



HS-1RL User Guide

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1 - Introduction

JADAK's HS-1RL is a hand-held barcode and Radio Frequency Identification (RFID) reader that utilizes area imaging technology to read popular linear (1D), stacked linear, and matrix (2D) barcodes, combined with reading and writing Low Frequency (LF or 125 kHz) RFID tags in close distance (10 to 40mm).

With a small ergonomic shape, the HS-1RL can be used in a wide variety of applications, but is specifically designed for healthcare applications and environments. The HS-1RL has a sealed housing that protects it from day to day debris and spills and is built with medical grade plastics that are compatible with popular medical cleansers and disinfectants.

This User's Guide provides installation and programming instructions for the HS-1RL. Product specifications, dimensions, warranty, and customer support information are also included. JADAK's barcode imagers are factory programmed for the most common terminal and communications settings. If you need to change these settings, programming is accomplished by scanning the bar codes in this guide or sending the relevant commands serially.

Note: An asterisk (*) next to an option indicates the default setting.

2 – Hardware Overview

CAT-HS-1RL Class 2 Laser Warning

Some versions of the HS-1RL contain a laser based aiming system that is fully compliant with eye safety certifications. For those customers that prefer a non-laser based aiming system, versions of the HS-1RL with LED based aiming systems are available as well.

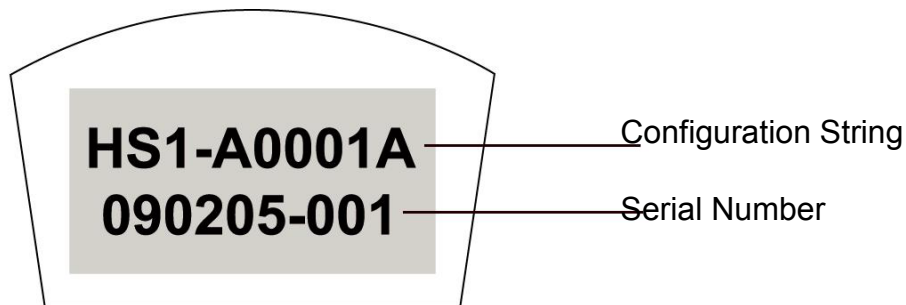


CAUTION This device emits CDRH/IEC Class 2 laser and IEC Class 1M light.
Do not stare into beam.

Some versions of the HS-1RL use a 650 or 655 nm laser and a pattern forming element to generate a laser aiming pattern which represents the imager's field of view throughout its entire depth of field. The pattern's center dot indicates the center of the field of view.

JADAK® HS-1RL Imager Identification

On the bottom of your scanner you will see a label as shown below:



Configuration String:

The configuration string is a 10-digit string with the first 9 digits being a factory configuration number and the last digit being the revision of the product.

Please consult the factory for configuration information.

Serial Number:

The serial number format is as follows: YYMMDD-NNN

Where:

YY = Year

MM = Month

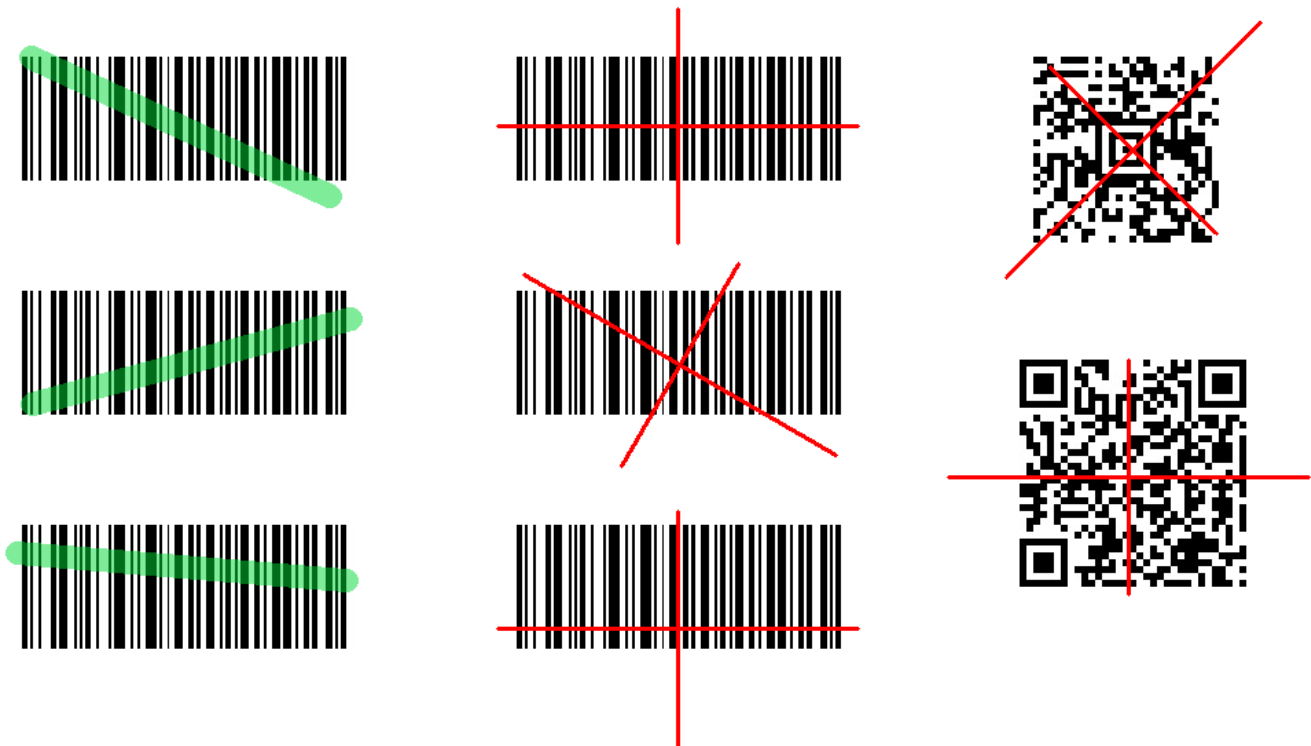
DD = Day
NNN = Unit Number

Reading Techniques

The imager has a view finder or aimer that projects a bright red cross or a green beam, which corresponds to the imager's horizontal/vertical field of view. The aimer should be centered over the bar code, but it can be positioned in any direction for a good read.

Linear bar code

2D Matrix symbol



The aiming beam is smaller when the imager is closer to the code and larger when it is farther from the code.

Symbologies with smaller bars or elements (lower mil size) should be read closer to the unit. Symbologies with larger bars or elements (higher mil size) should be read farther from the unit.

To read single or multiple symbols (on a page or on an object), hold the imager at an appropriate distance from the target, pull the trigger, and center the aiming beam on the symbol. If the code being scanned is highly reflective (e.g., laminated), it may be necessary to tilt the code up 15° to 18° to prevent unwanted reflection.

Interface Settings

Connecting the HS-1RL with USB Port

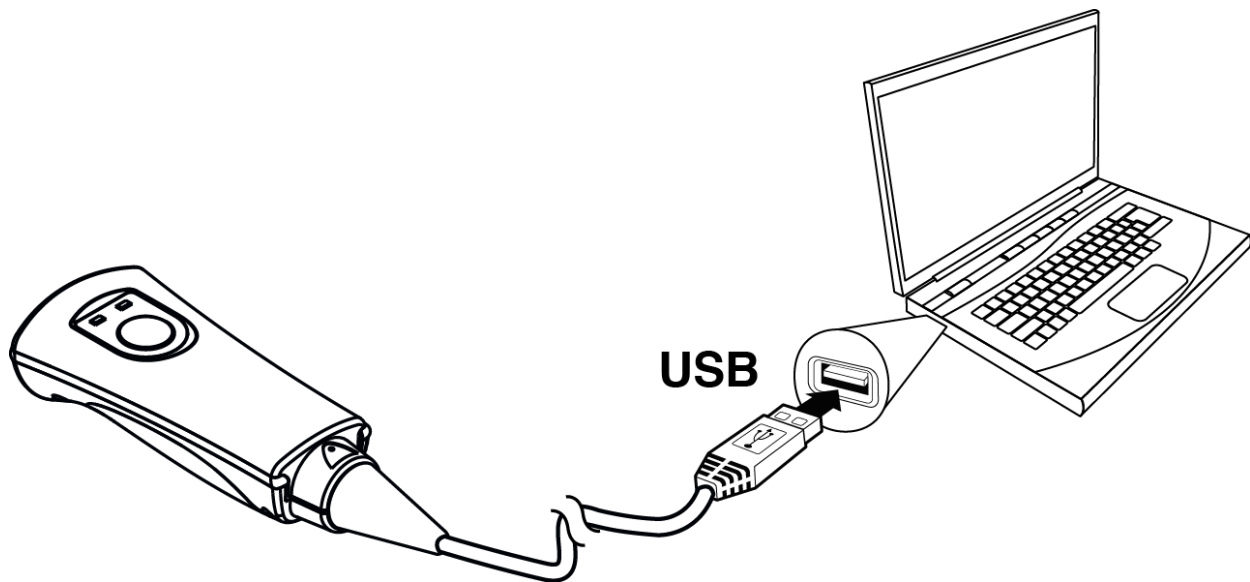
Note: These instructions are for use with the USB (JADAK CBL-0144) cable.

1. If you are using USB Serial Communication Port Emulation interface, you must first load the driver for that interface onto your computer.
The driver is available from your JADAK technical support contact.

No driver is required when using the USB HID Keyboard interface.

2. Turn off power to the terminal/computer.
3. Connect the appropriate interface cable to the HS-1RL hand scanner.

Note: For the imager to work properly, you must have the correct cable for your type of terminal/computer.



3. Plug the USB-A connector into a free USB port on your computer.
4. Once the imager has been fully connected, power up the computer.

Interface Options

USB COM Port Emulation

Scan the following code to program the HS-1RL to emulate a regular RS-232-based COM port.



Note: The HS-1RL **must** be power cycled after programming this interface!



USB COM Emulation

USB HID Keyboard Emulation

Scan the following code to program the HS-1RL for USB HID Keyboard mode.



Note: The HS-1RL **must** be power cycled after programming this interface!



USB HID Keyboard

Keyboard Country Layout

When the HS-1RL is set to USB HID Keyboard Emulation, use the following commands or programming barcodes to set the specific Keyboard layout for your language.
Default = United States.

* United States:



#KBDCNTY 0

United Kingdom:



#KBDCNTY 1

Belgium:



#KBDCNTY 21

Denmark:



#KBDCNTY 30

France:



#KBDCNTY 20

Germany:



#KBDCNTY 15

Italy:



#KBDCNTY 35

Netherlands:



#KBDCNTY 31

Norway:



#KBDCNTY 28

Portugal:



#KBDCNTY 33

Spain:



#KBDCNTY 36

Sweden / Finland:



#KBDCNTY 26

HID Keyboard Rate

If you use the HS-1RL in USB HID Keyboard mode, it's possible to change the speed of the data output when an RFID tag or barcode is read, akin to someone typing the data faster or slower on a keyboard. Faster settings may lead to data loss when large amounts of data are transmitted.

