

IF1

Fixed RFID Reader Series

1026FF01, 1026FF02F9, 1026FF03F9

User Manual

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Before You Begin

This section provides you with safety information, technical support information, and sources for additional product information.

Safety Information

Your safety is extremely important. Read and follow all warnings and cautions in this document before handling and operating Intermec equipment. You can be seriously injured, and equipment and data can be damaged if you do not follow the safety warnings and cautions.



A caution alerts you to an operating procedure, practice, condition, or statement that must be strictly observed to prevent equipment damage or destruction, or corruption or loss of data.



Note: Notes either provide extra information about a topic or contain special instructions for handling a particular condition or set of circumstances.

Global Services and Support

Warranty Information

To understand the warranty for your Intermec product, visit the Intermec website at www.intermec.com and click **Support > Returns and Repairs > Warranty**.

Disclaimer of warranties: The sample code included in this document is presented for reference only. The code does not necessarily represent complete, tested programs. The code is provided “as is with all faults.” All warranties are expressly disclaimed, including the implied warranties of merchantability and fitness for a particular purpose.

Web Support

Visit the Intermec website at www.intermec.com to download our current manuals (in PDF).

Visit the Intermec technical knowledge base (Knowledge Central) at www.intermec.com and click **Support > Knowledge Central** to review technical information or to request technical support for your Intermec product.

Send Feedback

Your feedback is crucial to the continual improvement of our documentation. To provide feedback about this manual, please contact the **Technical Communications** department.

Telephone Support

In the U.S.A. and Canada, call **1-800-755-5505**.

Outside the U.S.A. and Canada, contact your local Intermec representative. To search for your local representative, from the Intermec website, click **About Us > Contact Us**.

Who Should Read This Manual

This document is for the person who is responsible for installing, configuring, and maintaining the IF1.

This document provides you with information about the features of the IF1, and how to install, configure, operate, maintain, and troubleshoot it.

Before you work with the IF1, you should be familiar with your network and general networking terms, such as IP address.

Related Documents

The Intermec website at www.intermec.com contains our documents (as .pdf files) that you can download for free.

To download documents

- 1** Visit the Intermec website at www.intermec.com.
- 2** Click the **Products** tab.
- 3** Using the **Products** menu, navigate to your product page. For example, to find the IF1 product page, click **RFID > Fixed Readers > IF1**.
- 4** Click the **Manuals** tab.

If your product does not have its own product page, click **Support > Manuals**. Use the **Product Category**, **Product Family**, and **Product** fields to find your documentation.

1

About the RFID Reader

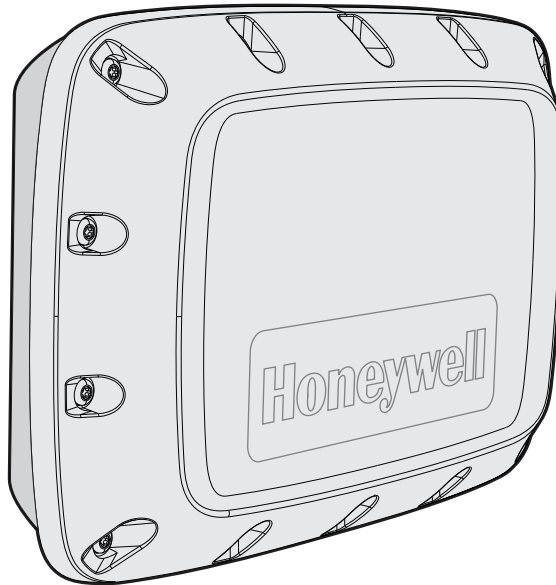
This chapter introduces the IF1 Fixed Mount RFID Reader Series, and includes descriptions of the reader features and basic operation.

About the RFID Reader

The IF1 Fixed RFID Reader is an RFID reader with integrated antenna that provides connectivity between tag data and an enterprise system.

Features of the RFID reader include:

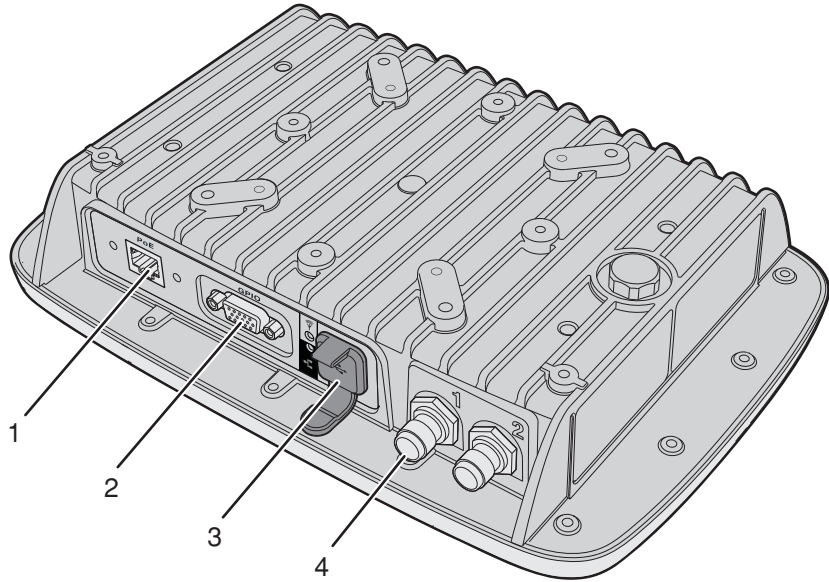
- integrated high-gain linear or two-antenna port options.
- 64 MB of storage space for your RFID applications.
- a web browser interface for easy configuration.
- options for a second external antenna connection.
- support for EPCglobal Gen-2 tag types.
- IP66 seal rating for outdoor installations.
- support for Power Over Ethernet.
- VESA mount compatibility.
- USB and sealed Power Over Ethernet ports.
- optional GPIO port.



IF1 Fixed RFID Reader

About the RFID Reader Ports

Depending on your configuration, the ports that are available on the IF1 may be different.



IF1 Fixed RFID Reader Ports

Reader Port Descriptions

Callout	Port	Description
1	Ethernet	10Base/100Base-T port that connects the reader to your Ethernet network. The reader auto-negotiates with the server to set the best data rate. This port uses MDI/MDI-X auto-switching so you can connect either a standard Ethernet cable or a crossover cable. The port also supports Power Over Ethernet (POE). To power the reader, you need an 802.3af-compliant power supply.
2	GPIO (Optional)	General purpose input/output (GPIO) port that connects the reader to industrial controls such as relays or indicators.

