RFTagAware™

Reader Configuration Guide

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ConnecTerra, Inc.

100 CambridgePark Drive

Cambridge, Massachusetts 02140

Phone: (617) 441-2200

Facsimile: (617) 492-5837

Web Site: www.connecterra.com

Email: Info@connecterra.com

RFTagAware™
Reader Configuration Guide

Contents

This document describes how to configure supported RFTagAware RFID readers.

Supported RFID Readers

You need one or more RFID readers to use RFTagAware. RFTagAware supports the makes and models of readers shown in the table below. The reader models marked with an asterisk (*) have substantially similar command sets and capabilities as others in the same row, but they have not been as extensively tested. Please contact ConnecTerra technical support if you encounter any issues with these reader models.

Make	Model	Read/Write[1]	Tag Classes Supported
Accraply	ALX-92X series	WO	EPC Class 1
Alien	ALR-9750 (Nanoscanner) 915 MHz RFID	RW	EPC Class 1
	ALR-9780 915 MHz RFID ALR-8780 866 MHz RFID	RW	EPC Class 1
Avery	6405	WO	EPC Class 1
AWID	MPR-2010AN, MPR-2080*	RW	EPC Class 1
CAEN	A928	RW	ISO 18000-6B
Datalogic	DS6300-105-010 (bar code reader)	RO	N/A
Escort Memory Systems	LRP820S, LRP2000	RO	ISO 15693
Intermec	Intellitag IF5	RW	Intellitag G1 ISO 18000-6B
Paxar	Monarch 9855	WO	EPC Class 1
Printronix	T5000e Smart Label	WO	EPC Class 0+, 1
	T5000r Smart Label	WO	EPC Class 0+, 1
SAMSys	MP9320 2.0 and 2.7	RW	EPC Class 1
		RO	ISO18000-6B v1.19 EPC
Symbol (Matrics)	RDR-001	RO	EPC Class 0
	AR400, DC400*	RO	EPC Class 0, 0+, 1
ThingMagic	Mercury3, Sensormatic Agile 1*	RW	EPC Class 1
	Mercury4, Sensormatic Agile 2*, Omron V740*	RO	EPC Class 0, 0+
		RW	EPC Class 1

Make	Model	Read/Write[1]	Tag Classes Supported
Zebra	R110XiIIIPlus	WO	EPC Class 0+
	R110Xi	WO	EPC Class 0+, 1
	R4MPlus	WO	EPC Class 1

1 - Supported read/write types are Read/Write (RW), Read Only (RO), Write Only (WO).

If you do not have a reader, you can use the reader simulator provided with RFTagAware. Out of the box, it runs on any workstation and simulates a ThingMagic Mercury4 reader; with minor editing it can simulate a Printronix reader. The reader simulator is useful for software evaluation, application development, and debugging.

ConnecTerra is committed to providing support for new makes and models of readers as they become available, so check with your ConnecTerra sales representative if your selected reader does not appear in this list.

Some readers may require specific configuration prior to use with RFTagAware.

Configuring Physical Readers

You can configure RFTagAware to communicate with supported readers in one of two ways:

- Edit the `edge.props` file directly to configure these devices. (This is the default for RFTagAware installations prior to version 1.3.) This file is a Java properties file used to configure the Edge Server. It is located in the `etc` subdirectory of the RFTagAware installation directory.

- (new for RFTagAware 1.3) Edit the reader configuration information using the RFID Devices pane on the Administration Console. (This is the default for new RFTagAware installations.)

Configuration properties consist of a name (shown in the Property Name column of the tables in this document) and a value (described in the Property Value and Description column of those same tables). When written out in the `edge.props` file, they will appear in the following format:

```
com.connecterra.ale.reader.<phys reader name>.<property name>=<property value>
```

If you are using the Administration Console to add and configure readers, the configuration dialog will contain reader-specific fields to enter information into. In this case, no information will be written to the edge.props file; instead, the configuration information you enter will be saved in the persistence store kept by the Edge Server.

See Chapters 2 and 3 of the *RFTagAware Deployment Guide* for more information on reader configuration procedures.

Accraply

This section describes driver configuration information for the Accraply label printer. This device is capable of connecting to a reader (referred to as a `secondaryLogicalReaderName`) for tag write operations.

The Accraply reader uses the Easy Plug Label Scripting language. For more information on Easy Plug, see *Using the Easy Plug Label Scripting Language* on page 14.

The Accraply driver uses the following properties:

Field Label	Property Name	Required?	Property Value and Description
Device Type	`class`	Yes	Must be set to: `com.connecterra.ale.readertypes.` `AccraplyPhysicalReader`
Reader Hostname	`hostname`	Yes	The DNS name or IP address of the printer's LAN adapter.
Reader Port	`port`	No	The TCP port the Edge Server will target when establishing connections to the printer's LAN adapter. The default value is 4000.
Socket Timeout	`socketTimeout`	No	The TCP socket timeout interval (milliseconds). The default value is 15000 milliseconds (15 seconds).
Logical Reader Name	`prnLogicalReaderName`	Yes	The logical reader name assigned to the Accraply printer's print head.
N/A	`defaultFormFilename`	No	See `easyPlugFilename`. Used only for backward compatibility with releases prior to RFTagAware 1.3.

Field Label	Property Name	Required?	Property Value and Description
Easy Plug Form	easyPlugFilename	No	Specifies the pathname of a file containing Easy Plug commands defining a smart label's form. Typically, the PCSpec `readerParameters` attribute specifies Easy Plug-based label design. This property provides a mechanism for specifying a default label design in the event the `PCSpec` does not contain this parameter. When present, `easyPlugFilename` refers to a text file containing the set of Easy Plug commands specifying the smart label's layout and dynamic (variable) content. Note: While optional, this property MUST point to a valid Easy Plug label script file if it is present.
Logical Reader Name for RFID Encoding	secondaryLogicalReaderName	Yes	Specifies a logical reader to write the RFID tag in the label. This logical reader must be properly specified and configured.
Retries	retries	No	The number of attempts that the `secondaryLogicalReaderName` should make to write the RFID tag in the label.
Fail Form	failFormFilename	No	The form which will be used instead of the `easyPlugFilename` if the `secondaryLogicalReaderName`'s tag write operation fails.
N/A	rfPowerLevel	No	See `rfAttenuation`. Used only for backward compatibility with releases prior to RFTagAware 1.3.
RF Attenuation	rfAttenuation	No	Default antenna power attenuation setting to be passed to the `secondaryLogicalReaderName`. Valid range: 0 (no attenuation, maximum power) to 160 (maximum attenuation, minimum power), in increments of 10 - each increment representing an additional 1 dB of RF attenuation. Default value is 0.
Enable RFID Encoding	programRFID	No	A Boolean (permissible values are `true` and `false`) specifying whether the reader driver instructs the printer to program EPC data into an embedded RFID tag. The default value is `true`.

Alien

RFTagAware uses two Alien reader drivers:

- Alien ALR-9750

  Use this driver for the Alien ALR-9750 (Nanoscanner 915 MHz) RFID reader.

- Alien ALR-9780

  Use this driver for the Alien ALR-9780 and ALR-8780 RFID readers.

Alien ALR-9750

This driver is used to interface the RFTagAware Edge Server with an Alien Technology ALR-9750 (Nanoscanner 915 MHz) RFID Reader. The reader driver implements Alien's text-based communications protocol for configuring and operating its RFID readers. This text-based reader/ host protocol is specified in the *Nanoscanner Reader User Guide* (Alien Doc # 8101024-000 Rev B).

The Alien ALR-9750 reader driver uses the following properties:

Field Label	Property Name	Required?	Property Value and Description

Device Type	`class`	Yes	For backward compatibility with releases prior to RFTagAware 1.1.2, set to:
			`com.connecterra.ale.readertypes.`
			`AlienReaderGroup`
			Otherwise, set to:
			`com.connecterra.ale.readertypes.`
			`AlienALR9750PhysicalReader`

Reader Hostname	`hostname`	Yes	The DNS name or IP address of the Alien reader.
Reader Port	`port`	No	The TCP port the Edge Server will use when establishing connections to the Alien Reader. The default is 23.

Field Label	Property Name	Required?	Property Value and Description
Socket Timeout	`socketTimeout`	No	The TCP socket timeout interval (milliseconds). The integer property value must be greater than or equal to 0. A timeout of 0 is interpreted as an infinite timeout. The default is 15000 milliseconds (15 seconds).
User Name	`username`	Yes	The username the Edge Server will use for gaining access to the Alien reader. Must be the same as the username you configured when setting up the Alien reader. Note: The username is case sensitive and must be entirely lowercase.
Password	`password`	Yes	The password the Edge Server will use for gaining access to the Alien reader. Must be the same as the password you configured when setting up the Alien reader. Note: The password is case sensitive and must be entirely lowercase.
Antenna 0 Logical Reader Name Antenna 1 Logical Reader Name	`uhf1LogicalReaderName` `uhf2LogicalReaderName`	No * (see descr.)	Specifies the logical reader name for each UHF antenna. At least one logical reader name must be specified or the Edge Server will generate an error on startup.
Default Rate	`defaultRate`	Yes	The period (in milliseconds) between the start of one read cycle and the start of the next. Note that if multiple logical readers are simultaneously active, then each logical reader will be read at an interval equal to the `defaultRate` times the number of logical readers.
Disable Programming Cycle Check	`disableProgrammingCycleCheck`	No	An optional boolean property (permissible values are `true` and `false`) specifying whether the driver disables the "Check Operation" (verification that there is a single tag in an antenna's field prior to conducting a tag programming operation). The default value is `false`, meaning the driver conducts the Check Operation.