Note: This setting has no impact when using the HS-1RL in USB COM Emulation mode.

Scan one of the codes below to change the Keyboard Rate setting. Default = Keyrate 1.



Note: The HS-1RL **must** be power cycled after changing the Keyboard rate!



#KEYRATE 0

Keyrate Slow



#KEYRATE 1

** Keyrate Medium*



#KEYRATE 2

Keyrate Fast



#KEYRATE 3

Keyrate Fastest

Default Options

Custom Default Settings

Scan the following code revert the unit to its custom default settings.



Note: The HS-1RL must be power cycled after programming this command!



To set custom defaults, please contact Jadak.

Factory Default Settings

Scan the following code revert the unit to its factory default settings.



Note: The HS-1RL must be power cycled after programming this command!



Input/Output Settings

Good Read Indicators

Beeper Volume - Good Read

The beeper volume codes modify the volume of the beep the imager emits on a good read. Default = High.



#BEPLEVL 0
Off



#BEPLEVL 1
Low



#BEPLEVL 2
Medium



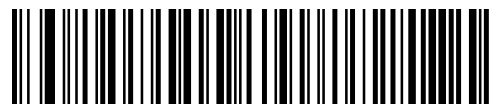
#BEPLEVL 3
** High*

No Reads

Not every trigger event will result in a successful barcode read. When there is no code read the HS-1RL may return a no read signer in the form of the characters NR. Default = Disable No Read.



#NO_READ 0
** Disable No Read*



#NO_READ 1
Enable No Read

Vibration

The HS-1RL has an optional internal Vibration function that can be turned on for good reads (both RFID and barcodes). This can be very helpful in an environment where an audible beep would be unwanted; for instance in a patient ward at night in a hospital, where patients are sleeping.

Default = Disabled



#VIBENAB 0



#VIBENAB 1

Trigger Commands

In order to scan barcodes, you need to 'trigger' the HS-1RL.

This can be done in various ways. You can activate the HS-1RL by sending the trigger command **TRGON** serially or by pressing the trigger button on the scanner itself.

Several supporting commands are provided to set the allowed trigger time-out (e.g. the maximum time that the scanner will take to keep looking for a barcode.)

TRGON This command turns the trigger ON.

TRGOFF This command turns the trigger OFF.

Trigger Modes

Manual Trigger (level)

You can activate the imager by pressing the trigger or sending the serial trigger command **TRGON**. When in manual trigger mode, the HS-1RL scans until a bar code is read, until the trigger is released, a **TRGOFF** command is sent, or a time-out occurs. Use the command below to enable Manual Trigger Mode.



#TRGMODE 0

** Manual (level) Trigger*

Presentation Mode

Presentation mode is a hands free mode of operation in which the imager will automatically trigger on when an object is moved into the field of view. The HS-1RL will not enter low power mode while in Presentation Mode. Use the command below to enable Presentation Mode.



#TRGMODE 1

Presentation Mode

Trigger Time Out

This sets the maximum time how trigger procession continues during a scan attempt.

This command is not valid in Presentation Trigger Mode.

Use the command **TRGTIME x** (where 'x' is a value between 0 and 300.000 in 1ms steps), to set the time between 1ms and 300 seconds. Default = 9900 (9.9 Seconds).

Note: TRGTIME 0 = infinite trigger time out.

Setting examples:



#TRGTIME 1000

Trigger Time Out 1.0 seconds



#TRGTIME 5000

Trigger Time Out 5.0 seconds



#TRGTIME 9900

* Trigger Time Out 9.9 seconds



#TRGTIME 30000

Trigger Time Out 30.0 seconds

Good Read Delay

This sets the time period before the scanner can read another bar code.

Use the command **DLYGDRD x** (where 'x' is a value between 0 and 30.000 milliseconds), to set the time between 0 (no delay) and 30.000 (=30 sec). Default time = 0 Seconds.

Note: Good Read Delay is most effective when in Presentation Mode or when Multiple Symbol Mode is turned on in combination with the other Trigger Modes.

Setting examples:



#DLYGDRD 0

* No Good Read delay



#DLYGDRD 200

Good Read delay 0.2 seconds



#DLYGDRD 500

Good Read delay 0.5 seconds



#DLYGDRD 1000

Good Read delay 1.0 seconds

Multiple Symbols Mode

This sets the option to allow you to read multiple symbols with a single pull of the trigger. If you press and hold the trigger, aiming at a series of symbols, it will read unique symbols once, beeping (if turned on) for each read. The HS-1RL attempts to find and decode new symbols as long as the trigger is pulled, and the same symbol will not be read more than once. When this programming selection is turned **Off**, the HS-1RL will only read the symbol closest to the aiming beam. Default = Off.



#MULTSYM 1

Multiple Symbol Mode On



#MULTSYM 0

** Multiple Symbol Mode Off*

Re-read Delay

This sets the time period before the imager can read the same bar code a second time. Setting a proper re-read delay time protects against accidental re-reads of the same bar code. Use shorter delays in applications where repetitive bar code scanning is required.

Several commonly used re-read delay menu command barcodes are included below. Use the command **DLYGDRD x** (where 'x' is a value between 0 and 30.000 in milliseconds), or by building a menu command barcode that includes such a value.

Please contact JADAK if assistance is needed. Default time = 0.6 seconds.

Note: Re-read Delay only works when in **Presentation Mode**.

Setting examples:



#DLYRERD 0

No Re-read delay



#DLYRERD 100

Re-read delay 0.1 seconds



#DLYRERD 600

** Re-read delay 0.6 seconds*



#DLYRERD 1000

Re-read delay 1.0 seconds



#DLYRERD 2000

Re-read delay 2.0 seconds



#DLYRERD 5000

Re-read delay 5.0 seconds

3 – Firmware Overview (Utilities)

Utilities Overview

This chapter describes some utilities that can tell more about certain aspects of the HS-1 hand scanner.

Report the list of available Programming Commands

All of the supported serial command of the imager, along with a short description and the current setting value will be serially output when this barcode is scanned.



Revision

Show Software Revision



Show Revision Time



Show Device Serial Number

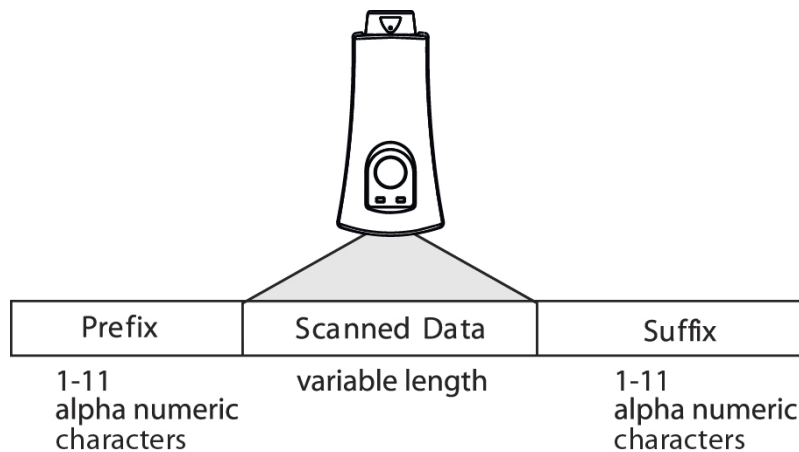


5 - Data Editing

Data Editing Overview

When a bar code is scanned, additional information is sent to the host computer along with the bar code data. This group of bar code data and additional, user-defined data is called a “message string.” The selections in this section are used to build the user-defined data into the message string.

The following illustration shows the breakdown of a message string:



Transmit AIM ID Character

Use the following codes to transmit an AIM ID character or a Symbol ID Character. See Appendix B for a chart of all supported barcodes and their corresponding AIM ID characters. Default = Don't Transmit AIM ID.



#XMITCID 1

Transmit AIM ID



#XMITCID 0

** Don't Transmit AIM ID*



#XMITCID 2

Transmit Symbol ID

Barcode Prefix

Prefix characters are user-definable data characters that can be sent before scanned data. It's possible for the HS-1RL to enable and set a specific prefix for all scanned Barcode data only. This can help to discern barcode data from RFID data when both are output alternately.

Note: This Barcode Prefix will be separate from any set RFID prefixes.

Barcode Prefixes On/Off

To enable or disable Barcode prefixes, scan the appropriate code below.
Default = enabled.



#PREBENA 1

* *Enable*



#PREBENA 0

Disable

Barcode Prefix Block String

Use the command **PREBBLK** in combination with ASCII or hex characters to set the specific Barcode Prefix string. See [Appendix D](#) for ASCII/hex conversion help.

Note: Hex characters must be preceded by **\x** and it's not possible to interject a Carriage Return in the middle of the block string.

For instance, if you want the prefix to be **[BC-data]**, send: **PREBBLK [BC-data]**.

Please contact JADAK if you need further help.

The default Barcode Prefix Block string is: **(B)**



#PREBBLK (B)

* *Barcode Prefix Block (B)*

Example codes:



#PREBBLK B/

Barcode Prefix Block B/



#PREBBLK [BC]

Barcode Prefix Block [BC]

Barcode Suffix

Suffix characters are user-definable data characters that can be sent after scanned data. It's possible for the HS-1RL to enable and set a specific suffix for all scanned Barcode data only.

Note: This Barcode Suffix will be separate from any set RFID suffixes or general suffixes.

Barcode Suffix On/Off

To enable or disable the Barcode suffix, scan the appropriate code below.

Default = enabled.



#SUFBENA 1

* *Enable*



#SUFBENA 0

Disable

Barcode Suffix Block String

Use the command **SUFBBLK** in combination with ASCII or hex characters to set the specific Barcode Suffix string. See [Appendix D](#) for ASCII/hex conversion help.

Note: Hex characters must be preceded by `\x` to be recognized as hex instead of ASCII and it's not possible to interject a Carriage Return in the middle of the block string.

For instance, it's possible to program a Suffix that starts with 123 (regular ASCII text), then a Tab symbol (as hex 09) and then ABC (ASCII characters again), send the following: **SUFBBLK 123\x09ABC**

Please contact JADAK if you need further help.

The default Barcode Suffix Block string is a Carriage Return (**hex '0D'**).



#SUFBBLK \x0D

* *Barcode Suffix Block \x0D*

6 - RFID

RFID Overview

Besides being able to scan 1D and 2D barcodes, the HS-1RL can also read (and write to) RFID tags, using LF RFID technology at 125 kHz.