Reader Port Descriptions (continued)

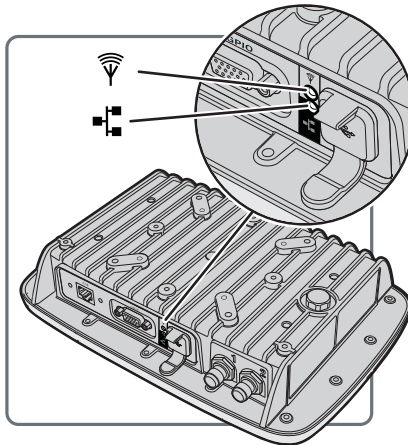
Callout	Port	Description
3	USB	Connects the reader to a desktop PC for configuration.
4	Antenna	Connects an external antenna to your reader. The antenna port uses Reverse TNC connectors.



Professional Installation Required: Government regulatory agencies require this RFID reader use only approved antennas and cables. Therefore, this reader uses a custom antenna connector. Do not use antennas not approved for use with this reader.

About the LED Indicators

The LED indicators on the reader light up to indicate the status of the reader during operation.



IF1 LED Indicators

LED Indicators

Icon	Name	Color	Description
	RFID antenna	Solid green	RF field is active
		Blinking green	A tag is being interrogated.
		Blinking red	The reader cannot output the requested RF power level, or an RF fault is detected.
		Off	The reader is not powered.
	Ethernet	Solid green	The reader is powered, an Ethernet link is established, and the host is connected.
		Flickering green	Packets of information are being sent through the Ethernet port.
		Blinking green and orange	An Ethernet link is established, but there is no host connection.
		Blinking red	The reader is powered, but an Ethernet link is not established.
		Off	The reader is not powered.

IF1 Accessories

You can use these accessories (sold and ordered separately) with the IF1. To order accessories, contact your local sales representative.

IF1 Accessories

Accessory	Description
Wall Mounting Kit	The wall mounting kit allows you to mount the IF1 to a flat surface.
Ethernet Connector Kit	The Ethernet Connector Kit provides a secure connection from your Ethernet cable to the IF1 and is required if you need to maintain the IP66 rating of the IF1.
GPIO Cable	15-pin GPIO cable to connect General Purpose Input/Output control lines to external devices.

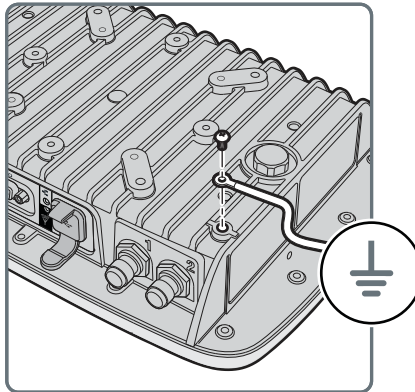
About the Mounting Kit Options

You can install the reader with a wall mounting kit (P/N 219-028-001) or a VESA mounting kit. Contact your local sales representative for more information.

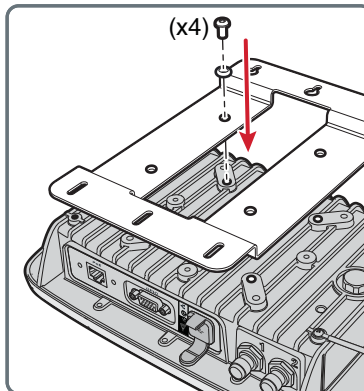
Install the Wall Mounting Kit

To maintain the IP66 rating of the IF1, you must mount the IF1 correctly.

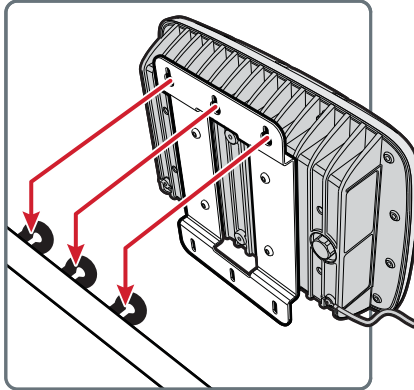
- 1 Choose a mounting location.
- 2 Connect an earth ground cable to the IF1.



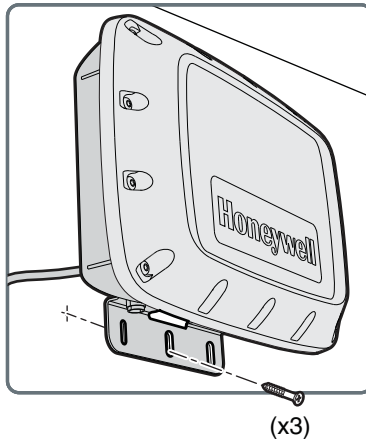
- 3 Secure the wall mount to the IF1 with the washers and screws provided.



- 4** Secure three screws (not provided) to the wall, and place the mounting bracket on to the screws.



- 5** Secure three screws (not provided) to the bottom of the wall mounting bracket.



How to Communicate with the IF1

By default, the reader is configured to be a DHCP client and accepts offers from any DHCP server. Therefore, the reader works out of the box if you connect it to your network and use a DHCP server to assign it an IP address.

If you are not using a DHCP server to assign an IP address, you need to use a serial communications program such as HyperTerminal or Tera Term to assign a static IP address.

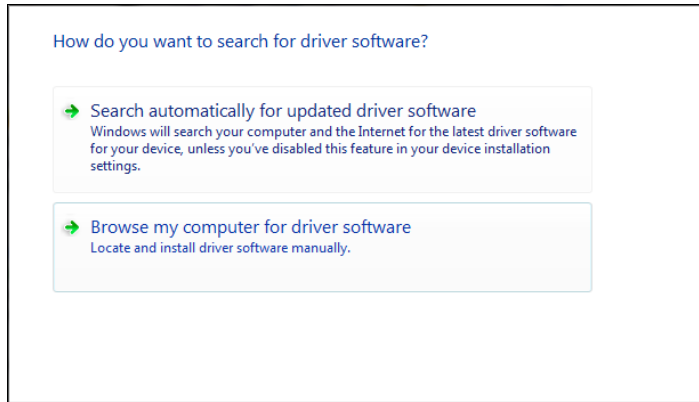
After the reader has been assigned an IP address, connect it to your network, and then complete the configuration by using the web browser interface.