The Alien reader obtains its IP network configuration dynamically via DHCP, or statically through one of the reader's configuration interfaces. Refer to the Alien *Nanoscanner Reader User Guide* for further details.

The Edge Server's Alien reader driver assumes the Alien reader has also been configured, through Alien's web interface or command line interface, with the following configuration settings. These configuration settings must be saved to the reader's flash memory so that reader reboots do not result in their loss.

```
Alien>Set Username=<username>
Alien>Set Password=<password>
```

Alien ALR-9780

This driver is used to interface the RFTagAware Edge Server with two models of Alien Technology readers: the ALR-9780 915 MHz RFID reader and the ALR-8780 866 MHz RFID Reader.

The reader driver implements Alien's text-based communications protocol for configuring and operating its RFID readers. This text-based reader/host protocol is specified in the *ALR-9780 Reader Interface Guide* (Alien Doc # 8101938-000 Rev 01).

The Alien ALR-9780 reader driver uses the following properties:

Field Label	Property Name	Required?	Property Value and Description
Device Type	`class`	Yes	For backward compatibility with releases prior to RFTagAware 1.1.2, set to: `com.connecterra.ale.readertypes.AlienALR9780Group` Otherwise, set to: `com.connecterra.ale.readertypes.AlienALR9780PhysicalReader`
Reader Hostname	`hostname`	Yes	The DNS name or IP address of the Alien reader.
Reader Port	`port`	No	The TCP port the Edge Server will use when establishing connections to the Alien Reader. The default is 23.
Socket Timeout	`socketTimeout`	No	The TCP socket timeout interval (milliseconds). The integer property value must be greater than or equal to 0. A timeout of 0 is interpreted as an infinite timeout. The default is 15000 milliseconds (15 seconds).

Field Label	Property Name	Required?	Property Value and Description
User Name	`username`	Yes	The username the Edge Server will use for gaining access to the Alien reader. Must be the same as the username you configured when setting up the Alien reader. Note: The username is case sensitive and must be lowercase.
Password	`password`	Yes	The password the Edge Server will use for gaining access to the Alien reader. Must be the same as the password you configured when setting up the Alien reader. Note: The password is case sensitive and must be lowercase.
Default Rate	`defaultRate`	Yes	The period (in milliseconds) between the start of one read cycle and the start of the next. Note that if multiple logical readers are simultaneously active, then each logical reader will be read at an interval equal to the `defaultRate` times the number of logical readers.
Reader Network Timeout	`readerNetworkTimeout`	No	The amount of time (in seconds) the reader maintains an idle connection with the RFTagAware Edge Server before closing the connection. The integer property value must be greater than 0. Valid range is 0-65535 seconds; default value is 90 seconds.

Antenna 0 Logical Reader Name
 Antenna 1 Logical Reader Name
 Antenna 2 Logical Reader Name
 Antenna 3 Logical Reader Name
	`uhf1LogicalReaderName`
	 `uhf2LogicalReaderName`
	 `uhf3LogicalReaderName`
	 `uhf4LogicalReaderName`
		No * (see descr.)	Specifies the logical reader name for each UHF antenna. At least one logical reader name must be specified or the Edge Server will generate an error on startup.
			
			 If multiple UHF antennas are assigned the *same* logical reader name, then the driver will treat them as a single combined antenna. The lowest-numbered antenna in the combined antenna grouping is checked to set antenna-specific properties and used for tag programming.

Field Label	Property Name	Required?	Property Value and Description
Read RF Attenuation	`readRfAttenuation`	No	Sets antenna power attenuation for tag read operations. Valid range: from 0 (no attenuation, maximum power) to 160 (maximum attenuation, minimum power), in increments of 10 - each increment representing an additional 1 dB of RF attenuation. Default value is 0.
Write RF Attenuation	`writeRfAttenuation`	No	Sets antenna power attenuation for program tag operations. Valid range: from 0 (no attenuation, maximum power) to 160 (maximum attenuation, minimum power), in increments of 10 - each increment representing an additional 1 dB of RF attenuation. Default value is 0. This property may be overridden at run-time by an application reader parameter `rfAttenuation`.

Antenna 0 Field Inventory Timeout
Antenna 1 Field Inventory Timeout
Antenna 2 Field Inventory Timeout
Antenna 3 Field Inventory Timeout
	`uhf1GetTagListTimeout`
	`uhf2GetTagListTimeout`
	`uhf3GetTagListTimeout`
	`uhf4GetTagListTimeout`
		No	The timeouts (in milliseconds) for field inventories (Alien Reader "Get TagList" commands). Each logical reader operates with its own timeout value. This configuration parameter, rather than the `socketTimeout` property, will serve as the socket timeout value when the Edge Server is awaiting a response to a "Get TagList" command. The integer property value must be greater than or equal to 0. A timeout of 0 is interpreted as an infinite timeout. The default value is the value of the `socketTimeout` property (or its default).

Antenna 0 Acq. Cycles
Antenna 1 Acq. Cycles
Antenna 2 Acq. Cycles
Antenna 3 Acq. Cycles
	`uhf1AcqCycles`
	`uhf2AcqCycles`
	`uhf3AcqCycles`
	`uhf4AcqCycles`
		No	The number of acquisition cycles that are performed each time a logical reader conducts a read cycle (is issued a "Get TagList" command). Each logical reader operates with its own value. Permissible integer property values range from 1 to 255. The default value is 1. See chapters 3 and 4 of the *ALR-9780 Reader Interface Guide* for further information on this Acquire Parameter.

Field Label	Property Name	Required?	Property Value and Description

Antenna 0 Wake Count at Start of Cycle
Antenna 1 …
Antenna 2 …
Antenna 3 …
	`uhf1AcqEnterWakeCount`
	`uhf2AcqEnterWakeCount`
	`uhf3AcqEnterWakeCount`
	`uhf4AcqEnterWakeCount`
		No	The number of RF wake commands the Alien reader issues at the start of each acquisition cycle. Each logical reader operates with its own value. Permissible integer property values range from 0 to 255. The default value is 3. See chapters 3 and 4 of the *ALR-9780 Reader Interface Guide* for further information on this Acquire Parameter.

Antenna 0 Field Reads per Cycle
Antenna 1 Field Reads per Cycle
Antenna 2 Field Reads per Cycle
Antenna 3 Field Reads per Cycle
	`uhf1AcqCount`
	`uhf2AcqCount`
	`uhf3AcqCount`
	`uhf4AcqCount`
		No	The number of field reads (anti-collision searches) that are performed in each acquisition cycle. Each logical reader operates with its own value. Permissible integer property values range from 1 to 255. The default value is 3. See chapters 3 and 4 of the *ALR-9780 Reader Interface Guide* for further information on this Acquire Parameter.

Antenna 0 Sleep Commands per Read
Antenna 1 Sleep Commands per Read
Antenna 2 Sleep Commands per Read
Antenna 3 Sleep Commands per Read
	`uhf1AcqSleepCount`
	`uhf2AcqSleepCount`
	`uhf3AcqSleepCount`
	`uhf4AcqSleepCount`
		No	The number of RF sleep commands the Alien reader issues after each field read. Each logical reader operates with its own value. Permissible integer property values range from 0 to 255. The default value is 1. See chapters 3 and 4 of the *ALR-9780 Reader Interface Guide* for further information on this Acquire Parameter.

Antenna 0 Wake Commands at end of each read
Antenna 1 …
Antenna 2 …
Antenna 3 …
	`uhf1AcqExitWakeCount`
	`uhf2AcqExitWakeCount`
	`uhf3AcqExitWakeCount`
	`uhf4AcqExitWakeCount`
		No	The number of RF wake commands the Alien reader issues at the end of each acquisition cycle. Each logical reader operates with its own value. Permissible integer property values range from 0 to 255. The default value imposed by RFTagAware is 1. See chapters 3 and 4 of the *ALR-9780 Reader Interface Guide* for further information on this Acquire Parameter.

Field Label	Property Name	Required?	Property Value and Description
Disable Programming Cycle Check	`disableProgrammingCycleCheck`	No	An optional boolean property (permissible values are `true` and `false`) specifying whether the driver disables the "Check Operation" (verification that there is a single tag in an antenna's field prior to conducting a tag programming operation). The default value is `false`, meaning the driver conducts the Check Operation.
Enable Global Scroll Mode	`enableGlobalScrollMode`	No	An optional boolean property specifying whether tags are to be acquired in the Global Scroll mode. The default value is `false` (the driver acquires tags in the Inventory mode).