RFID Mode On/Off

It's possible to enable or disable the RFID part of the HS-1RL. Scan one of the codes below to enable or disable RFID Scanning. Default = Enabled.



#RFIDMOD 1

** RFID Enabled*



#RFIDMOD 0

RFID Disabled

RFID Reading

When presenting a RFID tag to the HS-1RL, depending on the settings for PRERENA, RFIDMIN and RFIDMAX, it can automatically present the data in the following format:

[*Prefix*] [Tag UID],[Block data],[*nn*],[*L*],[Tag Type],

where *nn*=number of blocks, and *L*=Length of data.

RFID Start/Stop Read Block Number

These commands define at which block numbers the auto-RFID reading starts and stops. Use these commands in combination with a value, which represents the block's number or by building a menu barcode.

If you want only to output the first four blocks, set **RFIDMIN** to 0 and **RFIDMAX** to 3.

By default the first 8 blocks are outputted (i.e. **RFIDMIN 0** and **RFIDMAX 7**).

Please contact JADAK if assistance is needed.

RFID Time Out

This sets the time out period for RFID read and write operations. If such an operation does not take place within the programmed period, a time out message will be sent by the HS-1RL. Several commonly used RFID Time Out menu command barcodes are included below.

Use the command **RFIDTMO x** (where 'x' is a value between 0 and 65535), to set the time between 0 (no delay) and 65535 (=~65.5 seconds) in steps of 1ms, or by building a menu command barcode.

Please contact JADAK if assistance is needed. Default time = 1000 (1.0 second).

Setting examples:



#RFIDTMO 1000

* RFID Time Out 1.0 seconds



#RFIDTMO 2000

RFID Time Out 2.0 seconds



#RFIDTMO 5000

RFID Time Out 5.0 seconds



#RFIDTMO 10000

RFID Time Out 10.0 seconds

RFID Re-read Delay

This sets the time period before the HS-1RL can read the same RFID tag a second time.

Setting a proper re-read delay time protects against accidental re-reads of the same tag.

Several commonly used re-read delay menu command barcodes are included below. Use the command **RFIDDLY x** (where 'x' is a value between 0 and 5000), to set the time between 0 (no delay) and 5000 (=5 sec.) in steps of 1ms, or by building a menu command barcode.

Please contact JADAK if assistance is needed. Default time = 1.0 seconds.

Setting examples:



#RFIDDLY 0

No Re-read delay



#RFIDDLY 500

Re-read delay 0.5 seconds



#RFIDDLY 1000

* Re-read delay 1.0 seconds



#RFIDDLY 2000

Re-read delay 2.0 seconds

RFID Read Block

The HS-1RL can read the hex value-data stored in various RFID blocks from a tag at once or you can tell it to output specific ones. **RFIDRBK** uses the following arguments:

- TagType(1=ISO15693,2=MfUL,3=MfClassic,4=Topaz)
- Block Number (0-xx)
- HexKey(optional for MifareClassic Only)
- KeyType(optional for MifareClassic Only,0=A,1=B)

Example codes:



#RFIDRBK 1 0

RFID Read Block #0 of ISO 15693 tag



#RFIDRBK 1 3

RFID Read Block #3 of ISO 15693 tag



#RFIDRBK 4 2

RFID Read Block #2 of a Topaz tag



#RFIDRBK 3 4

RFID Read Block #4 of MiFare Classic tag

RFID Write Block

The HS-1RL can write data to specific blocks as well, using the same arguments as RFID Read Block command, where the block data can only contain 8 hex characters (0-9 and A-F) per block:

RFIDWBK uses the following arguments:

- TagType(1=ISO15693,2=MfUL,3=MfClassic,4=Topaz)
- Block Number (0-xx)
- HexKey(optional for MifareClassic Only)
- KeyType(optional for MifareClassic Only,0=A,1=B)

Example:



#RFIDWBK 1 3 1234ABCD

RFID Write Block 3 with data '1234ABCD' to an ISO15693 tag

RFID Data Text Mode

The HS-1RL can output the (partial) data of an RFID tag in either binary or text. Use the codes below to enable or disable the Data Text Mode. Default = Enabled.



#RFIDTXT 1

**RFID Text Enabled*

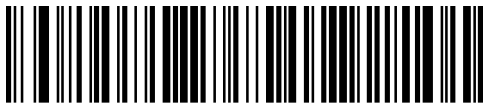


#RFIDTXT 0

RFID Text Disabled

RFID UID Only

The HS-1RL has the option to only output the UID of a scanned tag. Default = disabled.



#UIDONLY 1

UID Only Enabled



#UIDONLY 0

** UID Only Disabled*

RFID Reverse UID

The HS-1RL can reverse the UID data of an RFID tag when scanned. Scan the codes below to enable or disable the reversing of the UID's data. Default = disabled.



#RFIDUID 1

Reverse UID Enabled



#RFIDUID 0

** Reverse UID Disabled*

RFID Prefix

Prefix characters are user-definable data characters that can be sent before scanned data. It's possible to enable and set a specific prefix for all scanned RFID data only.

Note: This RFID Prefix will be separate from any set Barcode prefixes or general prefixes.

RFID Prefixes On/Off

To enable or disable RFID prefixes, scan the appropriate code below. Default = enabled.



#PRERENA 1

* *Enable*



#PRERENA 0

Disable

RFID Prefix Block String

Use the command **PRERBLK** in combination with ASCII or hex characters to set the specific RFID Prefix string. See [Appendix D](#) for ASCII/hex conversion help.

Note: Hex characters must be preceded by **\x** to be recognized as hex instead of ASCII and it's not possible to interject a Carriage Return in the middle of the block string.

For instance, if you want the prefix to be **[RFID]**, send: **PRERBLK [RFID]**.

Please contact JADAK if you need further help. Default RFID Prefix Block string is: **(R)**

Example codes:



#PRERBLK (R)

* *RFID Prefix Block (R)*



#PRERBLK [RFID]

RFID Prefix Block [RFID]

RFID Suffix

Suffix characters are user-definable data characters that can be sent after scanned data. It's possible to enable and set a specific suffix for all scanned RFID data only.

Note: This RFID Suffix will be separate from any set Barcode suffixes or general suffixes.

RFID Suffix On/Off

To enable or disable the RFID suffix, scan the appropriate code below. Default = enabled.



#SUFRENA 1

* *Enable*



#SUFRENA 0

Disable

RFID Suffix Block String

Use the following command in combination with ASCII or hex characters to set the specific RFID Suffix string. See [Appendix D](#) for ASCII/hex conversion help.

Note: Hex characters must be preceded by `\x` to be recognized as hex instead of ASCII and it's not possible to interject a Carriage Return in the middle of the block string.

For instance, it's possible to program a Suffix that starts with 123 (regular ASCII text), then a Tab symbol (as hex 09) and then ABC (ASCII characters again), send the following: **SUFRBLK 123\x09ABC**

Please contact JADAK if you need further help. The default RFID Suffix Block string is a Carriage Return (**hex '0D'**).



#SUFRBLK \x0D

* *RFID Suffix Block \x0D*

RFID Presentation Time Out

When you place the HS-1RL in a presentation cradle, it will automatically switch to Barcode Presentation mode. By pressing the trigger button, you can toggle between Barcode and RFID Presentation mode. By default, this is an infinite duration, but you can also have the HS-1RL switch back to barcode presentation mode from RFID mode after a specific time.

Use the command **PSTTIME x** (where 'x' is a value between 0 and 3600000), to set the time between 0 (no time out) and 3600000 (=1 hour) in steps of 1ms, or by building a menu command barcode. Please contact JADAK if assistance is needed. Default time = 0 / Infinite Time Out.

Setting examples:



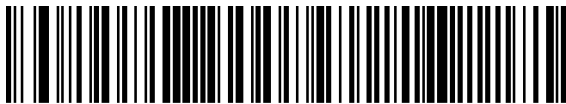
#PSTTIME 0

** Infinite Time Out*



#PSTTIME 5000

Presentation Time Out 5.0 seconds



#PSTTIME 10000

Presentation Time Out 10 seconds



#PSTTIME 30000

Presentation Time Out 30 seconds

Beeper Sounds

The HS-1RL has the option to have its beeper controlled externally by a host. This can be useful for certain notifications. Eight different beeper tones are available in the HS-1RL. Use the command **BEPSOND x** (where 'x' is a value between 0 and 7), to have the HS-1RL sound one of the 8 different beeper tones. *Beeper must be enabled.

Example codes:



#BEPSOND 0



#BEPSOND 1



#BEPSOND 2



#BEPSOND 5

LED Indicators

The HS-1RL also has the option to have its green and red LED controlled externally by a host. This can be useful for certain notifications. Five different beeper tones are available in the HS-1RL. Use the command **LEDINDC x** (where 'x' is a value between 0 and 4), to have the HS-1RL light up one of its LED Indicators in various ways.

Example codes:



#LEDINDC 0



#LEDINDC 4

Vibration Indicator

The HS-1RL furthermore has the option to have its vibration engine controlled externally by a host. This can be useful for certain notifications. Three different vibrations are available in the HS-1RL. Use the command **VIBRATE x** (where 'x' is a value between 0 and 2), to have the HS-1RL vibrate in various ways.

Note: For this command to work, Vibration has to be enabled (**VIBENAB 1**).

Example codes:



#VIBRATE 0



#VIBRATE 1

7 - Imaging

Imaging Overview

The HS-1RL cannot be used to take images with. While this could be very helpful in applications such as patient identity verification, signature capturing, or any other situation where you need to take an image, the internal structure of the HS-1RL doesn't allow for such transmissions. However, there are several options to configure the HS-1RL for improved barcode finding and decoding that are related to image processing. This chapter describes these options.

Illumination Brightness

Use the command **LEDSPWR** to set the Illumination (LEDs Power) between 'Off' and 100% with a value between 0 (=Off) and 3 (=100%).

Note that this setting also is in place when scanning bar codes, when **EXPMODE** is set to 0.

All illumination brightness menu command barcodes are included below.



#LEDSPWR 0

Illumination Off



#LEDSPWR 1

Illumination Brightness Low



#LEDSPWR 2

Illumination Brightness Medium



#LEDSPWR 3

** Illumination Brightness High*

Auto Exposure

Allow the imager to control gain and exposure settings automatically. Default = Enabled.



#EXPMODE 0

Disable



#EXPMODE 4

** Enable*

Maximum Exposure

Set the maximum allowable exposure for the unit between 1 and 7874.

Several commonly used Max Exposure menu command barcodes are included below. If a different value other than those provided is needed, it can be set either by sending the serial command **EXP_MAX x** (where 'x' is a value between 1 and 7874), or by building a menu command barcode. Please contact JADAK if assistance is needed. Default value = 100.

Setting examples:



#EXP_MAX 50



#EXP_MAX 100



#EXP_MAX 2500



#EXP_MAX 7500

Target White Value

Set the Target White Value within a range of 48 to 212.