Assign an IP Address

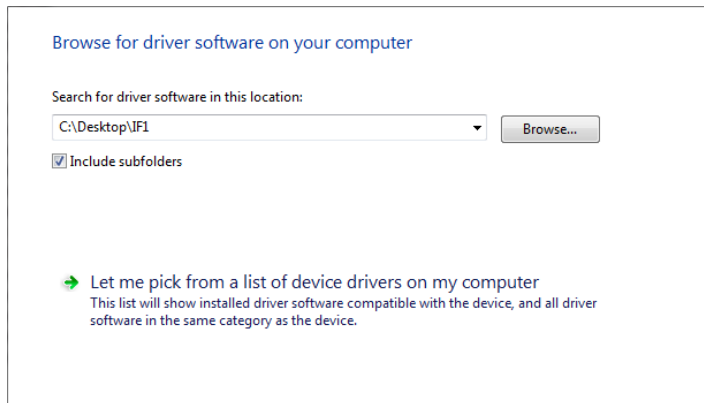
You need to assign an IP address to the reader before you can connect the reader to your network to use the web browser interface to complete the configuration.

- 1 Download the USB drivers for the reader from www.intermec.com.
- 2 Extract the installation files that you downloaded.
- 3 Connect a USB cable from your reader to your desktop PC.

- 4 When the USB Driver Installation Wizard appears, select **Browse my computer for driver software**.

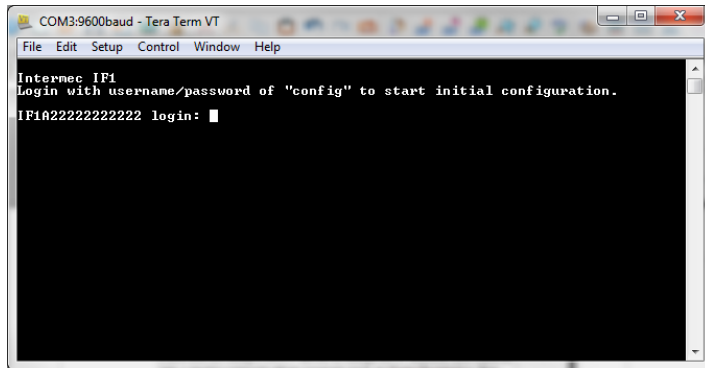


- 5 In **Search for driver software in this location**, click **Browse**, select the folder where you extracted the reader installation files, and click **OK**.
- 6 Click the **Windows** icon > **Control Panel** > **Device Manager** and see which COM port the reader was assigned.
- 7 Click **Next** to install the drivers.

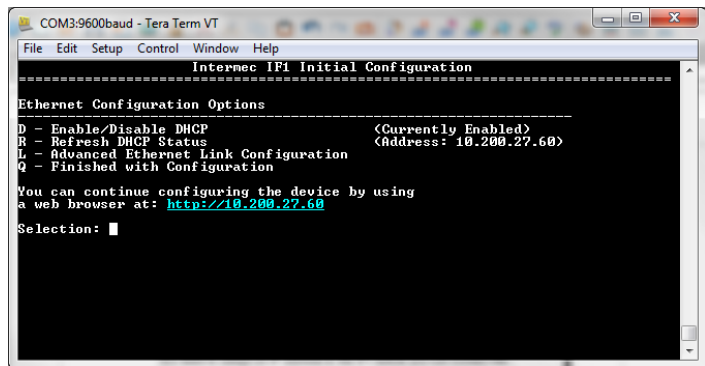


- 8 When the installation is finished, click **Close**.

- 9 Open a serial communications program to connect to the reader.

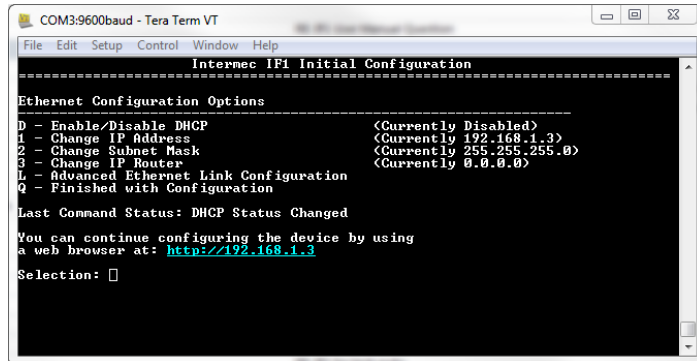


- 10 Type **config** and press **Enter**, and then type **config** again in the **Password** field and press **Enter**.



- 11** By default, DHCP is enabled and the IP address to configure the reader appears. Use the IP address to configure the reader through the web browser interface.

If you are not using DHCP, press **D**. DHCP is disabled and the Ethernet Configuration Options screen appears.

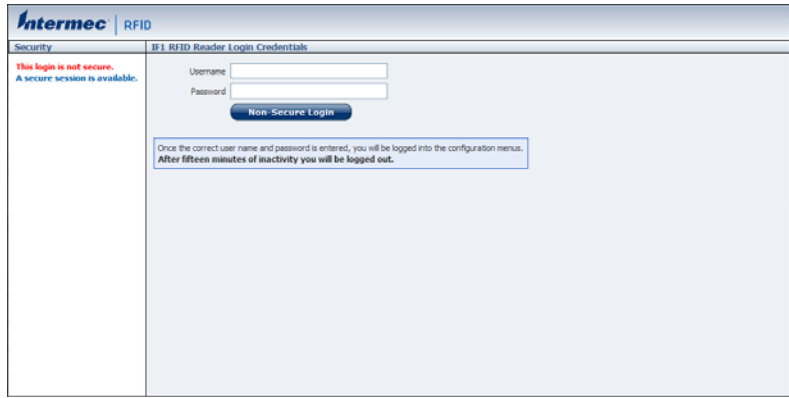


- 12** To set the IP address, press **1**, type in the IP address, and press **Enter**.
- 13** To set the subnet mask, press **2**, type in the subnet mask, and press **Enter**.
- 14** To set the IP router, press **3**, type in the IP address, and press **Enter**.
- 15** (Optional) To change the Ethernet link speed, press **L**, and choose the link speed.
- 16** Press **Q** to close the Initial Configuration screen.
- 17** Remove the USB cable from the reader. The reader is ready to be configured and connected to your network.

Log In to the Web Browser Interface

After the reader is assigned an IP address, you can configure the reader through the web browser interface. Before you log in, make sure an IP address has been assigned to the reader, and the reader is connected to your network.

- 1 Start a web browser.
- 2 In the browser address field, enter the IP address, and press **Enter**.