The Alien reader obtains its IP network configuration dynamically via DHCP, or statically through one of the reader's configuration interfaces. Refer to the Alien *Reader Interface Guide* for further details.

The Edge Server's Alien reader driver assumes the Alien reader has also been configured, through Alien's web interface or command line interface, with the following configuration settings. These configuration settings must be saved to the reader's flash memory so that reader reboots do not result in their loss.

```
Alien>Set Username=<username>
Alien>Set Password=<password>
```

Avery

This section describes driver configuration information for the Avery 6405 RFID label printer. The printer supports the writing (programming) of Class 1 tags embedded within label stock ("smart labels") and the printing of those labels.

The Avery 6405 reader driver uses the following properties:

Field Label	Property Name	Required?	Property Value and Description
Device Type	`class`	Yes	Must be set to: `com.connecterra.ale.readertypes.Avery6405PhysicalReader`
Reader Hostname	`hostname`	Yes	The DNS name or IP address of the printer's LAN adapter.
Reader Port	`port`	No	The TCP port the Edge Server will target when establishing connections to the printer's LAN adapter. The default value is 4000.
Socket Timeout	`socketTimeout`	No	The TCP socket timeout interval (milliseconds). The default value is 15000 milliseconds (15 seconds).
Logical Reader Name	`uhf1LogicalReaderName`	Yes	The logical reader name assigned to the Avery printer's single integrated UHF antenna.
N/A	`defaultFormFilename`	No	See `easyPlugFilename`. Used only for backward compatibility with releases prior to RFTagAware 1.3.
Easy Plug Form	`easyPlugFilename`	No	Specifies the pathname of a file containing Easy Plug commands defining a smart label's form. Typically, the `PCSpec` `readerParameters` attribute specifies Easy Plug-based label design. This property provides a mechanism for specifying a default label design in the event the `PCSpec` does not contain this parameter. When present, `easyPlugFilename` refers to a text file containing the set of Easy Plug commands specifying the smart label's layout and dynamic (variable) content. Note: While optional, this property MUST point to a valid Easy Plug label script file if it is present.

Field Label	Property Name	Required?	Property Value and Description
Enable RFID Encoding	`programRFID`	No	A Boolean (permissible values are `true` and `false`) specifying whether the reader driver instructs the printer to program EPC data into an embedded RFID tag. The default value is `true`.
Retries	`retries`	No	Defines the number of labels to retry in case of a failed RFID operation. The valid range is 1 through10. The default value is 3.

Using the Easy Plug Label Scripting Language

Easy Plug is a scripting language for specifying the layout and contents of printed labels. Easy Plug is described in detail in the Avery document, *Manual Easy Plug, Release 3.00, 11/2003*. Commands specific to the Avery 6405 are described in the document, *How to RFID with Avery 6405*.

The Avery 6405 and Accraply smart label printer drivers send their printers a separate collection of Easy Plug commands with each "smart label" (a printed label with an embedded RFID tag) to be printed and programmed. Users specify a smart label's Easy Plug commands when defining a `PCSpec` (see the *RFTagAware Programmer Guide*). A `PCSpec`'s `readerParameters` field carries the Easy Plug script as a String object; the corresponding reader parameter name is `easyPlugScript` (or one of `easyPlugScript.accraply` or `easyPlugScript.avery` if your RFTagAware installation supports more than one device that uses EasyPlug).

For backward compatibility with releases prior to RFTagAware 1.3, use the reader parameter names `com.connecterra.ale.readertypes.avery.eplScript` or `com.connecterra.ale.readertypes.accraply.eplScript`.

As an alternative to specifying Easy Plug within a `PCSpec`, the Edge Server administrator may specify a default Easy Plug script using the reader driver's `easyPlugFilename` property. The `easyPlugFilename` property provides a mechanism for specifying Easy Plug commands that serve as a default label design in the event the `PCSpec`'s `readerParameters` field does not carry a key/value pair containing an Easy Plug script.

The Easy Plug script, whether defined within the `PCSpec` or contained in a file identified by the `easyPlugFilename` property, must contain only Easy Plug commands. Here is an example script:

```
#!A1
#IMSR100/152.4//6/89/0V
#ER
#R000.00/000.00
#J100#T20.0
#M1/1
```

```
#YN100/0/100///THIS IS A TEST
#J50#T25.0
#YN100/0/58///[EPC_TAG_URI]
#Q1/
#!P1
```

Refer to Avery or Accraply documentation for additional information on Easy Plug.

AWID

This section describes driver configuration information for the AWID MPR-2010AN reader.

The AWID MPR-2010AN reader driver uses the following properties:

Field Label	Property Name	Required?	Property Value and Description
Device Type	`class`	Yes	Must be set to: `com.connecterra.ale.readertypes.` `AWID2010ANPhysicalReader`
Reader Hostname	`hostname`	Yes	The DNS name or IP address of the AWID MPR-2010AN reader.
Reader Port	`port`	No	Specifies the TCP port the AWID MPR-2010AN reader driver will target when establishing connections to the AWID MPR-2010AN reader. The default value is 4000.
Socket Timeout	`socketTimeout`	No	The driver's TCP socket timeout interval, expressed in milliseconds. The integer property must be greater than or equal to 0. A timeout of zero is interpreted as an infinite timeout. The default value is 15000 milliseconds.
Logical Reader Name	`uhf1LogicalReaderName`	Yes	A logical reader name bound to the AWID MPR-2010AN reader's UHF antenna. This reader has only one UHF antenna; hence, only one logical reader.
Default Rate	`defaultRate`	Yes	The period (in milliseconds) between polls of a logical reader.
EPC1 Read Timeout	`epcClass1ReadTimeout`	No	The time interval (in milliseconds) allocated to acquiring Class 1 tags. This interval is a portion of the `defaultRate` described earlier. The default value is 500 milliseconds.
EPC1 Write Timeout	`epcClass1WriteTimeout`	No	The time interval (in milliseconds) allocated to programming Class 1 tags. The default value is 500 milliseconds.

Field Label	Property Name	Required?	Property Value and Description
RF Power Level	`rfPowerLevel`	No	The RF power setting of the AWID MPR-2010AN reader. The range of valid values is from 0 (maximum power) to 255 (minimum power). The default value is 0.
EPC1 Sensitivity	`epcClass1Sensitivity`	No	The sensitivity setting of the AWID MPR-2010AN reader channel. The range of valid values is from 0 (minimum sensitivity) to 255 (maximum sensitivity). The default setting is 255.
List of Protocols	`rfProtocols`	Yes	A blank-separated list of RF protocols. AWID MPR-2010AN is a multi-protocol reader. To improve efficiency, the read operation will only attempt to collect tags encoded with the specified protocols. At least one protocol must be specified. At present, the only valid value is `epcClass1`. Support for more protocols may be added at a later time.
Disable Programming Cycle Check	`disableProgrammingCycleCheck`	No	Instructs the AWID MPR-2010AN driver not to perform a program cycle check. Valid values are: `true` `false` The default value is `false`. This property can be specified as `true` only if one of the writable protocols is listed in the `rfProtocols` property, otherwise the driver will generate a configuration error.

CAEN

This section describes driver configuration information for the CAEN Technologies A928 RFID reader.

Note: RFTagAware requires the separate installation of CAEN's Java library to enable interoperation with the CAEN A928 RFID reader. Please contact your CAEN supplier for access to the file `CAENRFIDLibrary.jar`. This file should be copied into the `lib` subdirectory of your RFTagAware installation before starting RFTagAware.

The CAEN reader driver uses the following properties:

Field Label	Property Name	Required?	Property Value and Description
Device Type	`class`	Yes	Must be set to: `com.connecterra.ale.readertypes.CaenA928PhysicalReader`
Reader Hostname	`hostname`	Yes	The DNS name or IP address of the reader.
Reader Port	`port`	No	The TCP port the Edge Server will use when establishing connections to the CAEN reader. The default is 1000.
Default Rate	`defaultRate`	Yes	The period (in milliseconds) between the start of one read cycle and the start of the next. Note that if multiple logical readers are simultaneously active, then each logical reader will be read at an interval equal to the `defaultRate` times the number of logical readers.
RF Protocol	`rfProtocols`	No	The RF protocol currently being used by the CAEN A928. The read operation will only attempt to collect tags encoded with the protocol specified. At least one protocol must be specified. The only valid value (and the default) is `iso18000-6B`.
EPC Byte Offset	`byteOffset`	No	Specifies the byte offset of the EPC within a tag's addressable memory. Values may range from 0 to the amount of available tag memory; the default value is 0.

Field Label	Property Name	Required?	Property Value and Description
Byte Length	`byteLength`	No	Data length in bytes (1-16).