Some menu command barcodes are included below. If a different value other than those provided is needed, it can be set either by sending the serial command **EXPTARG x** (where 'x' is a value between 48 and 212), or by building a menu command barcode.

Please contact JADAK if assistance is needed. Default value = 120.

Setting examples:



#EXPTARG 90



#EXPTARG 180

Image Width and Height

Use these commands to show the image's maximum width and height in pixels.



#IMGMAXX

Maximum Width of Image



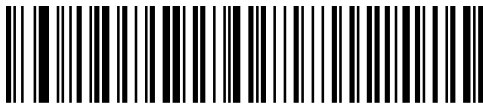
#IMGMAXY

Maximum Height of Image

Decode Window

Decode Windowing is about defining a limited area within the scanner's Field of View, where to look for a barcode, to improve performance. As long as the barcode or barcodes are within the boundaries of the Decode Window, they can be decoded, when Decode Windowing is enabled. If the barcode is outside the Decode Window, it will not be decoded.

Default = Disabled.



#WINDECE 1

Enable Decode Windowing



#WINDECE 0

** Disable Decode Windowing*

To define the Decode Window, one needs to set the boundaries for Top, Bottom, Left and Right. These boundaries are defined by pixel values within the full frame (e.g. 844 x 640 pixels).

Note: There are automated restrictions to prohibit a 'negative' Decode Window size. This means that the Bottom value cannot be 'above' Top and likewise for the values for Left and Right.

Decode Window Top/Bottom

The Top and Bottom boundaries for the decode window can be set either by sending the serial command shown under the barcodes below with a value between 0 and 639, or by building a menu command barcode.

Default Top boundary = 256. Default Bottom boundary = 384.

Please contact JADAK if assistance is needed



#WINDECT



#WINDECB

Decode Window Left/Right

The Left and Right boundaries for the decode window can be set either by sending the serial command shown under the barcodes below with a value between 0 and 843, or by building a menu command barcode.

Default Left boundary = 338. Default Right boundary = 506.

Please contact JADAK if assistance is needed



#WINDECL



#WINDECR

This is a screenshot of an example where a Decode Window with T=260, B=390, L=40, R=170 was used to speed up decoding a Data Matrix code that was offset to the left in the Field of View.

Note: This image was taken and transmitted using a regular HS-1 Scanner (non-RFID model).



8 - Symbologies

This programming section contains menu selections for the following symbologies.

- Aztec Code
- Codabar
- Code 11
- Code 128
- Code 39
- Code 93
- Composite Code
- Data Matrix
- EAN/JAN-13
- EAN/JAN-8
- GS1-128
- GS-1 Databar (RSS-14)
- GS-1 Databar Limited (RSS Limited)
- GS-1 Databar Expanded (RSS Expanded)
- Interleaved 2 of 5
- Matrix 2 of 5
- Maxi Code
- MicroPDF417
- MSI
- PDF417
- QR Code
- UPC-A
- UPC-E
- UPC-E1

All Symbologies

If you want to be able to decode all the symbologies allowable for your imager, scan the **All Symbologies On** code (Enable All).

If on the other hand, you want to decode only a particular symbology, scan **All Symbologies Off** (Disable All) followed by the On/Enable symbol for that particular symbology.



#ALLENAB 0

Disable All



#ALLENAB 1

Enable All

Linear Symbolologies

Codabar

Codabar Defaults

Set all Codabar settings to their default configuration with this code.



Codabar On/Off

Scan one of the codes below to enable or disable Codabar. Default = Enabled.



** Enable*



Disable

Codabar Minimum and Maximum Length

Use the following commands in combination with numerical values to set the minimum and maximum length. Default minimum length = 4. Default maximum length = 55.

The minimum and maximum length for this barcode can be set either by sending the serial command shown under the barcodes below with a value between 2 and 55, or by building a menu command barcode.

Please contact JADAK if assistance is needed.



Codabar Minimum Length



Codabar Maximum Length

Code 11

Code 11 Defaults

Set all Code 11 settings to their default configuration with this code/command.



#C11DEFA

Code 11 On/Off

Scan one of the codes below to enable or disable Code 11. Default = Disabled.



#C11ENAB 1

Enable



#C11ENAB 0

** Disable*

Code 11 Minimum and Maximum Length

Use the following commands in combination with numerical values to set the minimum and maximum length. Default minimum length = 4. Default maximum length = 55.

The minimum and maximum length for this barcode can be set either by sending the serial command shown under the barcodes below with a value between 1 and 55, or by building a menu command barcode.

Please contact JADAK if assistance is needed.



#C11MINL

Code 11 Minimum Length



#C11MAXL

Code 11 Maximum Length

Code 11 Check Digit

The HS-1RL may look for a check digit to decide if the code is valid.

Code 11 usually has 1 check digit and some codes have 2 check digits. Either option can be chosen to be validated.

Default = 1 Check Digit Validate.



#C11CHEC 0

** 1 Check Digit Validate*



#C11CHEC 1

2 Check Digits Validate

Code 128

Code 128 Defaults



#128DEFA

Code 128 On/Off

Scan one of the codes below to enable or disable Code 128. Default = Enabled.



#128ENAB 1

** Enable*



#128ENAB 0

Disable

Code 128 Minimum and Maximum Length

Use the following commands in combination with numerical values to set the minimum and maximum length. Default minimum length = 0. Default maximum length = 55.

The minimum and maximum length for this barcode can be set either by sending the serial command shown under the barcodes below with a value between 0 and 55, or by building a menu command barcode. Please contact JADAK if assistance is needed.



#128MINL

Code 128 Minimum Length



#128MAXL

Code 128 Maximum Length

ISBT 128 On/Off

ISBT 128 is a variant of Code 128 used in the blood bank industry. Scan the appropriate bar code below to enable or disable ISBT 128. Default = Disabled



#ISBT128 1

Enable



#ISBT128 0

** Disable*

Code 39

Code 39 Defaults



#C39DEFA

Code 39 On/Off

Scan one of the codes below to enable or disable Code 39. Default = Enabled.



#C39ENAB 1

** Enable*



#C39ENAB 0

Disable

Code 39 Minimum and Maximum Length

Use the following commands in combination with numerical values to set the minimum and maximum length. Default minimum length = 0. Default maximum length = 48.

The minimum and maximum length for this barcode can be set either by sending the serial command shown under the barcodes below with a value between 0 and 48, or by building a menu command bar code. Please contact JADAK if assistance is needed.



#C39MINL

Code 39 Minimum Length



#C39MAXL

Code 39 Maximum Length

Code 39 Full ASCII Conversion

Code 39 Full ASCII is a variant of Code 39 that pairs certain characters so it can include the entire ASCII set. Default = Disabled.



#C39ASCII 1

Enable



#C39ASCII 0

** Disable*

Code 39 Check Digit

Use the following commands to allow scanning of all Code 39's (No Check Digits) or only allow codes with a Check Digit. Default = No Check Digits.



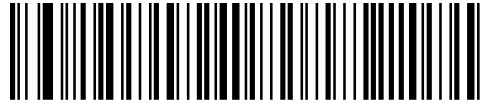
#C39CHEC 0

** Disable C39 Check Digit*



#C39CHEC 1

Validate, but don't Transmit



#C39CHEC 2

Validate and Transmit

Code 39 Convert to Code 32 / Pharmacode

Code 32 is a variant of Code 39 used by the Italian pharmaceutical industry. Scan the appropriate bar code below to enable or disable converting Code 39 to Code 32. Default = Disabled.

Note: In order for this parameter to work, Code 39 must be enabled.



#C39CONV 1

Enable



#C39CONV 0

** Disable*

Trioptic Code 39

Trioptic Code 39 is a variant of Code 39 used in the marking of computer tape cartridges. Trioptic Code 39 symbols always contain six characters. To enable or disable Trioptic Code 39, scan the appropriate bar code below. Default = Disabled.

Note: You cannot enable Trioptic Code 39 and Code 39 Full ASCII simultaneously.



#C39TRIO 1

Enable



#C39TRIO 0

** Disable*

Code 93

Code 93 Defaults

Set all Code 93 settings to their default configuration with this code.



Code 93 On/Off

Scan one of the codes below to enable or disable Code 93. Default = Enabled.



** Enable*



Disable

Code 93 Minimum and Maximum Length

Use the following commands in combination with numerical values to set the minimum and maximum length. Default minimum length = 0. Default maximum length = 55.

The minimum and maximum length for this barcode can be set either by sending the serial command shown under the barcodes below with a value between 0 and 55, or by building a menu command barcode.

Please contact JADAK if assistance is needed.



Code 93 Minimum Length



Code 93 Maximum Length

Composite Code

GS 1 Composite Code

Linear codes are combined with a unique 2D composite component to form a new class called GS1 Composite symbology. GS1 Composite symbologies allow for the co-existence of symbologies already in use.

Default = Disabled.



#COMENAB 1

Enable



#COMENAB 0

** Disable*

Composite Code Minimum and Maximum Length

Use the following commands in combination with numerical values to set the minimum and maximum length.

The minimum and maximum length for this barcode can be set either by sending the serial command shown under the barcodes below with a value between 1 and 2435, or by building a menu command barcode.

Default minimum length = 1. Default maximum length = 2435.

Please contact JADAK if assistance is needed.



#COMMINL

Composite Code Minimum Length



#COMMAXL

Composite Code Maximum Length

EAN-8/JAN 8

EAN-8/JAN 8 Defaults

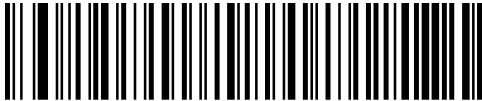
Set the EAN-8 settings to their default configuration with this code.



#EA8DEFA

EAN-8/JAN 8 On/Off

Scan one of the codes below to enable or disable EAN-8. Default = Enabled.



#EA8ENAB 1

** Enable*



#EA8ENAB 0

Disable

EAN-13/JAN 13

EAN-13/JAN 13 Defaults

Set the EAN-13 settings to their default configuration with this code.



#E13DEFA

EAN-13/JAN 13 On/Off

Scan one of the codes below to enable or disable EAN-13. Default = Enabled.



#E13ENAB 1

** Enable*



#E13ENAB 0

Disable

GS1-128 (Formerly UCC-EAN128)

Scan one of the codes below to enable or disable GS1-128. Default = Enabled.



#GS1ENAB 1

** Enable*



#GS1ENAB 0

Disable

GS1 DataBar (Formerly RSS-14)

Scan one of the codes below to enable or disable GS1 DataBar. Default = Enabled.



#RSSENAB 1

** Enable*



#RSSENAB 0

Disable

GS1 DataBar Limited (Formerly RSS-Limited)

Scan one of the codes below to enable or disable GS1 DataBar Limited. Default = Enabled.