The screenshot shows the Intermec RFID web browser login interface. The page has a header with the Intermec logo and 'RFID'. Below the header, there is a 'Security' section on the left and a 'B1 RFID Reader Login Credentials' section on the right. The 'Security' section contains a warning: 'This login is not secure. A secure session is available.' The 'B1 RFID Reader Login Credentials' section contains a 'Username' field, a 'Password' field, and a 'Non-Secure Login' button. Below the login fields, there is a message box that says: 'Once the correct user name and password is entered, you will be logged into the configuration menus. After fifteen minutes of inactivity you will be logged out.'

- 3 (Optional) For a secure session, click **A secure session is available**.
- 4 Enter your **Username** and **Password**. The default user name is intermec and the default password is intermec.
- 5 Click **Non-Secure Login**, or **Secure Login**. The Ethernet screen appears and you are logged in to the web browser interface.

Set the Date and Time

Set the date and time through the web browser interface.

- 1 From the Main Screen of the web browser interface, click the date and time in the upper right corner.

The screenshot shows the Intermecc RFID web interface. The top navigation bar includes the Intermecc logo, 'RFID', and links for 'Intermecc | Manual | Help | Logout'. The current date and time are displayed as 'Thursday, January 01, 12:01:00:20:35'. A 'Navigation Menu' on the left lists various system settings, with 'Maintenance' expanded to show 'Time'. The main content area is titled 'Time' and contains a 'System Time' form. The form has three rows of input fields: 'Year : Month : Day' (1970, 01, 01), 'Hour : Minute : Second' (00, 26, 35), and 'Time Zone' (GMT). An 'Activate Changes' button is located in the top right corner of the form area.

- 2 Select your time zone from the drop-down list, and then click **Activate Changes**.
- 3 Enter the current year, month, and day in the entry fields.
- 4 Enter the current hour, minutes, and seconds in the entry fields.
- 5 Click **Activate Changes**. The new time and date are set.

2

Configure the Reader

This chapter describes how to configure the reader.

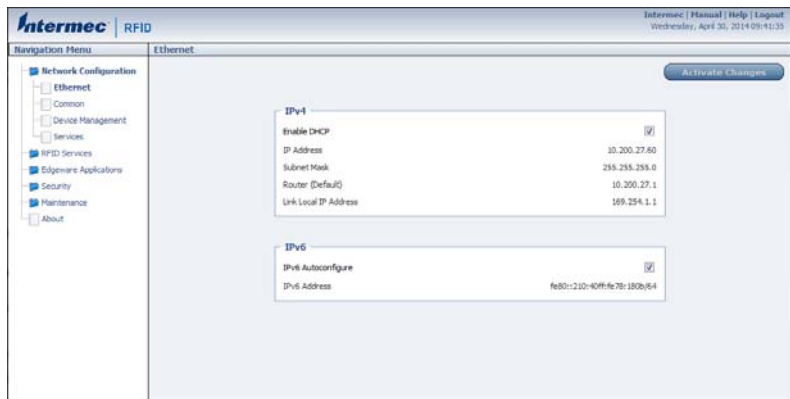
Configure Ethernet Settings

To use the reader, you need to configure Ethernet settings such as your IP address and subnet mask.



Note: If DHCP is enabled, you may not need to configure Ethernet settings. For more information, contact your network administrator.

- 1 Log in to the web browser interface and click **Network Configuration** or **Ethernet**.



The screenshot shows the Intermec RFID web interface. The top navigation bar includes the Intermec logo, 'RFID', and links for 'Intermec | Manual | Help | Logout'. The date and time 'Wednesday, April 30, 2014 09:41:35' are displayed. The left sidebar contains a 'Navigation Menu' with options: 'Network Configuration' (selected), 'Ethernet', 'Common', 'Device Management', 'Services', 'RFID Services', 'Edgeware Applications', 'Security', 'Maintenance', and 'About'. The main content area is titled 'Ethernet' and features an 'Activate Changes' button. It contains two configuration sections: 'IPv4' and 'IPv6'. The 'IPv4' section has a table with the following settings:

IPv4	
Enable DHCP	☒
IP Address	10.200.27.60
Subnet Mask	255.255.255.0
Router (Default)	10.200.27.1
Link Local IP Address	169.254.1.1

The 'IPv6' section has a table with the following settings:

IPv6	
IPv6 Autoconfigure	☒
IPv6 Address	fe80::210::40ff::fe7b:180b/64

- 2 Configure the settings.
- 3 When you are finished, click **Activate Changes** to save your changes.

Ethernet Settings

You can configure these Ethernet settings for your reader to communicate with your network.

Ethernet Settings

Setting	Description
Enable DHCP	Select this field if you want the reader to get its IP address from a DHCP server. If this field is not selected, you need to specify the IP address, subnet mask, and IP router for your network.
IP Address	The IP address of the reader. The IP address has the form <i>x.x.x.x</i>, where <i>x</i> is a number from 0 to 255. The default MAC address is on the label on the side of the reader. If DHCP is enabled, the currently assigned IP address appears in this field. If DHCP is disabled, specify the IP address in the entry field.
Subnet Mask	The subnet mask for this network. The subnet mask has the form <i>x.x.x.x</i>, where <i>x</i> is a number from 0 to 255. If DHCP is enabled, the currently assigned subnet mask appears in this field. If DHCP is disabled, specify the subnet mask in the entry field.
Router Default	The IP address of the router. The IP address has the form <i>x.x.x.x</i>, where <i>x</i> is a number from 0 to 255. If DHCP is enabled, the currently assigned router address appears in this field. If DHCP is disabled, specify the router address in the entry field.
Link Local IP Address	The IP address of the reader is only routable on the local IP subnet. The reader auto-negotiates with other devices on its Ethernet segment to obtain a unique address, so no user configuration of the Link Local IP Address is necessary. The reader always has a Link Local IP Address, even if another address is assigned through DHCP or statically via user-configuration.
IPv6 Autoconfigure	Enables IPv6 automatic configuration. Auto-configuration is enabled by default. If you disable auto-configuration, you need to specify an IPv6 address, subnet mask, and router.
IPv6 Address	128-bit IPv6 address for the reader.

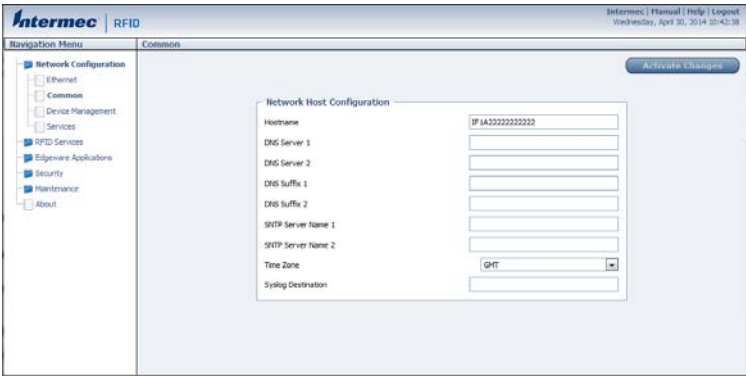
Ethernet Settings (continued)

Setting	Description
IPv6 Router	128-bit address for the IPv6 router.