Antenna 0 Logical Reader Name
Antenna 1 Logical Reader Name
Antenna 2 Logical Reader Name
Antenna 3 Logical Reader Name
	`uhf1LogicalReaderName`
	`uhf2LogicalReaderName`
	`uhf3LogicalReaderName`
	`uhf4LogicalReaderName`
		No *
		(see descr.)
			Specifies the logical reader name for each UHF antenna. At least one logical reader name must be specified or the Edge Server will generate an error on startup.

Read Power, mW	`uhf1ReadRfPower`
	`uhf2ReadRfPower`
	`uhf3ReadRfPower`
	`uhf4ReadRfPower`
		No	The strength of the RF signal used to read tags, in milliwatts.
			Valid values are 0-4000; the default value is 500. The maximum value allowable is determined by the reader; see the reader documentation for more information.

Write Power, mW	`uhf1WriteRfPower`
	`uhf2WriteRfPower`
	`uhf3WriteRfPower`
	`uhf4WriteRfPower`
		No	The strength of the RF signal used to write tags, in milliwatts.
			Valid values are 0-4000; the default value is 500. The maximum value allowable is determined by the reader; see the reader documentation for more information.

IO Gate Logical Reader Name	`ioGateLine1.logicalReaderName`
	`ioGateLine2.logicalReaderName`
	`ioGateLine3.logicalReaderName`
	`ioGateLine4.logicalReaderName`
		No	Specifies the logical reader controlled by this IO line. The value for this property must match one of the configured Logical Reader Names.

IO Mask	`ioGateLine1.ioMask`
	`ioGateLine2.ioMask`
	`ioGateLine3.ioMask`
	`ioGateLine4.ioMask`
		No	Specifies the IO Mask associated with this IO line. Values range from 0 to 15. A value of 0 means "disable IO gating signal".

DataLogic

This section describes driver configuration information for the DataLogic DS6300-105-010 bar code reader.

The DataLogic reader driver uses the following properties:

Field Label	Property Name	Required?	Property Value and Description
Device Type	`class`	Yes	Must be set to: `com.connecterra.ale.readertypes.DatalogicPhysicalReader`
Reader Hostname	`hostname`	Yes	The DNS name or IP address of the DataLogic reader.
Reader Port	`port`	No	The TCP port the Edge Server will use when establishing connections to the Datalogic reader. The default is 23.
Socket Timeout	`socketTimeout`	No	The TCP socket timeout interval (milliseconds). The integer property value must be greater than or equal to 0. A timeout of 0 is interpreted as an infinite timeout. The default is 15000 milliseconds (15 seconds).
Default Rate	`defaultRate`	Yes	The period (in milliseconds) between the start of one read cycle and the start of the next. Note that if multiple logical readers are simultaneously active, then each logical reader will be read at an interval equal to the defaultRate times the number of logical readers.
Logical Reader Name	`bcrLogicalReaderName`	Yes	A logical reader name specifying the DataLogic bar code reader.

Escort Memory Systems (EMS)

This section describes driver configuration information for the Escort Memory Systems (EMS) LRP820S and LRP2000 readers.

The EMS reader driver uses the following properties:

Field Label	Property Name	Required?	Property Value and Description
Device Type	`class`	Yes	For backward compatibility with releases prior to RFTagAware 1.1.2, set to: `com.connecterra.ale.readertypes.EMSLRPGroup` Otherwise, set to: `com.connecterra.ale.readertypes.EMSLRPPhysicalReader`

Reader Model	`model`	Yes	Specifies the particular model of LRP series reader. Valid values are:
			`LRP820S`
			`LRP2000`

N/A	`gatewayName`	No	See `hostname`. Used only for backward compatibility with releases prior to RFTagAware 1.3.
Reader Hostname	`hostname`	Yes	The DNS name or IP address of the MOXA serial-to- Ethernet adapter to which the reader is connected.
N/A	`gatewayPort`	No	See `port`. Used only for backward compatibility with releases prior to RFTagAware 1.3.
Reader Port	`port`	No	The TCP port the Edge Server will use when establishing connections to the MOXA serial-to-Ethernet adapter. The default value is 8080
Logical Reader Name	`hf1LogicalReaderName`	Yes	Specifies the logical reader name for the single HF antenna attached to the EMS LRP reader (the LRP2000 and LRP820S readers each support a single HF antenna).
Default Rate	`defaultRate`	Yes	The period (in milliseconds) between the start of one read cycle and the start of the next. Note that if multiple logical readers are simultaneously active, then each logical reader will be read at an interval equal to the `defaultRate` times the number of logical readers.

Field Label	Property Name	Required?	Property Value and Description
Command Timeout	`hf1CommandTimeout`	No	Specifies the command timeout value (in milliseconds) that the EMS LRP reader is provided in the commands the driver issues. Permissible integer property values range from 50 to 65,534 (0xFFFE). The default value is 250 milliseconds.
EPC Byte Offset	`epcByteOffset`	No	Specifies the byte offset of the EPC within a tag's addressable memory. The readers supported by this driver read and write ISO 15693 tags that have 48 bytes of reprogrammable memory; thus, the integer property values range from 0 to 47. The default value is 0.

EPC Byte Ordering	`epcByteOrdering`	No	Specifies the byte ordering of the EPC within a tag's addressable memory. Permissible property values are:
			
			`bigEndian`
			
			`littleEndian`
			
			Values are case insensitive.

RFTagAware requires the use of a MOXA serial-to-Ethernet adapter for LAN access to EMS LRP readers.

Intermec

This section describes driver configuration information for the Intermec Intellitag IF5 reader.

The Intermec Intellitag IF5 reader driver uses the following properties:

Field Label	Property Name	Required?	Property Value and Description

Device Type	`class`	Yes	Must be set to:
			`com.connecterra.ale.readertypes.`
			`IntermecIF5PhysicalReader`

Reader Hostname	`hostname`	Yes	The DNS name or IP address of the printer.
Reader Port	`port`	No	The TCP port the Edge Server will target when establishing connections to the reader. The default value is 2189.
Default Rate	`defaultRate`	Yes	The period (in milliseconds) between the start of one read cycle and the start of the next. If multiple logical readers are active simultaneously, then each logical reader will be read at an interval equal to the `defaultRate` times the number of logical readers.
Socket Timeout	`socketTimeout`	No	The TCP socket timeout interval (milliseconds). The default value is 15000 milliseconds (15 seconds). This value must be greater than 0.
ID Tries	`idTries`	No	Maximum number of identify attempts on a given tag. Values range from 1-255; the default value is 3.
Read Tries	`readTries`	No	Maximum number of read attempts on a given tag. Values range from 1-255; the default value is 3.
Write Tries	`writeTries`	No	Maximum number of write attempts on a given tag. Values range from 1-255; the default value is 3.
Enable V1.19 mode	`enableEPCv1.19`	No	Enables reading of EPC 1.19 tags. The default value is `false`.

Field Label	Property Name	Required?	Property Value and Description
EPC Byte Offset	`byteOffset`	No	Specifies the byte offset of the EPC within a tag's addressable memory. Values may range from 0 to the amount of available tag memory; the default value is 0.
Byte Length	`byteLength`	No	Data length in bytes (0-16).

RF Protocol	`rfProtocols`	No	The RF protocol currently being used by the Intermec reader. The Intellitag IF5 is a multi-protocol reader. To improve efficiency, the read operation will only attempt to collect tags encoded with the specified protocols. At least one protocol must be specified.
			
			The valid values are:
			`G1`
			`G2`
			`V119`
			`MIXED`
			The default value is `MIXED`.

Antenna 0 Logical Reader Name
Antenna 1 Logical Reader Name
Antenna 2 Logical Reader Name
Antenna 3 Logical Reader Name
	`uhf1LogicalReaderName`
	`uhf2LogicalReaderName`
	`uhf3LogicalReaderName`
	`uhf4LogicalReaderName`
		No *
		(see descr.)
			Specifies the logical reader name for each antenna. At least one logical reader name must be specified.
			
			If one of these properties is left undefined, there will be no logical reader associated with the corresponding antenna, and that antenna will not be accessible via the ALE API.

Field Label	Property Name	Required?	Property Value and Description
Disable Programming Cycle Check	`disableProgrammingCycleCheck`	No	An optional boolean property (permissible values are `true` and `false`) specifying whether the driver disables the "Check Operation" (verification that there is a single tag in an antenna's field prior to conducting a tag programming operation). The default value is `false`, meaning the driver conducts the Check Operation. Note that if the check operation is disabled (this property value is set to true) and multiple tags are present in the antenna's field when conducting a tag programming operation, then all tags in the field will be programmed with the same EPC.

Paxar Monarch

This section describes driver configuration information for the Paxar Monarch 9855 smart label printer. You will need to consult the *Monarch® 9855™ RFID Printer Operator's Handbook* and enable status polling to allow the printer to respond to status requests from RFTagAware.