#RSLENAB 1

** Enable*



#RSLENAB 0

Disable

GS1 DataBar Expanded (Formerly RSS-Expanded)

Scan one of the codes below to enable or disable GS1 DataBar Expanded. Default = Enabled.



#RSEENAB 1

** Enable*



#RSEENAB 0

Disable

Interleaved 2 of 5

Interleaved 2 of 5 Defaults

Set all Interleaved 2 of 5 settings to their default configuration with this code.



#125DEFA

Interleaved 2 of 5 On/Off

Scan one of the codes below to enable or disable Interleaved 2 of 5. Default = Enabled.



#125ENAB 1

* *Enable*



#125ENAB 0

Disable

Interleaved 2 of 5 Minimum and Maximum Length

Use the following commands in combination with numerical values to set the minimum and maximum length. Default minimum length = 6. Default maximum length = 30.

The minimum and maximum length for this barcode can be set either by sending the serial command shown under the barcodes below with a value between 2 and 55, or by building a menu command barcode.

Please contact JADAK if assistance is needed.



#125MINL

Interleaved 2 of 5 Minimum Length



#125MAXL

Interleaved 2 of 5 Maximum Length

Interleaved 2 of 5 Check Digit

The scanner may look for a check digit to decide if the code is valid. Interleaved 2 of 5's USS (Uniform Symbology Specification) Check digit can be validated and if desired, transmitted too.

Default = Disabled.



#I25CHEC 0

** Disable 1 2 of 5 Check Digits*



#I25CHEC 1

USS Check Validate



#I25CHEC 2

USS Check Validate & Transmit

Matrix 2 of 5

Matrix 2 of 5 Defaults

Set all Matrix 2 of 5 settings to their default configuration with this code.



#M25DEFA

Matrix 2 of 5 On/Off

Scan one of the codes below to enable or disable Matrix 2 of 5. Default = Disabled.



#M25ENAB 1

Enable



#M25ENAB 0

** Disable*

Matrix 2 of 5 Minimum and Maximum Length

Use the following commands in combination with numerical values to set the minimum and maximum length.

The minimum and maximum length for this barcode can be set either by sending the serial command shown under the barcodes below with a value between 1 and 55, or by building a menu command barcode.

Default minimum length = 4. Default maximum length = 55.

Please contact JADAK if assistance is needed.



#M25MINL

Matrix 2 of 5 Minimum Length



#M25MAXL

Matrix 2 of 5 Maximum Length

MSI

MSI Defaults

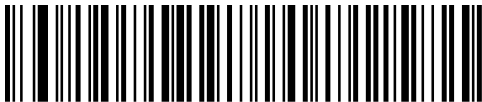
Set all MSI settings to their default configuration with this code.



#MSIDEFA

MSI On/Off

Scan one of the codes below to enable or disable MSI. Default = Disabled.



#MSIENAB 0

** Disable*



#MSIENAB 1

Enable

MSI Minimum and Maximum Length

Use the following commands in combination with numerical values to set the minimum and maximum length.

The minimum and maximum length for this barcode can be set either by sending the serial

command shown under the barcodes below with a value between 4 and 48, or by building a menu command barcode.

Default minimum length = 4. Default maximum length = 48.

Please contact JADAK if assistance is needed.



#MSIMINL

MSI Minimum Length



#MSIMAXL

MSI Maximum Length

MSI Check Digits

With MSI symbols, one check digit is mandatory and always verified by the reader. The second check digit is optional.

If the MSI codes include two check digits, scan the Two MSI Check Digits bar code to enable verification of the second check digit.

Default = Enable One Check Digit, but don't transmit.



#MSICHEC 0

Disable MSI Check Digits



#MSICHEC 1

** Enable One Check Digit, but don't Transmit*



#MSICHEC 2

Enable One Check Digit and Transmit



#MSICHEC 3

Enable Two Check Digits, but don't Transmit



#MSICHEC 4

Enable Two Check Digits and Transmit

UPC-A

UPC-A Defaults

Set the UPC-A settings to their default configuration with this code.



UPC-A On/Off

Scan one of the codes below to enable or disable UPC-A. Default = Enabled.



** Enable*



Disable

UPC-A Check Digit

The check digit is the last character and is used to verify data integrity. This digit is always checked but it may be chosen whether or not to transmit it. Default=Transmit



** Transmit UPC-A Check*



Do Not Transmit UPC-A Check

UPC-E(0)

UPC-E(0) Defaults

Set the UPC-E(0) settings to their default configuration with this code.



UPC-E On/Off

Scan one of the codes below to enable or disable UPC-E(0). Default = Enabled.



#UPEENAB 1

** Enable*



#UPEENAB 0

Disable

UPC-E(0) Check Digit

The check digit is the last character and is used to verify data integrity. This digit is always checked but it may be chosen whether or not to transmit it. Default=Transmit



#UPEXMIT 1

** Transmit UPC-E Check*



#UPEXMIT 0

Do Not Transmit UPC-E Check

UPC-E(0) Expanded Mode On/Off

UPC-E(0) Expanded Mode expands the UPC-E(0) code to the 12 digit, UPC-A format. Scan one of the codes below to enable or disable UPC-E(0) Expanded Mode. Default = Disabled.



#UPEENAB 1

Enable



#UPEENAB 0

** Disable*

UPC-E1

Scan one of the codes below to enable or disable UPC-E(1). Default = Disabled.



#UE1ENAB 1

Enable



#UE1ENAB 0

** Disable*

1D Stacked Symbolologies

PDF417

PDF417 Defaults

To set the default values for PDF417, scan this code:



#PDFDEFA

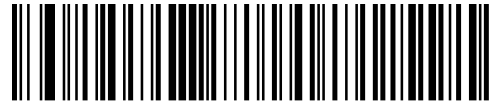
PDF417 On/Off

Scan one of the codes below to enable or disable PDF417. Default = Enabled.



#PDFENAB 1

** Enable*



#PDFENAB 0

Disable

MicroPDF417

MicroPDF417 Defaults

To set the default values for Micro PDF417, scan this code:



#MPDDEFA

MicroPDF417 On/Off

Scan one of the codes below to enable or disable Micro PDF417. Default = Disabled.



#MPDENAB 1

Enable



#MPDENAB 0

** Disable*

2D Matrix Symbolologies

Aztec Code

Aztec Code Defaults

To set the default values for Aztec Code, scan this code:



Aztec Code On/Off

Scan one of the codes below to enable or disable Aztec Code. Default = Enabled.



** Enable*



Disable

Data Matrix

Data Matrix Defaults

To set the default values for Data Matrix, scan this code:



Data Matrix On/Off

Scan one of the codes below to enable or disable Data Matrix. Default = Enabled.



** Enable*



Disable

2D Matrix Symbolologies

Maxi Code

Maxi Code Defaults

To set the default values for Maxi Code, scan this code:



Maxi Code On/Off

Scan one of the codes below to enable or disable Maxi Code. Default = Disabled.



Enable



** Disable*

QR Code

QR Code Defaults

To set the default values for QR Code, scan this code:



QR Code On/Off

Scan one of the codes below to enable or disable QR Code. Default = Enabled.



** Enable*



Disable

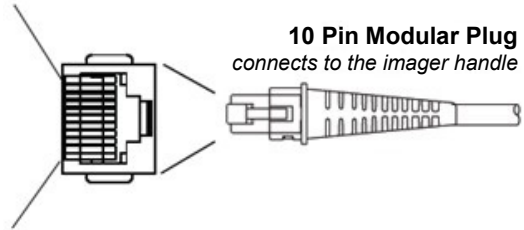
9 - Product Specifications

Technology	Notes
RFID	
RF Frequency:	125 kHz (LF)
Supported Transponders	Cotag, G-Prox (hash value only), HID Prox, Honeywell NexWatch, Indala, ioProx, EM4100, 4102, 4200 (UID only), AWID, CASI-RUSCO, HITAG 1 (no encryption), HITAG 2 (no encryption), HITAG S (no encryption), Keri, Miro, Pyramid, TIRIS/HDX, UNIQUE, FDX-B, Q5, TITAN (4x50), T55x7, ZOODIAC
Antenna:	Internal
Read Range:	Contact to 1.0" + (Tag dependent)
Barcode Scanning	
Light Source:	White LED illumination, Green LED line aimer
Rotational Sensitivity:	360°
Min X Dimension:	Linear codes: 5 mil, 2D Codes: 10 mil
Reading Distance:	2.0" to 15" (barcode dependent)
Ambient:	0-100,000 lux (complete darkness to full sunlight)
Symbologies:	2D: PDF417, MicroPDF417, Maxicode, Data Matrix, QR Code, Aztec, GS-1 Composite Linear: Code 39, Code 128, Codabar, UPC, EAN, Interleaved 2 of 5, GS-1 Databar, Code 93
Electrical	
Communications:	USB (Keyboard or COMM Port), RS-232 (available upon request)
Power Supply:	5VDC +/- 5%
Scanning Current:	500mA max.
Idle Current:	100mA
Agency:	FCC Class B, Industrie Canada (IC), ETSI EN 300 330 V2.1.1, RED 2014/53/EU, EN60601 compatible, CE, EN60950, ROHS, REACH, WEEE
Environmental	
Operating Temp.:	32° F to 122° F (0° to 50°C)
Relative Humidity:	95% RH non-condensing, at +50°C
Environmental Sealing:	IP54 Sealed Housing
Recommended Cleaning Solutions:	Sani-Cloth® HB, Sani-Cloth® Plus, Super Sani-Cloth®, Isopropyl Alcohol Wipes (70%), Cavi-Wipes, Betadine®, 409®, Windex® Blue, Hydrogen Peroxide (3%), Clorox® Bleach, Gentle Dish Soap and Water
All specifications subject to change without notice.	

Standard Cable Pin out

USB

- 1
- 2 Data +
- 3 Tied to 5 volt power
- 4 Supply ground
- 5
- 6
- 7 5 volt power connection
- 8
- 9
- 10 Data -



10 - Maintenance

Repairs

Repairs and/or upgrades are not to be performed on this product. These services are to be performed by JADAK only. Please contact JADAK for your service needs.

Maintenance

The HS-1RL provides reliable and efficient operation with a minimum of care. Although specific maintenance is not required, the following periodic checks ensure dependable product operation:

Cleaning the Scanning Window

Reading performance may degrade if the scanner's window is not clean. If the window is visibly dirty, or if the scanner isn't operating well, clean the window with a soft cloth or lens tissue dampened with water (or a mild detergent- water solution). If a detergent solution is used, rinse with a clean lens tissue dampened with water only.

Cleaning the Scanner Housing

The HS-1RL is IP54 rated when the cable is attached. This means that liquids and dusts will not penetrate into the housing, however, the scanner should not be submerged in water or other liquids. It is also good practice to dampen the cleansing cloth vs. spraying the scanner directly.