Configure Common Network Settings

You can configure the common network settings that apply to the reader network interface.

- 1 Log in to the web browser interface and click **Network Configuration > Common**.



- 2 Configure the settings.
- 3 Click **Activate Changes** to save your changes.

Common Network Settings

You can configure these common network settings that apply to the reader network interface.

Common Network Settings

Setting	Description
Hostname	Name for this reader. The default is “IF1<serial number of the reader>”. The hostname can be either a simple hostname, or a qualified domain name (FQDN). If this reader obtains its IP address via DHCP, this parameter is sent to the DHCP server. If the server supports it, this field is used for dynamic DNS updates.

Common Network Settings (continued)

Setting	Description
DNS Server 1	IP address of a domain name server that the reader uses to resolve DNS names.
DNS Server 2	IP address of a second domain name server that the reader uses to resolve DNS names.
DNS Suffix 1	Primary DNS suffix to be appended to unqualified names.
DNS Suffix 2	Secondary DNS suffix to be appended to unqualified names.
SNTP Server Name 1	DNS name or IP address of an SNTP or NTP server.
SNTP Server Name 2	DNS name or IP address of a second SNTP or NTP server.
Time Zone	Time zone for this reader. Choose the time zone from the drop-down list. Default is GMT.
SYSLOG Destination	Domain name or IP address of the SYSLOG server.

About the Device Configuration Web Service

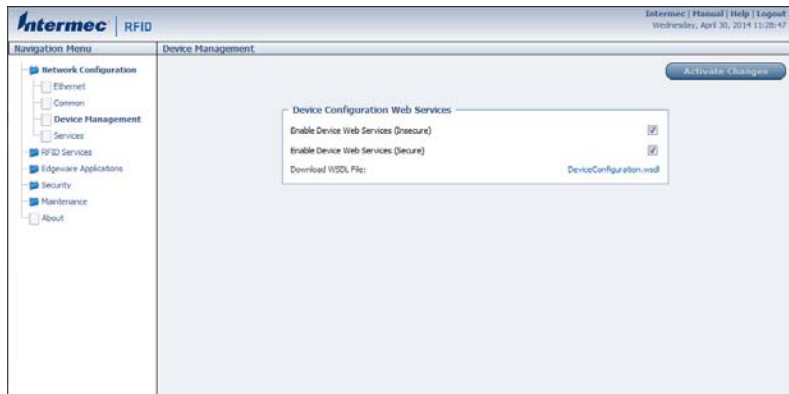
The Device Configuration web service provides a way to programmatically configure the reader over your network. This SOAP-based service provides a configuration API that allows you to specify a variety of network, RFID, and system settings.

For more information on the Device Configuration web service, see the [Device Configuration Web Service Command Reference Manual](#).

Configure the Device Configuration Web Service

Enable the device configuration web service to specify a variety of network, RFID, and system settings.

- 1 Log in to the web browser interface and click **Network Configuration > Device Management**.



By default, Device Configuration web services are enabled for either secure or insecure connections.

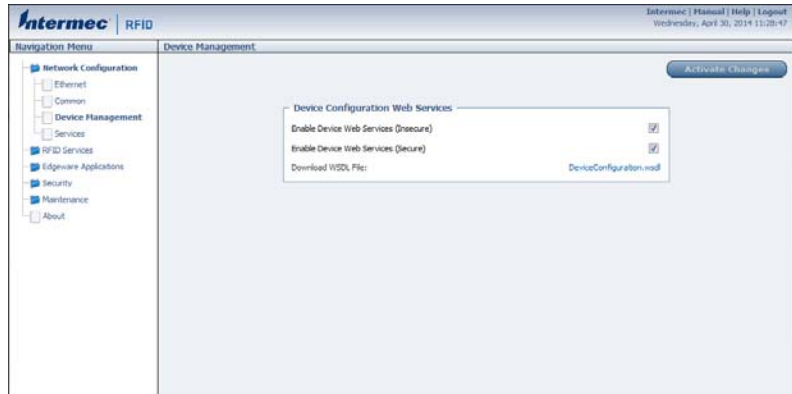
- 2 To disable web services over a secure connection, clear the **Enable Device Web Services (Secure)** check box, and then click **Activate Changes**.

To disable web services over an insecure connection, clear the **Enable Device Web Services (Insecure)** check box, and then click **Activate Changes**.

Download the Device Configuration WSDL Document

Download the device configuration web service description language (WSDL) document to help you configure your system settings.

- 1 Log in to the web browser interface and click **Network Configuration > Device Management**.

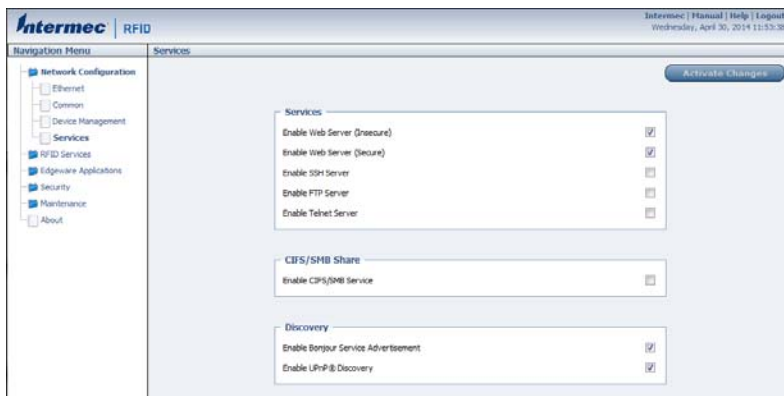


- 2 Click **DeviceConfiguration.wsdl**. The document opens in the browser window.

Configure Services

Configure the way users (such as developers) can access and configure the reader.

- 1 Log in to the web browser interface and click **Network Configuration > Services**.



- 2 Enable or disable the services by selecting or clearing the check boxes, or by selecting options from the drop-down list.
- 3 Click **Activate Changes** to save your changes.

Services Settings

Services settings control the way users access the reader.