The Paxar Monarch 9855 reader driver uses the following properties:

Field Label	Property Name	Required?	Property Value and Description
Device Type	`class`	Yes	Must be set to: `com.connecterra.ale.readertypes.Monarch9855PhysicalReader`
Reader Hostname	`hostname`	Yes	The DNS name or IP address of the printer.
Reader Port	`port`	No	The TCP port the Edge Server will target when establishing connections to the printer. The printer default value is 9100.
Socket Timeout	`socketTimeout`	No	The TCP socket timeout interval (milliseconds). The default value is 15000 milliseconds (15 seconds). This value must be greater than 0.
Logical Reader Name	`uhf1LogicalReaderName`	Yes	The logical reader name assigned to the device's single integrated UHF antenna.
MPCL Form	`mpclFilename`	No	Specifies the pathname of a file containing MPCL commands defining a smart label's form. Typically the MPCL-based label design will be specified within the PCSpec's `readerParameters` attribute. This property provides a mechanism for specifying a default label design in the event the PCSpec does not contain Monarch 9855 reader parameters. When present, the Monarch reader parameters are a string containing the set of MPCL commands specifying a smart label's layout.
Enable RFID Encoding	`programRFID`	No	A boolean (permissible values are `true` and `false`) specifying whether the reader driver instructs the printer to program EPC data into an embedded RFID tag. The default value is `true`.

Printronix

This section describes driver configuration information for the Printronix T5000e and T5000r series of label printers with integrated RFID UHF encoder. Although the Printronix device has a "reader driver," it does not support tag reading. Instead, it supports the writing (programming) of Class 1 and Class 0+ tags embedded within label stock ("smart labels") and the printing of those labels.

The Printronix T5000e and T5000r reader drivers use the following properties:

Field Label	Property Name	Required?	Property Value and Description
Device Type	`class`	Yes	For backward compatibility with releases prior to RFTagAware 1.1.2, set to: `com.connecterra.ale.readertypes.PrintronixT5000eGroup` Otherwise, set to: `com.connecterra.ale.readertypes.PrintronixT5000ePhysicalReader`
Reader Hostname	`hostname`	Yes	The DNS name or IP address of the printer's LAN adapter.
Reader Port	`port`	No	The TCP port the Edge Server will target when establishing connections to the printer's LAN adapter. The default value is 9100, the Printronix device's factory default.
Socket Timeout	`socketTimeout`	No	The TCP socket timeout interval (milliseconds). The default value is 15000 milliseconds (15 seconds).
Logical Reader Name	`uhf1LogicalReaderName`	Yes	The logical reader name assigned to the Printronix device's single integrated UHF antenna.

Field Label	Property Name	Required?	Property Value and Description
PGL Form	`pglFilename`	No	Specifies the pathname of a file containing Printronix PGL commands defining a smart label's form. Typically, the `PCSpec readerParameters` attribute specifies PGL-based label design. This property provides a mechanism for specifying a default label design in the event the `PCSpec` does not contain Printronix reader parameters. When present, `pglFilename` refers to a text file (`label.pgl`) containing the set of PGL create-mode commands specifying the smart label's layout and non-EPC content. See *Using the Printronix Graphics Language* (below) for more information.
Enable RFID Encoding	`programRFID`	No	A boolean (permissible values are `true` and `false`) specifying whether the reader driver instructs the printer to program EPC data into an embedded RFID tag. The default value is `true`.

Using the Printronix Graphics Language (PGL)

The Printronix Graphics Language (PGL) is a scripting language for specifying the layout and contents of printed labels. PGL is described in detail in the Printronix document, *IGP/PGL Emulation for T5000e series Printers: Printronix Graphics Language Programmer's Reference Manual* (Printronix document 750929-001E).

The Printronix T5000e/T5000r smart label printer drivers send the printer a separate collection of PGL commands with each "smart label" (a printed label with an embedded RFID tag) to be printed and programmed. Users specify a smart label's PGL commands when defining a `PCSpec` (see the *RFTagAware Programmer Guide*). A `PCSpec`'s `readerParameters` field carries the PGL script as a String object; the reader parameter name is `pglScript`. (For backward compatibility with releases prior to RFTagAware 1.3, use the reader parameter name `com.connecterra.ale.readertypes.PrintronixT5000eGroup.pglScript`.)

As an alternative to specifying PGL within a `PCSpec`, the Edge Server administrator may specify a default PGL script using the Printronix reader driver's `pglFilename` property. The `pglFilename` property provides a mechanism for specifying PGL commands that serve as a default label design in the event the `PCSpec`'s `readerParameters` field does not carry a key/value pair containing a PGL script.

The PGL script, whether defined within the `PCSpec` or contained in a file identified by the `pglFilename` property, must only contain IGP/PGL Create Form mode commands. Below is an example PGL script:

```
SCALE;DOT;200;200
```

```
FONT;FACE 92250
ALPHA
POINT;60;50;8;8;*SHIP FROM:*
POINT;90;50;10;10;*ACME*
POINT;120;50;10;10;*Corporation*
POINT;150;50;10;10;*P.O. Box 1000*
POINT;180;50;10;10;*Dallas, TX75261*

POINT;60;365;8;8;*SHIP TO:*
POINT;90;365;10;10;*Retailer Distribution Center*
POINT;120;365;10;10;*200 Main Street*
POINT;150;365;10;10;*Springfield, MA01103*
STOP

HORZ
4;200;40;790
STOP

VERT
3;343;60;200
STOP

ALPHA
POINT;235;50;8;8;*(420)SHIP TO POSTAL CODE:*
POINT;285;100;12;12;*(420) 01103*
POINT;235;385;8;8;*CARRIER:*
POINT;285;400;12;12;*Acme Freightways*
POINT;330;400;10;10;*PRO: 1234*
POINT;370;400;10;10;*B/L: 5678*
STOP

BARCODE
C128C;XRD3:3:6:6:9:9:12:12;H7;283;75
*01103*
STOP

HORZ
4;425;40;790
STOP
```

```
VERT
3;374;200;425
STOP

ALPHA
POINT;465;50;12;12;*EPC:*
AF512;25;POINT;550;70;14;14
STOP

HORZ
4;625;40;779
STOP

ALPHA
POINT;665;50;12;12;*SKU:*
POINT;705;70;14;14;*ABC21270*
STOP

HORZ
4;750;40;779
STOP

ALPHA
POINT;790;50;12;12;*GTIN:*
POINT;840;270;12;12;*(01) 10036000212706*
STOP

BARCODE
C128C;XRD3:3:6:6:9:9:12:12;H7;850;250
*10036000212706*
STOP
```

The user-defined PGL script must not contain an `RFWRITE` Create Form mode command; the reader driver will insert the necessary `RFWRITE` command if it is called on to program a smart label's embedded RFID tag.

If the user wishes to print a specified EPC value on the smart label, the user-supplied PGL must use special substitution strings, indicating in what representation the tag values are to be printed. RFTagAware recognizes the following substitution string values:

`[EPC_HEX]`	Will be replaced by the hexadecimal representation of the tag value.
`[EPC_ID_URI]`	Will be replaced by the pure identity URN representation of the tag value.
`[EPC_TAG_URI]`	Will be replaced by the tag URN representation of the tag value.

Example:

```
ALPHA
POINT;465;50;12;12;*EPC:*
POINT;550;70;14;14;*[EPC_ID_URI]*
STOP
```

Note: For backward compatibility, RFTagAware also supports the use of the alphanumeric dynamic data field `AF512` to print out a hexadecimal representation of the tag value. This method was supported in RFTagAware Release 1.1 and RFTagAware Release 1.1.1. You should use the substitution strings above for new applications.

`AF512` example:

```
ALPHA
POINT;465;50;12;12;*EPC:*
AF512;25;POINT;550;70;14;14
STOP
```

Please refer to Printronix documentation for additional information on IGP/PGL.

SAMSys

SAMSys MP9320 2.0 is a serial device and does not provide for Ethernet connectivity. To be used with RFTagAware, it requires a serial to Ethernet adapter (such as the Digi Connect ME Module). The adapter serial port must be configured to 57600/8/1/N.

The SAMSys MP9320 2.0 and 2.7 reader drivers use the following properties:

Field Label	Property Name	Required?	Property Value and Description
Device Type	class	Yes	Must be set to: com.connecterra.ale.readertypes. SAMSysMP9320PhysicalReader
Reader Hostname	hostname	Yes	The DNS name or IP address of the reader.
Default Rate	defaultRate	Yes	The period (in milliseconds) between polls of a logical reader. The same defaultRate value applies to all logical readers provisioned on a single physical reader.
Reader Port	port	No	The TCP port the SAMSys MP9320 reader driver will target when establishing connections to the SAMSys reader. The default value is 2101. Note: • For MP9320 2.0, set port to match your gateway device (such as MOXA). • For MP9320 2.7, port must be set to 2101.
Socket Timeout	socketTimeout	No	The TCP socket timeout interval (milliseconds). Must be greater than or equal to zero. A timeout of zero is interpreted as an infinite timeout. The default value is 15000 milliseconds (15 seconds).