The HS-1RL housing is compatible with the following medical grade cleaners:

Sani-Cloth® HB
Sani-Cloth® Plus
Hydrogen Peroxide
CaviWipes™
409® Glass and Surface Cleaner
Windex® Blue
Clorox® Bleach (100%)
Isopropyl Alcohol
Gentle dish soap and water



Caution!

Do not submerge the imager in water.
Do not use abrasive wipes or tissues on the imager's window – abrasive wipes may scratch the window.
Never use solvents (e.g., acetone, benzene, ether, or phenol-based agents) on the housing or window – solvents may damage the finish or the window.

Interface Cable

Inspect the imager's interface cable and connector for wear or other signs of damage. A badly worn cable or damaged connector may interfere with scanner operation.

Should the cable be damaged, the cable can be replaced in the field.

NOTE: The use of non-JADAK cables voids the warranty, only a JADAK cable can be used to keep the IP54 rating.

Replacing the Interface Cable

To Replace the JADAK HS-1RL Interface Cable:

1. Turn the power to the host system OFF.
2. Disconnect the imager's cable from the terminal or computer.
3. Locate the small hole underneath a triangular label on the bottom side of the hand scanner near the cable connection point. This is the cable release.
4. Straighten one end of a paper clip.
5. Insert the straight end of the paper clip into the small hole and press in. This depresses the retention tab, releasing the connector. Pull the connector out while maintaining pressure on the paper clip. When the connector is free, remove the paper clip.
6. Replace with the new cable. Insert the connector into the opening and press firmly. The connector is keyed to go in only one way, and will click into place.

11 - Customer Support

Obtaining Technical Assistance or Factory Service

JADAK provides assistance and service for all its products. To obtain warranty or non-warranty service, return the unit to JADAK (postage paid) with a copy of the dated purchase record attached. Contact the appropriate location below to obtain a Return Material Authorization number (RMA #) before returning the product.

If you need assistance installing or troubleshooting your scanner, please contact the JADAK office in your area.

North America

JADAK, LLC

Telephone: +1 315-701-0678

Fax: +1 315-701-0679

E-mail: info@jadaktech.com

Europe

JADAK BV

Telephone +31 (0)76-522-5588

Fax: +31 (0)76-522-4747

E-mail: info@jadaktech.com

Limited Warranty

JADAK LLC (“JADAK”) warrants the HS-1RL to be free from defects in materials and workmanship and to conform to JADAK’s published specifications applicable to the products purchased at the time of shipment. This warranty does not cover the interface cable and does not include any JADAK product which is (i) improperly installed or used; (ii) damaged by accident or negligence, including failure to follow the proper maintenance, service, and cleaning schedule; or (iii) damaged as a result of: (A) Modification or alteration by the purchaser or other party, (B) Excessive voltage or current supplied to or drawn from the interface connections, (C) Static electricity or electro-static discharge, (D) Operation under conditions beyond the specified operating parameters, or (E) Repair or service of the product by anyone other than JADAK or its authorized representatives.

This warranty shall extend from the time of shipment for the duration published by JADAK for the product at the time of purchase (“Warranty Period”). Any defective product must be returned (at purchaser’s expense) during the Warranty Period to JADAK factory for inspection. No product will be accepted by JADAK without a Return Materials Authorization, which may be obtained by contacting JADAK. In the event that the product is returned to JADAK within the Warranty Period and JADAK determines to its satisfaction that the product is defective due to defects in materials or workmanship, JADAK, at its sole option, will either repair or replace the product without charge, except for return shipping to JADAK.

EXCEPT AS MAY BE OTHERWISE PROVIDED BY APPLICABLE LAW, THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER COVENANTS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, ORAL OR WRITTEN, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

JADAK’S RESPONSIBILITY AND PURCHASER’S EXCLUSIVE REMEDY UNDER THIS WARRANTY IS LIMITED TO THE REPAIR OR REPLACEMENT OF THE DEFECTIVE PRODUCT WITH NEW OR REFURBISHED PARTS. IN NO EVENT SHALL JADAK BE LIABLE FOR INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, AND, IN NO EVENT, SHALL ANY LIABILITY OF JADAK ARISING IN CONNECTION WITH ANY PRODUCT SOLD HEREUNDER (WHETHER SUCH LIABILITY ARISES FROM A CLAIM BASED ON CONTRACT, WARRANTY, TORT, OR OTHERWISE) EXCEED THE ACTUAL AMOUNT PAID TO JADAK FOR THE PRODUCT. THESE LIMITATIONS ON LIABILITY SHALL REMAIN IN FULL FORCE AND EFFECT EVEN WHEN JADAK MAY HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH INJURIES, LOSSES, OR DAMAGES. SOME STATES, PROVINCES, OR COUNTRIES DO NOT ALLOW THE EXCLUSION OR LIMITATIONS OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

All provisions of this Limited Warranty are separate and severable, which means that if any provision is held invalid and unenforceable, such determination shall not affect the validity of enforceability of the other provisions hereof. Use of any peripherals not provided by the manufacturer may result in damage not covered by this warranty. This includes but is not limited to: cables, power supplies, cradles, and docking stations. JADAK extends these warranties only to the first end users of the products. These warranties are non-transferable. The duration of the limited warranty for the HS-1RL is for one (1) year.

Compliance and IP Notices

Statement of Agency Compliance

Model Numbers: HS-1RL, HS-1RS, HS1RL, HS1RS, FlexTap, FlexTap RL, FlexTap RS
FCC ID: QV5HS1RL
IC: 5407A-HS1RL
EU: CE

The product is designed to support the following regulatory and safety standards as a standalone unit. The end user will need to verify general EMC compliance as implemented in their host system.

Federal Communication Commission (FCC) and Industrie Canada (IC) Compliance Information Statement

This device complies with FCC Rules Part 15 and with Industry Canada license-exempt RSS standard(s). Operation is subject to two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference that may be received or that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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.

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

To comply with FCC and IC RF exposure compliance requirements, the entire device outer surface may be contacted by operators during normal operation; the device housing provides sufficient spacing for safety. The device must not be co-located or operated in conjunction with any other antenna or transmitter.

Pour se conformer aux exigences de conformité de la FCC et de l'IC en matière d'exposition aux radiofréquences, les utilisateurs peuvent entrer en contact avec toute la surface extérieure du dispositif au cours de son fonctionnement normal. Le boîtier de l'appareil offre un espacement suffisant pour la sécurité. L'appareil ne doit pas être co-localisé ou utilisé en conjonction avec une autre antenne ou un autre émetteur.

Responsible Party: Novanta

Address: 125 Middlesex Turnpike, Bedford, MA 01730, USA

Internet Contact Information: www.novanta.com

Appendices

Appendix A - Command Format

The HS-1RL accepts a wide range of configuration commands. Commands can be sent to the imager wither by scanning menu bar symbol or via Serial commands sent from the host machine.

The HS-1RL command format is.

Send Command: #<parameter><space><argument><specifier>

Where:

Parameter: Command

Argument: Value to be set, if applicable

Specifier: Character to designate action to be taken.

Specifier	Action
!	Save value to RAM
.	Save value to ROM
@	Save all current settings to custom defaults
?	Query current value
*	Query range

All available commands are listed on the following pages as well as a brief description of what the parameter choices mean. Some commands require further elaboration that can be found in the relevant sections in the guide.

For example, the command to enable reading of Code 128 barcode symbols is "128ENAB 1". The full command to apply this setting to ROM is:

#128ENAB 1.

Throughout this manual, the serial command for each setting is shown directly below the corresponding barcode menu symbol. Additionally, all commands are shown in table A1-2.

Upon reception of the special command "**#HELP**", the imager will output all of its commands serially to the host computer, in the format shown in table A1-1. This is a very helpful way to see what commands are supported by the firmware version that you are using, and to archive the imager configuration.

Query Commands

This section will describe in more detail how to use the query commands.

Several special characters can be used to query the device about its settings:

- ^ What is the default value for the setting?
- ? What is the device's current ROM value for the setting?
- % What is the device's current RAM value for the setting?
- * What is the range of possible values for the setting?

Examples:

In the following examples, a bracketed notation [] depicts a non-displayable response.

Query Goal: What is the range of possible values for the Code 128 Max Length?

Send: #128MAXL *[CR]

Response: #0-55[CR]

Query Goal: What is the default value for the Code 128 Max Length?

Send: #128MAXL ^[CR]

Response: #55[CR]

Table A1-1: Example Output part from the “HELP” command

#Cmds	Description	RAM	ROM	Default		Range	
#HELP	Display command list	N/A	N/A	N/A	N/A	N/A	N/A
#DEFAULT	Restore All Settings To Custom Defaults			N/A	N/A	N/A	N/A
#DEFFACT	Restore All Settings To Factory Defaults			N/A	N/A	N/A	N/A
#DNLDAPP	Download a firmware (*.moc) file via XModem			N/A	N/A	N/A	N/A
#REVSOFT	Request Firmware revision information			N/A	N/A	N/A	N/A
#REVTIME	Request Time and Date of build information			N/A	N/A	N/A	N/A
#ALLENAB	Enable all Symbologies	N/A	N/A	N/A	N/A		
#COMENAB	Enable Composite Code	0	0	0	0	0-1	
#COMMAXL	Composite Code Max Symbol Length			2435	2435	2435	1-2435
#COMMINGL	Composite Code Min Symbol Length			1	1	1	1-2435
#128DEFA	Default Code 128 Parameters			N/A	N/A	N/A	N/A
#128ENAB	Enable Decoding Code 128	1	1	1	1	0-1	
#128MAXL	Max Code 128 Symbol Length			55	55	55	0-55
#128MINL	Min Code 128 Symbol Length			0	0	0	0-55
#ISBT128	Enable ISBT-128	0	0	0	0	0-1	
#C39DEFA	Default Code 39 Parameters			N/A	N/A	N/A	N/A
#C39ASCI	Code 39 Full ASCII Mode	0	0	0	0	0-1	
#C39CHEC	Code 39 Check Digit 0=none 1=req 2=req+xmit			0	0	0	0|1|2
#C39ENAB	Enable Code 39 Decoding	1	1	1	1	0-1	
#C39MAXL	Max Code 39 Symbol Length			48	48	48	0-48
#C39MINL	Min Code 39 Symbol Length			0	0	0	0-48
#C39CONV	convert C39 to C32 Pharmacode			0	0	0	0-1
#C39TRIO	Code 39 Trioptic	0	0	0	0	0-1	
#CBRDEFA	Default Codabar Parameters			N/A	N/A	N/A	N/A
#CBRENAB	Enable Decoding Codabar	1	1	1	1	0-1	
#CBRMAXL	Max Codabar Symbol Length			55	55	55	2-55
#CBRMINL	Min Codabar Symbol Length			5	5	5	2-55
#I25DEFA	Default I25 Parameters	N/A	N/A	N/A	N/A	N/A	N/A
#I25CHEC	I25 Check Digit 0=none 1=req 2=req+xmit			0	0	0	0|1|2
#I25ENAB	Enable Decoding I25	1	1	1	1	0-1	
#I25MAXL	Max I25 Symbol Length	30	30	30	30	2-55	
#I25MINL	Min I25 Symbol Length	6	6	6	6	2-55	
#C11DEFA	Default Code 11 Parameters			N/A	N/A	N/A	N/A
#C11CHEC	Code 11 2-Char Check Digit	0	0	0	0	0-1	
#C11ENAB	Enable Decoding Code 11	0	0	0	0	0-1	
#C11MAXL	Code 11 Max Symbol Length			55	55	55	1-55
#C11MINL	Code 11 Min Symbol Length			4	4	4	1-55
#C93DEFA	Default Code 93 Parameters			N/A	N/A	N/A	N/A
#C93ENAB	Enable Decoding Code 93	1	1	1	1	0-1	
#C93MAXL	Max Code 93 Symbol Length			55	55	55	0-55
#C93MINL	Min Code 93 Symbol Length	0	0	0	0	0-55	

