-rear of the Kezar device.
- While pressing the flange, lift the Kezar device away from its base.

If you need to move the device and base more than a few feet, it's safer to move the Kezar device and base separately.

Operation

Power

To power on the device:

- Press the button on the bottom of the device. Press and hold the button for about one second.
- While the device is starting up, the power status LED will flash blue.
- Once the device is connected to the network, the power status LED will display blue solidly.
- When the device is ready to scan, white lights will sweep back and forth across the LED light ring.
- Note that it may take up to one full minute for the unit to start up.
- If, after one minute or so, the unit does not display its ready-to-scan sweeping white light, turn the unit off (see below) and back on.

To power off the device:

- Press the button on the bottom. Press and hold the button for about one second.
- While the unit is powering off, the power status LED will flash blue very rapidly for about ten seconds. The unit cannot be turned back on until the flashing stops.

Power Status LED	Power Condition	Network Connection?
Off	Off	No
Solid	On	No
* * Blinking * *	On	Yes
* * Rapid Blinking * *	Shutting Down	-

Ticket Scanning

Kezar uses a downward facing camera to scan barcodes and QR codes. Theses code can be printed on a ticket or other paper, or displayed on the screen of a smartphone.

The camera field of view is optimal toward the bottom of red opening (where its field of view is widest). There is a small area at the vertical back wall of the red opening where the camera cannot see.

A printed barcode or QR code should be scanned flat (parallel to the ground) and low (towards the bottom of the red opening).

Reading codes from a smartphone works best when the phone is mostly flat but tipped slightly towards the unit. In some cases, it may be necessary to zoom in on the code and/or increase the brightness setting on the smartphone.

RFID Scanning

To support future capabilities, the device hardware is capable of reading from (and in some cases, writing to) a variety of RFID and NFC devices. To scan an RFID tag, tap the tag to the center of the lower surface of the red opening.

Ticket Validation

Once a tickets barcode or QR code is viewed by the code reading camera (or an RFID tag is scanned), the sweeping ready lights turn off. The ticket's data is then sent over a network for validation by the Foreman server. The server replies to the Kezar device indicating whether the ticket is valid and providing additional information.

Validation Feedback

Based on a ticket's validation result from the server, the device will play a sound and illuminated the LED light ring.

The LED light ring display different colors, sometime solid and sometimes blinking.

There are two distinctive sounds:

- Good: A high-pitched two-tone beep
- Bad: A lower-pitched triple beep

This table shows Kezar's light and sound feedback for each type of ticket validation result:

Ticket Validation Result	Light Feedback	Sound Feedback	Displays for	Interruptible after	Rescan gives same result?
Good Ticket	Solid	Two-Tone (good)	2.0 secs	0.7 secs	No (see notes)
Special Good Ticket (VIP)	Solid	Two-Tone (good)	3.0 secs	2.0 secs	No (see notes)
Bad Ticket	Solid	Triple-Beep (bad)	3.0 secs	2.0 secs	Yes
Recently Scanned Ticket (scanned good < 30 secs ago)	Solid	Triple-Beep (bad)	3.0 secs	2.0 secs	Yes (for 30 secs)
Exception Ticket (e.g broken seat)	* * Blinking * *	Triple-Beep (bad)	3.0 secs	2.0 secs	Yes
Blocked Ticket (special security concern)	* * Blinking * *	Triple-Beep (bad)	3.0 secs	2.0 secs	Yes

Notes:

- A ticket that was just scanned and validated as good (regular or VIP) is ignored if rescanned at the same Kezar device within 5 seconds of the original good scan.
- A ticket that was just scanned and validated as good produces distinctive yellow feedback (and a bad sound) if rescanned at the same Kezar device within 5 to 30 seconds of the original good scan.
- LED light ring feedback from a previous ticket can be interrupted with a new ticket scan, after a certain period of time (refer to the table). Sound feedback is short and is never interrupted.
- If the system does not provide sound and light feedback for the ticket, there may be a problem communicating with the server. Wait a few seconds for the sweeping ready lights to reappear, and try rescanning the ticket.

Status LEDs During Operation

Power status LED:

- When the blue power status LED on the back of the device lights solidly, it means that the unit has a connection to the network.

- If the blue power status LED on the back of the device starts flashing, it means that the unit has lost its network connection. To recover, power the device off, wait 10 seconds, power the unit on, and wait for its ready-to-scan indication.

Power Status LED	Power Condition	Network Connection?
Solid	On	No
* * Blinking * *	On	Yes

Battery/charge status LED:

- When operating on battery power, the battery/charge status LED is normally not lit.
- If the battery/charge status LED is slowly flashing red, it indicates a low battery condition. After the low battery indication is given, the device will continue to operate for at least five more minutes. From a full charge, Kezar is designed to operate for at least eight hours and 2500 ticket scans.
- If the battery/charge status LED is very rapidly flashing red, it indicates a critical battery condition. The device will no longer scan tickets (until it is recharged) and should be powered off.