Field Label	Property Name	Required?	Property Value and Description

Antenna 0 Logical Reader Name
Antenna 1 Logical Reader Name
Antenna 2 Logical Reader Name
Antenna 3 Logical Reader Name
	`uhf1LogicalReaderName`
	`uhf2LogicalReaderName`
	`uhf3LogicalReaderName`
	`uhf4LogicalReaderName`
		No *
		(see descr.)
			A set of properties specifying a logical reader name bound to each of the SAMSys MP9320 reader's UHF antennas. At least one logical reader name must be specified.
			
			The SAMSys MP9320 reader supports up to four logical readers. If a property within this set is left undefined, there will be no logical reader associated with the corresponding antenna.

Disable Programming Cycle Check	`disableProgrammingCycleCheck`	No	A Boolean property (permissible values are `true` and `false`) specifying whether the driver disables the Program Cycle Check (verification that there is exactly one programmable tag in an antenna's field prior to conducting a tag programming operation). The default value is `false`, meaning the driver conducts the Check Operation. Note that if the check operation is disabled (this property value is set to `true`) and multiple tags are present in the antenna's field when conducting a tag programming operation, then all tags in the field will be programmed with the same EPC.

List of Protocols	`rfProtocols`	No	A blank-separated list of RF protocols. SAMSys MP9320 is a multi-protocol reader. To improve efficiency, the read operation will only attempt to collect tags encoded with the specified protocols. At present, valid values are:
			`iso18000-6B-64`
			`iso18000-6B-96`
			`epcClass1`
			The default value is `epcClass1`.
			Note: Only one of the ISO18000-6B protocols at a time can be specified. The Edge Server will generate an error if both protocols are listed.

Field Label	Property Name	Required?	Property Value and Description
Enable Reader Beep	`enableReaderBeep`	No	A Boolean (permissible values are `true` and `false`) specifying whether the reader driver instructs the reader to beep when reading an RFID tag. The default value is `false`.
Reader Operation Mode	`operationMode`	No	Indicates the behavior of the SAMSys reader in response to a request for data from an application such as RFTagAware. A value of `poll` means that the reader is idle between requests, but performs a tag read when it receives a request for data. A value of `autopoll` means that the reader continuously reads tags and stores the data in memory between requests, and forwards all stored tag information when it receives a request from the application. Valid values are: `poll` `autopoll` The default value is `poll`.

Setting the Baud Rate

To attain the maximum output from the SAMSys MP9320 2.7 reader, RFTagAware is preconfigured to work at 57600 bps. You will need to duplicate this setting in the SAMSys setup for best performance. Use the instructions below to do this:

1. Use a serial cable to connect the reader's RS232 port to your computer's serial port.

2. Run the SAMSys reader's RF Command Suite software. Select the **Reader Connection | Connect via Serial Port** menu option.

3. The software should detect the reader connected to your computer's serial port. If you cannot establish a connection, select the menu item **Reader Connection | Serial Port Settings**, and use the *Maximum Speed* field to set the correct baud rate to connect to the reader.

4. Open a web browser and navigate to http://<IP.address.of.reader>/ . This URL will launch a Java applet. You will need to enable Java in your web browser to see the applet. If you would prefer to perform this configuration via telnet, skip step 5 and follow the instructions in Appendix C of the *MP9320 2.7 User's Guide*.

5. On the applet that displays, click **Serial Ports** on the left side of the page, change the Baud Rate to `57600`, then click **Save**.

6. In the RF Command Suite software, click the Command tab, and type the command `}Cw,d:scw,b:00161616,f:1!` to set the reader's baud rate to 57600.

7. Close the RF Command Suite and the web browser window.

8. Power-cycle the reader. Afterward, the reader's external RS232 port and the external serial port on the Digi Connect ME Module are set to a baud rate of 57600.

Notes: If the reader stops responding, use HyperTerminal to connect to the reader, power-cycle it, and press the [Enter] key three times. This will set the reader to the factory default.

If you change the baud rate of the reader in RFTagAware, you will need to perform the above steps again to keep the baud rate settings the same throughout the hardware and software.

Symbol (Matrics)

RFTagAware uses two Symbol (Matrics) reader drivers:

- RDR-001
  Use this driver for the Symbol Matrics RDR-001 reader.

- AR400
  Use this driver for the Symbol Matrics AR400 reader.

Note: Symbol Technologies acquired Matrics (an RFID reader manufacturer) in July of 2004. As a result, there may be naming discrepancies between class names and reader names for the readers in this section.

RDR-001

The Symbol Matrics RDR-001 reader driver requires the use of a MOXA serial-to-Ethernet adapter, available from Symbol Technologies. This reader uses the following properties:

Field Label	Property Name	Required?	Property Value and Description
Device Type	`class`	Yes	For backward compatibility with releases prior to RFTagAware 1.1.2, set to: `com.connecterra.ale.readertypes.MatricsReaderGroup` Otherwise, set to: `com.connecterra.ale.readertypes.` `MatricsRDR001PhysicalReader`
N/A	`gatewayName`	No	See `hostname`. Used only for backward compatibility with releases prior to RFTagAware 1.3.
Reader Hostname	`hostname`	Yes	The DNS name or IP address of the MOXA serial-to-Ethernet adapter to which the reader is connected.
N/A	`gatewayPort`	No	See `port`. Used only for backward compatibility with releases prior to RFTagAware 1.3.

Field Label	Property Name	Required?	Property Value and Description
Reader Port	`port`	No	The TCP port the Edge Server will use when establishing connections to the MOXA serial-to-Ethernet adapter. The default value is 8080
Socket Timeout	`socketTimeout`	No	The TCP socket timeout interval (milliseconds). The default is 15000 milliseconds (15 seconds).
Node Address	`nodeAddress`	No	The reader's RS-485 protocol node address. Permissible integer property values range from 0 (00 hex) to 31 (1F hex). The default value is 4.
Frequency Channel	`frequencyChannel`	No	The frequency channel the RDR-001 reader will use to read tags. This property MUST ONLY be used with RDR-001 readers running FCC Part 90 Firmware. Permissible integer property values range from 0 to 13, corresponding to 914.25 MHz to 917.25 MHz, in 500 kHz steps. There is no default value.

Antenna 0 Logical Reader Name
Antenna 1 Logical Reader Name
Antenna 2 Logical Reader Name
Antenna 3 Logical Reader Name
	`uhf1LogicalReaderName`
	`uhf2LogicalReaderName`
	`uhf3LogicalReaderName`
	`uhf4LogicalReaderName`
		No *
		(see descr.)
			Specifies the logical reader name for each UHF antenna. At least one logical reader name must be specified or the Edge Server will generate an error on startup.

Antenna 0 Power Level
Antenna 1 Power Level
Antenna 2 Power Level
Antenna 3 Power Level
	`uhf1PowerLevel`
	`uhf2PowerLevel`
	`uhf3PowerLevel`
	`uhf4PowerLevel`
		No	The power level for each UHF antenna. The value of this property must be an integer in the range 1 to 255. Power level is logarithmic; hence, 192 is about 50% of and 128 is about 25% of an antenna's maximum power. The default power level is 192.

Antenna 0 Environment Variable
Antenna 1 Environment Variable
Antenna 2 Environment Variable
Antenna 3 Environment Variable
	`uhf1EnvironmentVariable`
	`uhf2EnvironmentVariable`
	`uhf3EnvironmentVariable`
	`uhf4EnvironmentVariable`
		No	Controls the length of time the RDR-001 reader gives itself when reading tags within a single antenna's field. The value of this property must be an integer in the range 0 to 8, where greater numbers indicate longer time. The default is 3.

Default Rate	`defaultRate`	Yes	The period (in milliseconds) between the start of one read cycle and the start of the next. Note that if multiple logical readers are simultaneously active, then each logical reader will be read at an interval equal to the `defaultRate` times the number of logical readers.

AR400

The Symbol Matrics AR400 reader uses the following properties:

Field Label	Property Name	Required?	Property Value and Description
Device Type	`class`	Yes	Must be set to: `com.connecterra.ale.readertypes.` `MatricsAR400PhysicalReader`
Reader Hostname	`hostname`	Yes	The DNS name or IP address of the reader.
Default Rate	`defaultRate`	Yes	The period (in milliseconds) between polls of a logical reader. The same `defaultRate` value applies to all logical readers provisioned on a single physical reader.
Reader Port	`port`	No	The TCP port the Edge Server will target when establishing connections to the reader. The default value is 3000.
Socket Timeout	`socketTimeout`	No	The TCP socket timeout interval (milliseconds). The default value is 15000 milliseconds (15 seconds).

Antenna 0 Logical Reader Name
Antenna 1 Logical Reader Name
Antenna 2 Logical Reader Name
Antenna 3 Logical Reader Name
	`uhf1LogicalReaderName`
	`uhf2LogicalReaderName`
	`uhf3LogicalReaderName`
	`uhf4LogicalReaderName`
		No *
		(see descr.)
			A set of properties specifying a logical reader name bound to each of the reader's UHF antennas. At least one logical reader name must be specified. (The AR400 reader supports up to four logical readers.) If a property within this set is left undefined, there will be no logical reader associated with the corresponding antenna.
			