Appendix A1-2 Command List and Standard Default Parameters

Command	Range (if applicable)	Default Value	Description
128DEFA			Default Code 128 parameters
128ENAB	0 to 1	1	Enable Decoding Code 128
128MAXL	0 to 55	55	Max Code 128 symbol length
128MINL	0 to 55	0	Min Code 128 symbol length
ALLENAB	0 to 1	1	Enable All Symbologies
AZTDEFA			Default Aztec parameters
AZTENAB	0 to 1	1	Enable Aztec Decoding
BEPLEVL	0 to 3	3	Set Beeper Level
C11CHEC	0 to 1	0	Enable Code 11 2-digit Check digit
C11DEFA			Default Code 11 parameters
C11ENAB	0 to 1	0	Enable Decoding Code 11
C11MAXL	1 to 55	55	Max Code 11 symbol length
C11MINL	1 to 55	4	Min Code 11 symbol length
C39ASCII	0 to 1	0	Enable Code 39 full ASCII mode
C39CHEC	0 to 1	0	Enable Code 39 Check digit
C39CONV	0 to 1	0	Enable conversion C39 to C32 Pharma
C39DEFA			Default Code 39 parameters
C39ENAB	0 to 1	1	Enable Code 39 Decoding
C39MAXL	0 to 48	48	Max Code 39 symbol length
C39MINL	0 to 48	0	Min Code 39 symbol length
C39TRIO	0 to 1	0	Enable Trioptic C39
C93DEFA			Default Code 93 parameters
C93ENAB	0 to 1	0	Enable Decoding Code 93
C93MAXL	0 to 55	55	Max Code 93 symbol length
C93MINL	0 to 55	0	Min Code 93 symbol length
CBRDEFA			Default Codabar Parameters
CBRENAB	0 to 1	0	Enable Codabar Decoding
CBRMAXL	2 to 55	55	Max Codabar symbol length
CBRMINL	2 to 55	5	Min Codabar symbol length
COMENAB	0 to 1	0	Enable Composite Code
COMMAXL	1 to 2435	2435	Composite Code Max Symbol Length
COMMINGL	1 to 2435	1	Composite Code Min Symbol Length
DEFFACT			Restore All Settings To Factory Defaults
DEFAULT			Restore All Settings To Custom Defaults
DEVSENR			Show Device Serial Number
DLYGDRD	0 to 30000	0	Good Read Delay (in milliseconds)
DLYRERD	0 to 30000	600	Re-read Delay (in milliseconds)
DMXDEFA			Default Data Matrix Parameters

Command	Range (if applicable)	Default Value	Description
DMXENAB	0 to 1	1	Enable Data Matrix Decoding
DNLDAPP			Download a firmware file via XModem
E13DEFA			Default EAN13 parameters
E13ENAB	0 to 1	1	Enable Decoding EAN13
EA8DEFA			Default EAN8 Parameters
EA8ENAB	0 to 1	1	Enable EAN8 Decoding
ELEDDUR	0 to 1000	1	Error LED duration in milliseconds
EXP_MAX	1 to 7874	100	Max Exposure
EXPMODE	0, 2	0	Exposure Mode
EXPTARG	48 to 212	120	Target White Value
GS1ENAB	0 to 1	1	Enable/Disable GS1 Formatting
GS1EMUL	0 to 1	0	Enable Emulation from GS1 (0=Off, 1=128)
HELP			Show command list and settings
HOSTCFG	0 to 1	0	0 = CDC (COM Emulation), 1 = HID Keyboard
I25CHEC	0 to 2	0	Enable I2of5 Check digit
I25DEFA			Default I2of5 parameters
I25ENAB	0 to 1	1	Enable I2of5 Decoding
I25MAXL	0 to 55	30	Max I2of5 Symbol Length
I25MINL	0 to 55	6	Min I2of5 Symbol Length
IMGMAXX		844	Get Image Width
IMGMAXY		640	Get Image Height
ISBT128	0 to 1	0	Enable ISBT-128 Concatenation
KBD_CTY	12 options	0	Keyboard Country Setting
LEDSPWR	0 to 3	3	Set illumination brightness
M25DEFA			Default Matrix 2 of 5 Parameters
M25ENAB	0 to 1	0	Enable Decoding Matrix 2 of 5
M25MAXL	1 to 55	55	Max Matrix 2 of 5 symbol length
M25MINL	1 to 55	4	Min Matrix 2 of 5 symbol length
MAXDEFA			Default MaxiCode parameters
MAXENAB	0 to 1	0	Enable MaxiCode
MPDDEFA			Default Micro PDF parameters
MPDENAB	0 to 1	0	Enable Micro PDF417 Decoding
MSICHEC	0 to 4	0	MSI Check Digit (0-4)
MSIDEFA			Default MSI Parameters
MSIENAB	0 to 1	0	Enable Decoding MSI
MSIMAXL	4 to 48	48	Max MSI Symbol Length
MSIMINL	4 to 48	4	Min MSI Symbol Length
MULTSYM	0 to 1	0	Multiple Symbol mode
NO_READ	0 to 1	0	Enable No Read message
PDFDEFA			Default PDF417 parameters
PDFENAB	0 to 1	1	Enable Decoding PDF417

Command	Range (if applicable)	Default Value	Description
PREBBLK		(B)	Barcode Prefix Block
PREBENA	0 to 1	1	Enable Barcode Prefix
QRCDEFA			Default QR Code parameters
QRCENAB	0 to 1	1	Enable QR Code Decoding
REVSOFT			Report Software revision
REVTIME			Report Build Time
RSEENAB	0 to 1	1	Enable RSS-Expanded (GS1 Databar Expanded)
RSLENAB	0 to 1	1	Enable RSS-Limited (GS1 Databar Limited)
RSENAB	0 to 1	1	Enable RSS-14 (GS1 Databar)
SUFBBLK		[CR]	Barcode Suffix
SUSBENA	0 to 1	1	Enable Barcode Suffix
TRGMODE	0, 1	0	Trigger Mode 0=Single, 1=Presentation
TRGOFF			Software Trigger Off
TRGON			Software Trigger On
TRGTIME	0 to 300000	9900	Trigger Timeout (in milliseconds)
UE1ENAB	0 to 1	0	Enable UPC-E1 Decoding
UPADEFA			Default UPC-A parameters
UPAENAB	0 to 1	1	Enable UPC-A Decoding
UPAXMIT	0 to 1	1	Transmit UPC-A Enable Check digit
UPEDEFA			Default UPC-E parameters
UPEENAB	0 to 1	1	Enable UPC-E (0) Decoding
UPEEXPN	0 to 1	0	Enable UPC-E Expanded Decoding
UPEXMIT	0 to 1	1	Transmit UPC-E(0) Check digit
WINDECE	0 to 1	0	Enable Decode Windowing
WINDECB	0 to 639	384	Set Bottom boundary of decode window
WINDECL	0 to 843	338	Set Left boundary of decode window
WINDECR	0 to 843	506	Set Right boundary of decode window
WINDECT	0 to 639	256	Set Top boundary of decode window
XMITCID	0 to 2	0	Transmit Code ID (0-Off, 1-AIM ID, 2-Symbol ID)

Appendix A1-2 RFID Command List and Standard Default Parameters

Command	Range (if applicable)	Default Value	Description
BEPLEVL	0 to 3	3	Beeper Volume
BEPSOND	0 to 7		Sound Beeper
KEYRATE	0 to 3	1	HID Keyboard Rate. 0=Slowest 3=Fastest
LEDINDC	0 to 4		LED Indicator 0-4
PRERBLK		(R)	RFID Prefix Block
PRERENA	0 to 1	1	Enable RFID Prefix
PSTTIME	0 to 3.600.000	0	RFID Timeout in Presentation in Milliseconds
RFIDDLY	0 to 5000	1000	RFID Re-Read Delay in Milliseconds
RFIDMIN	0 to 255	0	RFID Start Read Block Number
RFIDMAX	0 to 255	7	RFID End Read Block Number
RFIDMOD	0 to 2	0	RFID Mode 0 = Off, 1 = On
RFIDRBK			RFID Read Block of data to a tag
RFIDTMO	0 to 65535	1000	RFID Read/Write Block Timeout in ms
RFIDTXT	0 to 1	0	RFID Data Text Mode (0=binary, 1=Text)
RFIDUID	0 to 1	0	Little/Big Endian output of UID
RFIDWBK			RFID Write Block of data to a tag
SUFRBLK		[CR]	RFID Suffix
SUFRENA	0 to 1	1	Enable RFID Suffix
UIDONLY	0 to 1	1	Output the UID of an RFID tag only
VIBENAB	0 to 1	1	Enable Vibration
VIBRATE	0 to 2		Vibration Indicator 0-2