Services Settings

Service	Description
Enable Web Server (Insecure)	Enables access to the web browser interface. An insecure connection only allows users to log in to web browser interface from HTTPS through port 80.
Enable Web Server (Secure)	Enables access to the web browser interface. An insecure connection only allows users to log in to web browser interface from HTTPS through port 443.
Enable SSH Server	Enables Secure Shell (SSH) access to the Linux system console using the same login and password as the web browser interface (default is <code>intermec</code>). SSH access is disabled by default.
Enable FTP Server	Enables access to the reader through its FTP server.

Services Settings (continued)

Service	Description
Enable Telnet Server	Enables access to the Linux system console via standard Telnet, using the same login and password as the web browser interface. The default login and password is <code>intermec</code> . The Telnet server is disabled by default.
Enable CIFS/SMB Service	Enables the Common Internet File System service, which creates a file sharing connection from a Windows PC to the <code>/home/developer</code> directory on the IF61. CIFS/SMB is disabled by default. When you enable the CIFS/SMB service, entry fields for a username and password appear. Enter these settings and then click Activate Changes .
Enable Bonjour Service Advertisement	Enables the reader to advertise services and be discovered by Bonjour zero-configuration networking. Bonjour is enabled by default. To prevent errors when using Bonjour, make sure the reader hostname does not include spaces.
Enable UPnP Discovery	Enables the reader to be discovered by Universal Plug and Play protocols. UPnP is enabled by default.

About RFID Services

The RFID services set the protocol your application uses to communicate with the RFID module. There are two RFID services available:

- **BRI (Basic Reader Interface):** Intermec proprietary protocol for controlling the reader. For information about the BRI, see [Basic Reader Interface Programmer Reference Manual](#).
- **LLRP (Low-Level Reader Protocol):** EPCglobal standard for network interfaces between the RFID reader and its controlling software. The IF1 supports version 1.0.1 of the EPCglobal LLRP. For information on LLRP, see go to <http://www.epcglobalinc.org/standards/llrp>. An open source LLRP Toolkit can be downloaded at <http://sourceforge.net/projects/llrp-toolkit>.

Configure the BRI Server Settings

Configure the BRI Server to handle communications between you application and the RFID module.

- 1 Log in to the web browser interface and click **RFID Services > BRI > BRI Server**.



- 2 Configure the BRI Server settings.
- 3 Click **Activate Changes** to save your changes.

BRI Server Settings

BRI Server settings handle communications between your application and the RFID module.

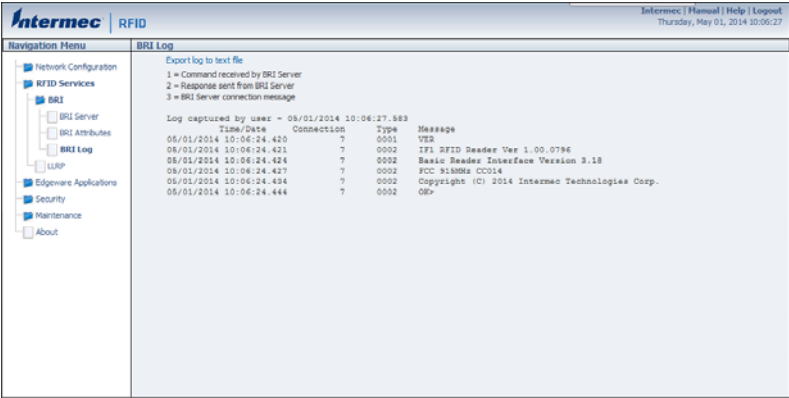
BRI Server Settings

Setting	Description
Enable External BRI Connections	Enables external TCP connections to the BRI server. If this is not enabled, BRI applications will not be able to connect to the reader.
BRI TCP Port	Specifies the TCP port used for incoming connections to the BRI server. This port must be unique for all TCP services running on the reader. Valid range is 2189 to 65535. Default is 2189.
Enable Logging	Enables logging of BRI server events.
Enable BRI on serial port	Enables sending BRI commands through the serial port.
Serial Baud Rate	Specifies the serial baud rate the reader uses to communicate.

View the BRI Server Log

If you enable logging, you can see a list of BRI server events, and save the logfile as a .txt file.

- 1 Log in to the web browser interface and enable logging.
- 2 Click **RFID Services > BRI > BRI Log**.



- 3 To save the log file, click **Export log to text file** and then choose **File > Save As**. Follow the prompts to save the log file to your desktop PC.

BRI Server Event Settings

You can view BRI Server Events when you enable logging.

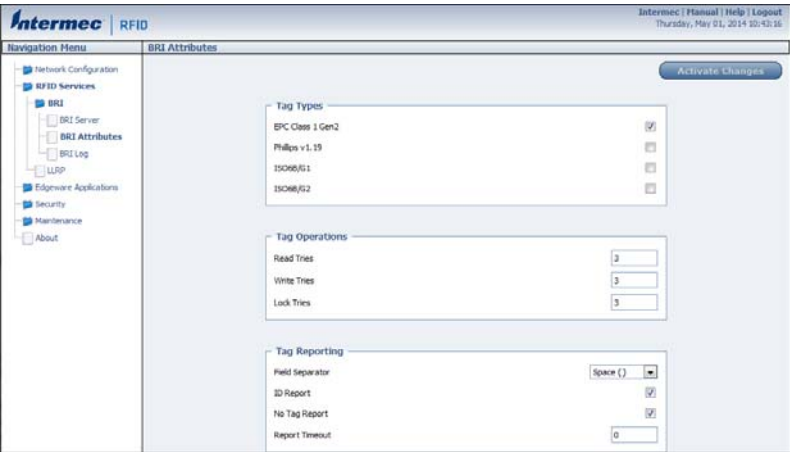
BRI Server Events

Event Name	Description
Time/Date	Time and date of the event.
Connection	Session ID of the client communicating with the BRI server.
Type	Message type of the event, generally indicating which system sent the message: 1 = Command received by BRI server 2 = Response sent by BRI server 3 = BRI server connection message
Message	Text of the message, including responses.

Configure the BRI Attribute Settings

Configure the BRI Attribute settings to control how the reader operates and reads tags.

- 1 Log in to the web browser interface and click **RFID Services > BRI > BRI Attributes**.



- 2 Configure the BRI Attribute settings.
- 3 Click **Activate Changes** to save your changes.

BRI Attribute Settings

BRI Attribute settings control how the reader operates and reads tags. For more information, see the [Basic Reader Interface Programmer Reference Manual](#).

BRI Attribute Settings Descriptions

Setting	Description
Tag Type	Select the tag types you want the RFID reader to read: • EPC Class 1 Gen 2 (default) • Phillips v1.19 • ISO6B/G1 • ISO6B/G2 This setting is equivalent to the TAGTYPE BRI attribute.