			If multiple UHF antennas are assigned the same logical reader name, then the driver will treat them as a single combined antenna. The lowest-numbered antenna in the combined antenna grouping is checked to set antenna-specific properties and used for tag programming. If running in this combined antenna mode, see the note below this table for more information.

Field Label	Property Name	Required?	Property Value and Description

Antenna 0 Power Level
Antenna 1 Power Level
Antenna 2 Power Level
Antenna 3 Power Level
	`uhf1PowerLevel`
	`uhf2PowerLevel`
	`uhf3PowerLevel`
	`uhf4PowerLevel`
		No	A set of properties specifying UHF antenna (n=1..4) power levels. Permissible integer property values range from 1 to 255. Power level is logarithmic; hence, 192 is about 50% of and 128 is about 25% of an antenna's maximum power. The default power level is 192.

Antenna 0 Environment Variable
Antenna 1 Environment Variable
Antenna 2 Environment Variable
Antenna 3 Environment Variable
	`uhf1EnvironmentVariable`
	`uhf2EnvironmentVariable`
	`uhf3EnvironmentVariable`
	`uhf4EnvironmentVariable`
		No	A property controlling the length of time the AR400 reader gives itself when reading tags within a single antenna's field in response to a single "Read Full Field" Command. Permissible integer property values range from 0 to 8, with full field read times lengthening with increasing environment variable property value. The default environment variable value is 3.

Frequency Channel	`frequencyChannel`	No	The frequency channel the AR400 reader will use to read tags. This property MUST ONLY be used with Symbol/Matrics FCC part 90 readers. Permissible integer property values range from 0 to 13, corresponding to 914.25 MHz to 917.25 MHz, in 500 kHz steps. There is no default value. When not specified, the Set Frequency Channel command is not issued.

Note: The AR400 reader driver in RFTagAware runs a bytestream protocol. The bytestream protocol driver now supports combined antenna operations. To enable combined antenna operations, assign the same logical reader name to multiple physical antenna ports (`uhf1-uhf4`). All antennas combined within a single logical group must operate with the same set of antenna-specific configuration options (`PowerLevel`, `EnvironmentVariable`). The driver will use the configuration properties assigned to the lowest numbered antenna port in a group for all antennas in that group. So, if `uhf1` and `uhf2` are combined into the same group, then the power level and environment variable properties specified for `uhf1` will also apply to `uhf2`.

ThingMagic Driver Configuration

RFTagAware uses two ThingMagic reader drivers:

- ThingMagic Mercury3
  Use this driver for the ThingMagic Mercury3 reader.

- ThingMagic Mercury4
  Use this driver for the ThingMagic Mercury4 reader/printer.

ThingMagic Mercury3

The ThingMagic Mercury3 reader driver uses the following properties:

Field Label	Property Name	Required?	Property Value and Description
Device Type	`class`	Yes	For backward compatibility with releases prior to RFTagAware 1.1.2, set to: `com.connecterra.ale.readertypes.ThingMagicReaderGroup` Otherwise, set to: `com.connecterra.ale.readertypes.ThingMagicMercury3PhysicalReader`
Reader Hostname	`hostname`	Yes	The DNS name or IP address of the ThingMagic reader
Reader Port	`port`	No	The TCP port the Edge Server will use when establishing connections to the ThingMagic Reader. The default is 8080.
Socket Timeout	`socketTimeout`	No	The TCP socket timeout interval (milliseconds). The default is 15000 milliseconds (15 seconds).

Field Label	Property Name	Required?	Property Value and Description
HF Antenna 1 Logical Reader Name HF Antenna 2 Logical Reader Name	`hf1LogicalReaderName` `hf2LogicalReaderName`	No * (see descr.)	Specifies the logical reader name for each HF (13.56 MHz) antenna. At least one logical reader name must be specified. If one of these properties is left undefined, there will be no logical reader associated with the corresponding antenna, and that antenna will not be accessible via the ALE API.
UHF Antenna 1 Logical Reader Name UHF Antenna 2 Logical Reader Name	`uhf1LogicalReaderName` `uhf2LogicalReaderName`	No * (see descr.)	Specifies the logical reader name for each UHF (915 MHz) antenna. At least one logical reader name must be specified. If one of these properties is left undefined, there will be no logical reader associated with the corresponding antenna, and that antenna will not be accessible via the ALE API. If multiple UHF antennas are assigned the *same* logical reader name, then the driver will treat them as a single combined antenna. The lowest-numbered antenna in the combined antenna grouping is checked to set antenna-specific properties and used for tag programming.
Default Rate	`defaultRate`	Yes	The period (in milliseconds) between the start of one read cycle and the start of the next. Note that if multiple logical readers are simultaneously active, then each logical reader will be read at an interval equal to the `defaultRate` times the number of logical readers.
Read Timeout	`readTimeout`	No	Specifies the maximum amount of time (in milliseconds) the reader may spend when servicing a request to read tags in a single antenna's field. The default value is 250 milliseconds.
Write Timeout	`writeTimeout`	No	Specifies the maximum amount of time (in milliseconds) the reader may spend when servicing a request to program a tag across a single antenna. The default value is 250 milliseconds.

Field Label	Property Name	Required?	Property Value and Description
Disable Programming Cycle Check	`disableProgrammingCycleCheck`	No	An optional boolean property (permissible values are `true` and `false`) specifying whether the driver disables the "Check Operation" (verification that there is a single tag in an antenna's field prior to conducting a tag programming operation). The default value is `false`, meaning the driver conducts the Check Operation. Note that if the check operation is disabled (this property value is set to `true`) and multiple tags are present in the antenna's field when conducting a tag programming operation, then all tags in the field will be programmed with the same EPC.

The ThingMagic reader obtains its IP network configuration dynamically via DHCP, or statically through one of the reader's configuration interfaces. Refer to the *ThingMagic User Guide* for further details.

ThingMagic Mercury4

The ThingMagic Mercury4 reader driver uses the following properties:

Field Label	Property Name	Required?	Property Value and Description
Device Type	`class`	Yes	`com.connecterra.ale.readertypes.` `ThingMagicMercury4PhysicalReader`
Reader Hostname	`hostname`	Yes	The DNS name or IP address of the ThingMagic reader
Reader Port	`port`	No	The TCP port the Edge Server will use when establishing connections to the ThingMagic Reader. The default is 8080.
Socket Timeout	`socketTimeout`	No	The TCP socket timeout interval (milliseconds). The default is 15000 milliseconds (15 seconds).

Field Label	Property Name	Required?	Property Value and Description
Default Rate	defaultRate	Yes	The period (in milliseconds) between the start of one read cycle and the start of the next. Note that if multiple logical readers are simultaneously active, then each logical reader will be read at an interval equal to the defaultRate times the number of logical readers.
Read Timeout	readTimeout	No	Specifies the maximum amount of time (in milliseconds) the reader may spend when servicing a request to read tags in a single antenna's field. The default value is 250 milliseconds.
Write Timeout	writeTimeout	No	Specifies the maximum amount of time (in milliseconds) the reader may spend when servicing a request to program a tag across a single antenna. The default value is 250 milliseconds.
HF Antenna 1 Logical Reader Name HF Antenna 2 Logical Reader Name HF Antenna 3 Logical Reader Name HF Antenna 4 Logical Reader Name	hf1LogicalReaderName hf2LogicalReaderName hf3LogicalReaderName hf4LogicalReaderName	No * (see descr.)	Specifies the logical reader name for each HF (13.56 MHz) antenna. At least one logical reader name must be specified. If one of these properties is left undefined, there will be no logical reader associated with the corresponding antenna, and that antenna will not be accessible via the ALE API.

Field Label	Property Name	Required?	Property Value and Description

UHF Antenna 1 Logical Reader Name
UHF Antenna 2 Logical Reader Name
UHF Antenna 3 Logical Reader Name
...
UHF Antenna 16 Logical Reader Name
	`uhf1LogicalReaderName`
	`uhf2LogicalReaderName`
	`uhf3LogicalReaderName`
	`...`
	`uhf16LogicalReaderName`
		No *
		(see descr.)
			Specifies the logical reader name for each UHF (915 MHz) antenna. At least one logical reader name must be specified.
			
			If one of these properties is left undefined, there will be no logical reader associated with the corresponding antenna, and that antenna will not be accessible via the ALE API.
			
			If multiple UHF antennas are assigned the *same* logical reader name, then the driver will treat them as a single combined antenna. The lowest-numbered antenna in the combined antenna grouping is checked to set antenna-specific properties and used for tag programming.