Battery/Charge Status LED	Battery Condition	Charger Plugged In?	Device Turned On?
Off	Good Battery	No	Yes
* * Blinking * *	Low Battery	No	Yes
* * Rapid Blinking * *	Critical Battery	No	Yes

Maintenance

Charging

To charge the device:

- Verify that the device is powered off.
- Remove the dust cap from the charger port on the bottom of the device.
- Insert the power supply (charger) plug fully into the charger port.
- While the battery is being charged, the battery/charge status light will flash green.
- When the battery is fully charged, the battery/charge status light will turn solid green.
- Remove the plug from the charger port.
- Replace the dust cap

Battery/Charge Status LED	Battery Condition	Charger Plugged In?	Device Turned On?
* * Blinking * *	Charging	Yes	-
Solid	Charged (Full)	Yes	-
** Blinking Red/Yellow **	Charging Error	Yes	-

Notes:

- Be sure to charge the device indoors and under the proper environmental conditions (see the appendix at the end of this document).
- To recharge a device fully may take up to eight hours.
- If there is a problem charging the battery, the battery/charge status light will flash red and yellow. Contact the manufacturer.
- The device does not need to be kept upright during charging.
- Kezar can also be powered indoors using the power supply (charger). Do not plug or unplug the power supply from AC power or the Kezar device while the device is powered on.

Transportation and Storage

When transporting a Kezar device:

- Protect the device from rain or other moisture, particularly the bottom of the device
- Avoid exposing the device to excessive vibration or shock
- Avoid contact with other Kezar devices or other hard objects
- Hold the device at the top and bottom rather than grasping the red opening.

- It is not necessary to keep the device upright.

When storing a Kezar device:

- Be sure the storage location meets the proper environmental conditions (see the appendix at the end of this document).
- It is not necessary to keep the device upright.

Cleaning

The outside of the device may be wiped down with a damp cloth. If more thorough cleaning is needed, use mild dish soap and water, or Formula 409. Avoid all other cleaning products, as they may damage the device. Avoid soaking the device. Do not immerse or submerge the device.

Servicing

The device has no user serviceable parts. Contact the manufacturer for any service or repair needs.

Configuration and Diagnostics

Overview

The Kezar device software includes bootloaders, an operating system (Linux), the Kezar application, and various configuration settings. Software is installed when a Kezar device is manufactured and can be updated. All configuration settings can be changed by connecting a computer to the device's diagnostic serial port or over a network-based shell session (SSH). Some settings can be changed by presenting special QR codes to the device's code reader camera. Additionally, some settings can be changed by command from a Foreman server.

When connecting to a device using the diagnostic serial port or SSH session, various diagnostics, including self-tests, are available.

Diagnostic Serial Port

The diagnostic serial port requires a special cable that has been provided. Insert the audio jack end of the cable in the audio socket on the bottom of the Kezar device. Plug the USB end of the cable into a PC. Configure serial port communication software on the PC (such as PuTTY) with the following settings:

- 9600 baud, 8 data bits, no parity, 1 stop bit

Network Configuration

Kezar supports both WiFi and cabled Ethernet network connections. An RJ45 port is available on the bottom of the device.

General Kezar networking notes:

- Kezar networking currently requires DHCP and IPV4.
- Kezar cabled Ethernet is 100BASE-T.
- Kezar does not support cabled Ethernet and WiFi simultaneously.

- When an active Ethernet cable is plugged into the device, the cabled Ethernet interface is selected.
- When switching between cabled Ethernet and WiFi, a device reboot (power off and back on) is required.

Some specifics about Kezar WiFi:

- Kezar WiFi supports all US 5 GHz frequencies, including DFS.
- For authentication, Kezar WiFi supports WEP, WPA-PSK [TKIP], WPA2-PSK [AES], and selected 802.1x protocols (namely PEAP/MSCHAPv2).
- Kezar WiFi does not currently support certificates, but could in the future.
- Kezar WiFi cannot connect to networks with a hidden SSID.