BRI Attribute Settings Descriptions (continued)

Setting	Description
Read Tries	The maximum number of times the read algorithm is executed before a response is returned to a Read command. Valid range is 1 to 254. Default is 3. In practice, this is the number of times an identified tag is read until the Read is successful. This setting is equivalent to the RDTRIES BRI attribute.
Write Tries	The maximum number of times the read algorithm is executed before a response is returned to a Write command. Valid range is 1 to 254. Default is 5. In practice, this is the number of times an identified tag is read until the Write is successful. This setting is equivalent to the WRTIES BRI attribute.
Lock Tries	The maximum number of times the lock algorithm is executed before a response is returned to a Lock command. Valid range is 1 to 254. Default is 3. This setting is equivalent to the LOCKTRIES BRI attribute.
Field Separator	The character used for separating fields in tag data. Choose from space (), comma (,), colon (:), semicolon (;), tab, caret (^), or tilde (~). Default is space (). This setting is equivalent to the FIELDSEP BRI attribute.
ID Report	Enables tag ID reporting after a Read, Write, or Lock command is executed: • For ISO tags, the tag identifier corresponds to TAGID. • For EPC tags, the identifier corresponds to EPCID. Default is enabled. This setting is equivalent to the IDREPORT BRI attribute.
No Tag Report	Enables a NOTAG message, which is sent when no tags are found during execution of a Read, Write, or Lock command. Default is disabled. This setting is equivalent to the NOTAGRPT BRI attribute.
Report Timeout	The timeout (in ms) for delays in tag reporting when the RFID reader is in continuous read mode. Valid range is 0 to 65534. Default is 0. This setting is equivalent to the RPTTIMEOUT BRI attribute.
Timeout Configuration Mode	Establishes whether to use the Timeout or Tries attributes. Default is off. This setting is equivalent to the TIMEOUTMODE BRI attribute.

BRI Attribute Settings Descriptions (continued)

Setting	Description
Select Tries	(Not supported by EPCglobal Class 1 Gen 2 tags) The number of times a group select is attempted. A group select is the command that starts the identity process. Valid range is 1 to 254. Default is 1. This setting is equivalent to the SELTRIES BRI attribute.
Unselect Tries	(Not supported by EPCglobal Class 1 Gen 2 tags) The number of times a group unselect is attempted. Valid range is 1 to 254. Default is 1. This setting is equivalent to the UNSELTRIES BRI attribute.
Session	The command session parameter to a corresponding EPCglobal Class 1 Gen 2 air protocol command. Valid range is 0 to 3. Default is 3. This setting is equivalent to the SESSION BRI attribute.
Initial Q	(EPCglobal Class 1 Gen 2 tags only) The initial Q parameter value used by the Query command. Valid range is 1 to 254. Default is 4. If you know there is only one tag in the field, set this attribute to 0 for best performance. This setting is equivalent to the INITIALQ BRI attribute.
Initialization Tries	The maximum number of times the reader attempts to initialize a tag. Valid range is 1 to 254. Default is 1. This setting is equivalent to the INITTRIES BRI attribute.
Schedule Option	Determines how antennas are switched during the inventory process: • 0 - Legacy BRI operations • 1 - Simplified BRI operations • 2 - Simplified BRI operations with EPCC1G2 A/B toggling. Default is 0. This setting is equivalent to the SCHEDULEOPT BRI attribute.
ID Tries	The maximum number of times the reader executes the identify algorithm before a response is returned to a Read or Write command. Valid range is 1 to 254. Default is 1. In practice, this is the number of times a tag ID attempt is made for the antenna. This setting is equivalent to the IDTRIES BRI attribute.
Antenna Tries	The number of times the antenna is used for a Read and Write command. Valid range is 1 to 254. Default is 1. This setting is equivalent to the ANTTRIES BRI attribute.

BRI Attribute Settings Descriptions (continued)

Setting	Description
EPCC1G2 Advance Medium Access Mode	Dense Reader Mode settings used with EPCC1G2 parameters. This setting is equivalent to EPCC1G2PARAMETERS BRI attribute.
Dense Reader Mode	Allows the reader to hop between channels within a certain frequency spectrum to prevent other readers in the area from interfering with one another. Default is enabled. This setting is equivalent to the DENSEREADERMODE or DRM BRI attribute.
Field Strength dB 1-4	The RF power level (in dBm). Valid range is 1 to 30. Default is 30. Use this setting to attenuate the antenna field strength. In some situations, full output power can cause unnecessary interference. For example, if the tag is close to the antenna, full output power might overload the tag and cause unreliable behavior. This setting is equivalent to the FIELDSTRENGTH BRI attribute.
Antenna Sequence 1-8	The antenna sequence to be used during READ and WRITE commands. This setting is valid for two antennas only, and is equivalent to the ANTS BRI attribute.

Configure LLRP Settings

Configure the LLRP settings to establish an interface method between the reader and a client. For more information on LLRP, see <http://www.epcglobalinc.org/standards/llrp>.

- 1 Log in to the web browser interface and click **RFID Services > LLRP**.

The screenshot displays the Intermec RFID web interface. The top navigation bar includes the Intermec logo, 'RFID', and links for 'Intermec', 'Manual', 'Help', and 'Logout'. The date and time 'Friday, May 02, 2014 08:57:10' are shown on the right. A left-hand 'Navigation Menu' lists 'Network Configuration', 'RFID Services' (with sub-items 'BRI', 'LLRP', 'Edgeware Applications', 'Security', 'Maintenance', and 'About'), and 'About'. The main content area is titled 'LLRP' and features an 'Activate Changes' button in the top right. It contains four sections: 'EPCglobal Low Level Reader Protocol (LLRP) Options' with checkboxes for 'Secure Server Enable' and 'Unsecure Server Enable' (both checked); 'Extension Definitions' with a 'Download Intermec Extension Definitions' link pointing to 'llp-intermec.xml'; 'Forced Client Termination' with a 'Terminate' button; and 'Reader-Initiated Connections' with input fields for 'Client Address' and 'TCP Port', a checked 'Enable Security (TLS)' checkbox, and an 'Initiate' button.

- 2 Configure the LLRP settings.
- 3 Click **Activate Changes** to save your changes.

LLRP Settings

LLRP settings establish an interface method between the reader and a client.