Disable Programming Cycle Check	`disableProgrammingCycleCheck`	No	An optional boolean property (permissible values are `true` and `false`) specifying whether the driver disables the "Check Operation" (verification that there is a single tag in an antenna's field prior to conducting a tag programming operation). The default value is `false`, meaning the driver conducts the Check Operation. Note that if the check operation is disabled (this property value is set to `true`) and multiple tags are present in the antenna's field when conducting a tag programming operation, then all tags in the field will be programmed with the same EPC.
N/A	`rfProtocol`	No	See `rfProtocols`. Used only for backward compatibility with releases prior to RFTagAware 1.3.

Field Label	Property Name	Required?	Property Value and Description

List of Protocols	`rfProtocols`	No	A blank-separated list of RF protocols. Mercury4 is a multi-protocol reader and can operate in read-only or read-write mode. At least one protocol must be specified. At present, the valid values are:
			
			 `epcClass0`
			 (read-only, reads EPC Class 0 and Class 0+ tags)
			
			 `epcClass1`
			 (read-write, reads/writes EPC Class 1 tags only)
			
			 `ALL`
			 (read-write, reads EPC Class 0, Class 0+, and Class 1 tags, writes Class 1 tags)
			
			 The default value is `epcClass1`.

The ThingMagic reader obtains its IP network configuration dynamically via DHCP, or statically through one of the reader's configuration interfaces. Refer to the *ThingMagic User Guide* for further details.

Zebra

This section describes driver configuration information for the Zebra R110XiIIIPlus, R110Xi and R4MPlus label printers.

- The R110XiIIIPlus printer supports the writing (programming) of Class 0+ and Class 1 tags embedded within label stock ("smart labels") and the printing of those labels.

- The R110Xi printer supports the writing and printing of Class 0+ and Class 1 tags embedded within label stock ("smart labels").

- The R4MPlus printer does the same for Class 1 tags.

The Zebra R110XiIIIPlus, R110Xi and R4MPlus printer drivers share all the same properties except `class`, as shown in the following table.

Field Label	Property Name	Required?	Property Value and Description
Device Type	`class`	Yes	R110XiIIIPlus: `com.connecterra.ale.readertypes.ZebraR110XiIIIPlusPhysicalReader` R110Xi: `com.connecterra.ale.readertypes.ZebraR110XiIIIPlusPhysicalReader` R4MPlus: `com.connecterra.ale.readertypes.ZebraR4MPlusPhysicalReader`
Reader Hostname	`hostname`	Yes	The DNS name or IP address of the printer's LAN adapter.
Reader Port	`port`	No	The TCP port the Edge Server will target when establishing connections to the printer's LAN adapter. The default value is 9100, the Zebra R110XiIIIPlus device's factory default.
Socket Timeout	`socketTimeout`	No	The TCP socket timeout interval (milliseconds). The default value is 15000 milliseconds (15 seconds).
Logical Reader Name	`uhf1LogicalReaderName`	Yes	The logical reader name assigned to the Zebra device's single integrated UHF antenna.

Field Label	Property Name	Required?	Property Value and Description
Enable RFID Encoding	`programRFID`	No	A Boolean (permissible values are `true` and `false`) specifying whether the reader driver instructs the printer to program EPC data into an embedded RFID tag. The default value is `true`.
Retries	`retries`	No	Defines the number of labels to retry in case of a failed RFID operation. The valid range is 1 through 10, the default value is 3.
ZPL Form	`zplFilename`	No	Specifies the pathname of a file containing Zebra ZPL commands defining a smart label's form. Typically, the `PCSpec` `readerParameters` attribute specifies ZPL-based label design. This property provides a mechanism for specifying a default label design in the event the `PCSpec` does not contain ZPL reader parameters. When present, `zplFilename` refers to a text file (`label.zpl`) containing the set of ZPL commands specifying the smart label's layout and dynamic (variable) content. See *Using the Zebra Printing Language*, below, for more information. Note: If specified, this property MUST point to a valid ZPL file.

Error Handling	`errorHandling`	No	Specifies an error handling operation, if an RFID operation fails after the number of retries (specified in the `retries` property). The valid values are:
			`NO_ACTION`
			`PAUSE_MODE`
			`ERROR_MODE`
			The default value is `NO_ACTION`.

Verify Pre-encoded A5A5	`verifyValidData`	No	Applies only to R4MPlus printer. A Boolean (permissible values are `true` and `false`). The default value is `false`. When `true`, the printer fails the tag programming operation if the first two bytes of the tag are not 0xA5A5.
Transponder Position	`transponderDisplacement`	No	Applies only to R4MPlus printer. Specifies the value of parameter in the `^RS` comand issued to the printer. Use this property only if necessary. Refer to *Zebra R4MPlus User Guide* for explanation and usage guidelines

Using the Zebra Printing Language (ZPL II)

ZPL is a scripting language for specifying the layout and contents of printed labels. ZPL is described in detail in the Zebra document, *ZPLII Programming Guide (Zebra Document 45541LB-R3)*.

The Zebra printer driver sends its printer a separate collection of ZPL commands with each "smart label" (a printed label with an embedded RFID tag) to be printed and programmed. Users specify a smart label's ZPL commands when defining a `PCSpec` (see the *RFTagAware Programmer Guide*). A `PCSpec`'s `readerParameters` field carries the ZPL script as a String object; the corresponding reader parameter name is `zplScript`.

(For backward compatibility with releases prior to RFTagAware 1.3, use the reader parameter name `com.connecterra.ale.readertypes.ZebraR110XiIIIPlus.zplScript`. This parameter name applies when using the Zebra R4MPlus printer as well as the R110XiIIIPlus.)

As an alternative to specifying ZPL within a `PCSpec`, the Edge Server administrator may specify a default ZPL script using the Zebra reader driver's `zplFilename` property. The `zplFilename` property provides a mechanism for specifying ZPL commands that serve as a default label design in the event the `PCSpec`'s `readerParameters` field does not carry a key/value pair containing a ZPL script.

Below is a sample ZPL script (blank lines have been inserted for readability):

```
^XA
^FX *** NOTE: Lines, beginning with ^FX are comments ***^FS
^FX Set home position ^FS
^LH30,35

^FX Write EPC HEX ^FS
^WT,,,,1^FD[EPC_HEX]^FS

^FX "Ship From" text ^FS
^FO20,15^A0N,18,,^FDSHIP FROM:^FS
^FO20,40^A0N,26,,^FDAcme^FS
^FO20,65^A0N,26,,^FDCorporation^FS
^FO20,90^A0N,26,,^FDP.O. Box 61900^FS
^FO20,115^A0N,26,,^FDDallas, TX 75261^FS

^FX Draw vertical line ^FS
^FO300,0^GB0,180,2^FS
```

```
^FX "Ship to" text ^FS
^FO320,15^A0N,18,,^FDSHIP TO:^FS
^FO320,40^A0N,26,,^FDRetailer Distribution Center^FS
^FO320,65^A0N,26,,^FD200 Main Street^FS
^FO320,90^A0N,26,,^FDSpringfield, MA01103^FS


^FX Draw horizontal line ^FS
^FO0,180^GB720,0,4^FS


^FX Postal code text ^FS
^FO20,195^A0N,18,,^FDSHIP TO POSTAL CODE:^FS
^FO30,275^A0N,32,,^BC,90,,Y,^FD(420) 01103^FS


^FX Draw vertical line ^FS
^FO340,180^GB0,270,2^FS


^FX Carrier text ^FS
^FO360,195^A0N,18,,^FDCARRIER:^FS
^FO360,245^A0N,36,,^FDAcme Freightways^FS
^FO360,295^A0N,30,,^FDPRO: 1234^FS
^FO360,345^A0N,30,,^FDB/L: 5678^FS


^FX Draw horizontal line ^FS
^FO0,450^GB720,0,4^FS


^FX EPC text ^FS
^FO0,465^A0N,32,,^FDEPC:^FS
^FO20,575^A0N,32,,^FD[EPC_TAG_URI]^FS


^FX Draw horizontal line ^FS
^FO0,670^GB720,0,4^FS


^FX SKU text ^FS
```

```
^FO0,685^A0N,32,,^FDSKU:^FS
^FO15,724^A0N,36,,^FDABC21270^FS


^FX Draw hoarizontal line ^FS
^FO0,785^GB720,0,4^FS


^FX GTIN text ^FS
^FO0,800^A0N,32,,^FDGTIN^FS
^FO100,890^A0N,32,,^BC,90,,Y,^FD>; (01) 10036000212706 ^FS
^XZ
```

If the user wishes to print a specified EPC value on the smart label, the user-supplied ZPL must include special substitution strings, indicating in what representation the tag values are to be printed.

RFTagAware recognizes the following substitution string values:

[EPC_HEX]	Will be replaced by the hexadecimal representation of the tag value.
[EPC_ID_URI]	Will be replaced by the pure identity URN representation of the tag value.
[EPC_TAG_URI]	Will be replaced by the tag URN representation of the tag value.

Example:

```
^XA
^FO20,575^A0N,32,,^FD[EPC_TAG_URI]^FS
^XZ
```