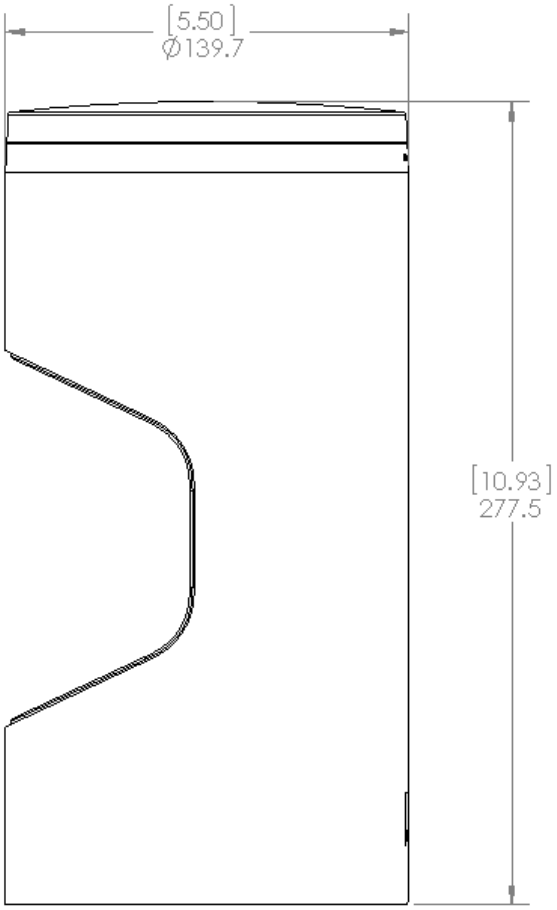
Network connection settings can be accessed via the diagnostic menus that are presented when connecting the diagnostic serial port or an SSH session.

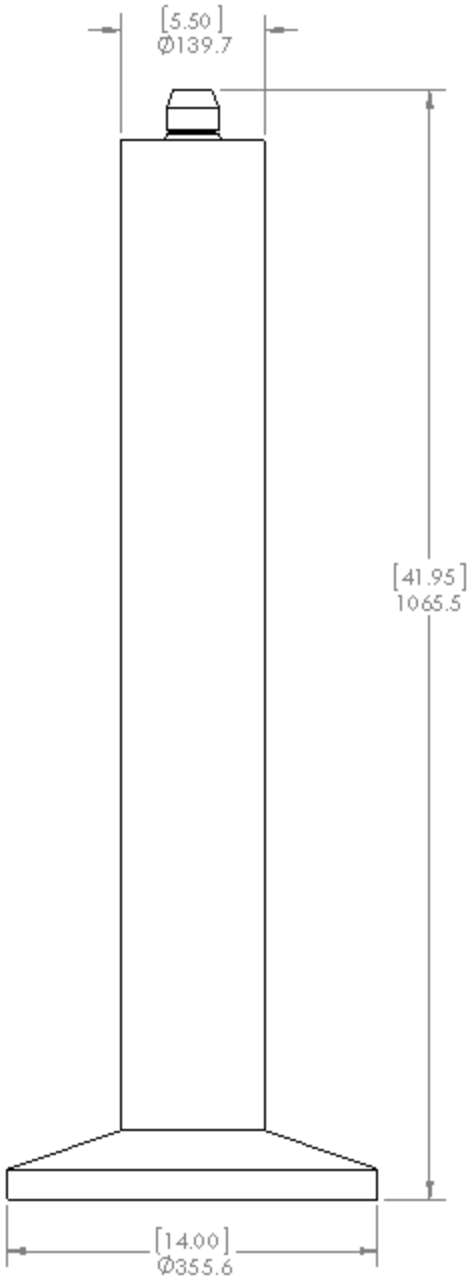
Additional Configuration

Other configuration settings can be accessed via the diagnostic menus that are presented when connecting the diagnostic serial port or an SSH session.

Appendices

Physical Specifications





Kezar reader assembly, P/N: 300-002007-XX

- Housing materials: Aluminum 6061-T6, PC/ABS: Triloy 200 and HR5007A, PC: 3022IR
- Size: 139.7mm (5.5 in) diameter, 277.5mm (10.93 in) height
- Unit weight: 4 pounds

Kezar base assembly, P/N: 300-002009-XX

- Housing materials: primarily aluminum 6063-T6
- Size: 139.7mm (5.5 in) diameter,1065.5 mm (41.95 in) height, 355.6mm (14 in) base
- Unit weight: 26 pounds

Environmental Conditions

- Operating conditions:
  - Temperature range: -20 to 45 C (-4 to 113 F)
  - Maximum relative humidity: 98%
- Charging and storage conditions:
  - Temperature range: 0 to 40 C (32 to 104 F)
  - Maximum relative humidity: 98%

Battery/Charge Status LED Indications

Battery/Charge Status LED	Battery Condition	Charger Plugged In?	Device Turned On?
Off	Off	No	No
Off	Good Battery	No	Yes
* * Blinking * *	Low Battery	No	Yes
* * Rapid Blinking * *	Critical Battery	No	Yes
* * Blinking * *	Charging	Yes	-
Solid	Charged (Full)	Yes	-
** Blinking Red/Yellow **	Charging Error	Yes	-

Power Status LED Indications

Power Status LED	Power Condition	Network Connection?
Off	Off	No
Solid	On	No
* * Blinking * *	On	Yes
* * Rapid Blinking * *	Shutting Down	-

Revision History

Rev	Date	Author	Description
01-F	5/11/2014	Jeff Wolinsky et al	Initial revision