Appendix B - AIM IDs

Barcode	AIM ID	AIM ID Modifiers
Code 39, Code 39 Full ASCII, Code 32	A	0 No check character or Full ASCII processing.
		1 Reader has checked one check character.
		3 Reader has checked and stripped check character.
		4 Reader has performed Full ASCII character conversion.
		5 Reader has performed Full ASCII character conversion and checked one check character.
		7 Reader has performed Full ASCII character conversion and checked and stripped check character.
		<i>Example:</i> A Full ASCII bar code with check character W, A+I+MI+DW , is transmitted as JA7AIMID where 7 = (3+4).
Code 128, ISBT 128, ISBT 128 Concatenated, GS1-128, Coupon (Code 128 portion)	C	0 Standard data packet, no Function code 1 in first symbol position.
		1 Function code 1 in first symbol character position.
		2 Function code 1 in second symbol character position.
		<i>Example:</i> A Code (EAN) 128 bar code with Function 1 character FNC1 in the first position, AIMID is transmitted as JC1AIMID
Data Matrix	d	0 ECC 000-140, not supported.
		1 ECC 200.
		2 ECC 200, FNC1 in first or fifth position.
		3 ECC 200, FNC1 in second or sixth position.
		4 ECC 200, ECI protocol implemented.
		5 ECC 200, FNC1 in first or fifth position, ECI protocol implemented.
		6 ECC 200, FNC1 in second or sixth position, ECI protocol implemented.
UPC/EAN, Coupon (UPC portion)	E	0 Standard data packet in full EAN format, i.e. 13 digits for UPC-A, UPC-E, and EAN-13 (not including supplemental data).
		1 Two digit supplemental data only.
		2 Five digit supplemental data only.
		3 Combined data packet comprising 13 digits from EAN-13, UPC-A or UPC-E symbol and 2 or 5 digits from supplemental symbol.
		4 EAN-8 data packet.
		<i>Example:</i> A UPC-A bar code 012345678905 is transmitted as JE00012345678905

Barcode	AIM ID	AIM ID Modifiers
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GS1 DataBar Family	e	No option specified at this time. Always transmit 0. GS1 DataBar and GS1 DataBar Limited transmit with an Application Identifier "01". Note: In GS1-128 emulation mode, GS1 DataBar is transmitted using Code 128 rules (i.e.,]C1).
		<i>Example:</i> A GS1 DataBar bar code 0110012345678902 is transmitted as]e00110012345678902.
Codabar	F	0 No check digit processing.
		1 Reader has checked check digit.
		3 Reader has stripped check digit before transmission.
		<i>Example:</i> A Codabar bar code without check digit, 4123, is transmitted as]F04123
Code 93	G	0 No options specified at this time. Always transmit 0.
		<i>Example:</i> A Code 93 bar code 012345678905 is transmitted as]G0012345678905
Code 11	H	0 Single check digit
		1 Two check digits
		3 Check characters validated but not transmitted.
Interleaved 2 of 5	I	0 No check digit processing.
		1 Reader has validated check digit.
		3 Reader has validated and stripped check digit.
		<i>Example:</i> An I 2 of 5 bar code without check digit, 4123, is transmitted as]I04123
PDF417, Macro PDF417, Micro PDF417	L	0 Reader set to conform to protocol defined in 1994 PDF417 Symbology specifications. Note: When this option is transmitted, the receiver cannot reliably determine whether ECIs have been invoked or whether data byte 92DEC has been doubled in transmission.
		1 Reader set to follow the ECI protocol (Extended Channel Interpretation). All data characters 92 _{DEC} are doubled.
		2 Reader set for Basic Channel operation (no escape character transmission protocol). Data characters 92 _{DEC} are not doubled. Note: When decoders are set to this mode, unbuffered Macro symbols and symbols requiring the decoder to convey ECI escape sequences cannot be transmitted.
		3 The bar code contains a GS1-128 symbol, and the first codeword is 903-907, 912, 914, 915.
		4 The bar code contains a GS1-128 symbol, and the first codeword is in the range 908-909.
		5 The bar code contains a GS1-128 symbol, and the first codeword is in the range 910-911.
		<i>Example:</i> A PDF417 bar code ABCD, with no transmission protocol enabled, is transmitted as]L2ABCD.

Barcode	AIM ID	AIM ID Modifiers
TLC 39	L2	
MSI	M	0 Check digits are sent.
		1 No check digit is sent.
		<i>Example:</i> An MSI bar code 4123, with a single check digit checked, is transmitted as JM14123
QR Code, MicroQR	Q	0 Model 1 symbol.
		1 Model 2 / MicroQR symbol, ECI protocol not implemented.
		2 Model 2 symbol, ECI protocol implemented.
		3 Model 2 symbol, ECI protocol not implemented, FNC1 implied in first position.
		4 Model 2 symbol, ECI protocol implemented, FNC1 implied in first position.
		5 Model 2 symbol, ECI protocol not implemented, FNC1 implied in second position.
		6 Model 2 symbol, ECI protocol implemented, FNC1 implied in second position.
Discrete 2 of 5, IATA 2 of 5	S	0 No options specified at this time. Always transmit 0.
		<i>Example:</i> A D 2 of 5 bar code 4123, is transmitted as JS04123
Maxicode	U	0 Symbol in Mode 4 or 5.
		1 Symbol in Mode 2 or 3.
		2 Symbol in Mode 4 or 5, ECI protocol implemented.
		3 Symbol in Mode 2 or 3,
Aztec, Aztec Rune	z	0 Aztec symbol.
		C Aztec Rune symbol.
Trioptic Code 39	X	0 No option specified at this time. Always transmit 0.
		<i>Example:</i> A Trioptic bar code 412356 is transmitted as JX0412356
Bookland EAN	X	0 No options specified at this time. Always transmit 0.
		<i>Example:</i> A Bookland EAN bar code 123456789X is transmitted as JX0123456789X
ISSN EAN	X	0 No options specified at this time. Always transmit 0.
		<i>Example:</i> An ISSN EAN bar code 123456789X is transmitted as JX0123456789X
Chinese 2 of 5, Matrix 2 of 5, Korean 3 of 5, US Postnet, US Planet, UK Postal, Japan Postal, Australia Post, Netherlands KIX Code, USPS 4CB/One Code/ Intelligent Mail, UPU FICS Postal	X	

Appendix C - Sample Bar Codes



UPC-A



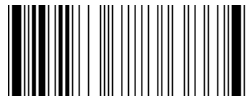
Codabar



Code 128



Code 39



Code 93



Interleaved 2 of 5



PDF-417



Composite Code



MicroPDF



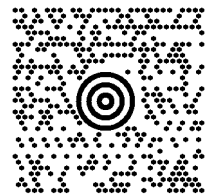
Aztec



Data Matrix



QR Code



MaxiCode

Appendix D - ASCII Conversion Chart

For these Imager engines, use the 2-digit Hex values to create an ASCII character.
 E.g., to create an F, use '46' and to create an f, use '66'. The first 32 characters are unprintable.

Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char
0	00	NUL	32	20	Space	64	40	@	96	60	`
1	01	SOH	33	21	!	65	41	A	97	61	a
2	02	STX	34	22	"	66	42	B	98	62	b
3	03	ETX	35	23	#	67	43	C	99	63	c
4	04	EOT	36	24	\$	68	44	D	100	64	d
5	05	ENQ	37	25	%	69	45	E	101	65	e
6	06	ACK	38	26	&	70	46	F	102	66	f
7	07	BEL	39	27	'	71	47	G	103	67	g
8	08	BS	40	28	(	72	48	H	104	68	h
9	09	HT	41	29	)	73	49	I	105	69	i
10	0A	LF	42	2A	*	74	4A	J	106	6A	j
11	0B	VT	43	2B	+	75	4B	K	107	6B	k
12	0C	FF	44	2C	,	76	4C	L	108	6C	l
13	0D	CR	45	2D	-	77	4D	M	109	6D	m
14	0E	SO	46	2E	.	78	4E	N	110	6E	n
15	0F	SI	47	2F	/	79	4F	O	111	6F	o
16	10	DLE	48	30	0	80	50	P	112	70	p
17	11	DC1	49	31	1	81	51	Q	113	71	q
18	12	DC2	50	32	2	82	52	R	114	72	r
19	13	DC3	51	33	3	83	53	S	115	73	s
20	14	DC4	52	34	4	84	54	T	116	74	t
21	15	NAK	53	35	5	85	55	U	117	75	u
22	16	SYN	54	36	6	86	56	V	118	76	v
23	17	ETB	55	37	7	87	57	W	119	77	w
24	18	CAN	56	38	8	88	58	X	120	78	x
25	19	EM	57	39	9	89	59	Y	121	79	y
26	1A	SUB	58	3A	:	90	5A	Z	122	7A	z
27	1B	ESC	59	3B	;	91	5B	[	123	7B	{
28	1C	FS	60	3C	<	92	5C	\	124	7C	|
29	1D	GS	61	3D	=	93	5D	]	125	7D	}
30	1E	RS	62	3E	>	94	5E	^	126	7E	~
31	1F	US	63	3F	?	95	5F	_	127	7F	DEL

Appendix D – Extended ASCII Conversion Chart

Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char
128	80	€	160	A0		192	C0	À	224	E0	à
129	81	□	161	A1	ı	193	C1	Á	225	E1	á
130	82	,	162	A2	¢	194	C2	Â	226	E2	â
131	83	f	163	A3	£	195	C3	Ã	227	E3	ã
132	84	”	164	A4	¤	196	C4	Ä	228	E4	ä
133	85	...	165	A5	¥	197	C5	Å	229	E5	å
134	86	†	166	A6	|	198	C6	Æ	230	E6	æ
135	87	‡	167	A7	§	199	C7	Ç	231	E7	ç
136	88	^	168	A8	¨	200	C8	È	232	E8	è
137	89	‰	169	A9	©	201	C9	É	233	E9	é
138	8A	Š	170	AA	ª	202	CA	Ê	234	EA	ê
139	8B	‹	171	AB	«	203	CB	Ë	235	EB	ë
140	8C	Œ	172	AC	¬	204	CC	Ì	236	EC	ì
141	8D	□	173	AD		205	CD	Í	237	ED	í
142	8E	Ž	174	AE	®	206	CE	Î	238	EE	î
143	8F	□	175	AF	¯	207	CF	Ï	239	EF	ï
144	90	□	176	B0	°	208	D0	Ð	240	F0	ð
145	91	‘	177	B1	±	209	D1	Ñ	241	F1	ñ
146	92	’	178	B2	²	210	D2	Ò	242	F2	ò
147	93	“	179	B3	³	211	D3	Ó	243	F3	ó
148	94	”	180	B4	´	212	D4	Ô	244	F4	ô
149	95	•	181	B5	µ	213	D5	Õ	245	F5	õ
150	96	–	182	B6	¶	214	D6	Ö	246	F6	ö
151	97	—	183	B7	·	215	D7	×	247	F7	÷
152	98	~	184	B8	¸	216	D8	Ø	248	F8	ø
153	99	™	185	B9	¹	217	D9	Ù	249	F9	ù
154	9A	Š	186	BA	º	218	DA	Ú	250	FA	ú
155	9B	›	187	BB	»	219	DB	Û	251	FB	û
156	9C	œ	188	BC	¼	220	DC	Ü	252	FC	ü
157	9D	□	189	BD	½	221	DD	Ý	253	FD	ý
158	9E	Ž	190	BE	¾	222	DE	Þ	254	FE	þ
159	9F	ÿ	191	BF	¿	223	DF	ß	255	FF	ÿ