LLRP Settings

Setting	Description
Secure Server Enable	Allows connections to the secure LLRP server on port 5085.
Unsecure Server Enable	Allows connections to the unsecure LLRP sever on port 5084.
Download Intermec Extensions Definition	Downloads an XML file that describes Intermec by Honewell-specific extensions for the LLRP protocol.
Reader Initiated Connections	For reader-initiated TCP/IP connections to a remote LLRP client. • Client address - The IP address of the remote LLRP client. • TCP port - Port number for the TCP/IP socket connection. • Enable security (TLS) - Select this option to enable Transport Layer Security for this TCP/IP connection.

Configure Security

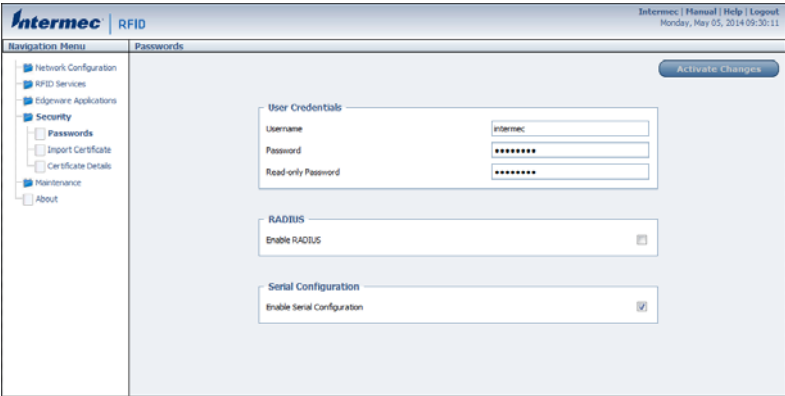
To make sure the reader is secure, change your security settings when you set up your reader. You can secure the reader by:

- changing user credentials.
- enabling a RADIUS server.
- enabling or disabling serial configuration.

Change User Credentials

If you are not using a password server to authorize user logins to the reader, change the default user name and password.

- 1 Log in to the web browser interface and click **Security > Passwords**.



- 2 Configure the User Credential settings.
- 3 Click **Activate Changes** to save your changes.

User Credential Settings

User Credential settings control the user name and password you use to log in to the reader.

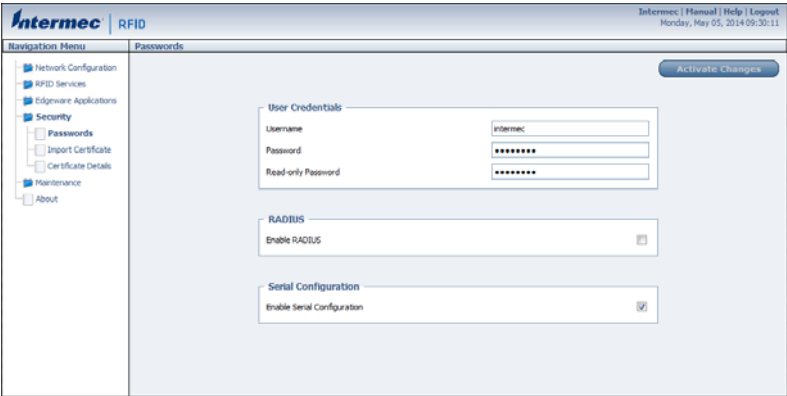
User Credential Settings

Setting	Description
Username	The user name to log in to the reader. The user name can be from 1 to 32 characters long. You must always specify a user name. Default is <code>intermec</code> .
Password	The password to log in to the reader. This password gives you both read and write access to the reader configuration. The password can be from 8 to 32 characters long. You must always specify a password. Default is <code>intermec</code> .
Read-only password	The password to log in to the reader. This password gives a user read-only access. The user can view the configuration of the reader and execute diagnostics, but cannot perform any tasks that affect the reader operation. Default is read only. The read-only password cannot be deleted. To disable read-only access, you need to enable the RADIUS server.

Configure the RADIUS Server

If you are using a password server to manage users who log in to the reader, you need to enable and configure the RADIUS server.

- 1 Log in to the web browser interface and click **Security > Passwords**.



- 2 Select **Enable RADIUS**.
- 3 Configure the RADIUS server settings.
- 4 Click **Activate Changes** to save your changes.

RADIUS Server Settings

You can configure RADIUS Server settings to manage how users log in to the reader.

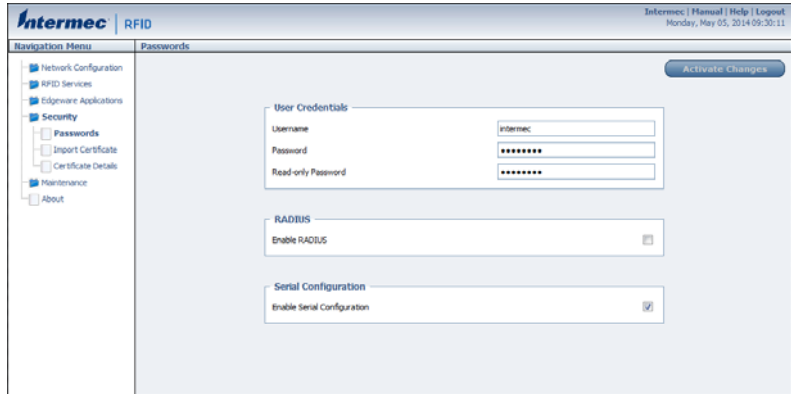
RADIUS Server Settings

Setting	Description
Enable RADIUS	Enables RADIUS authentication for the reader.
Primary RADIUS Server	IP address or DNS name of the RADIUS server. If this is left blank, the RADIUS client does not use this entry.
Secret	Secret key for the RADIUS server.
Port	Port number of the primary RADIUS server. Default is 1812.
Secondary RADIUS Server	IP address or DNS name of the RADIUS server to use if there is no response from the primary RADIUS server.
Secret	Secret key for the secondary RADIUS server.
Port	Port number of the secondary RADIUS server. Default is 1812.

Disable Serial Port Access

To enhance security, or allow an external application to communicate with the serial port, disable serial port access to the reader.

- 1 Log in to the web browser interface and click **Security > Passwords**.



The screenshot shows the Intermec RFID web interface. The top navigation bar includes the Intermec logo, 'RFID', and links for 'Manual', 'Help', and 'Logout'. The date and time 'Monday, May 05, 2014 09:30:11' are displayed on the right. A 'Navigation Menu' on the left lists various configuration options, with 'Security' expanded to show 'Passwords', 'Import Certificate', and 'Certificate Details'. The main content area is titled 'Passwords' and contains three sections: 'User Credentials' with fields for 'Username' (intermec), 'Password' (masked with asterisks), and 'Read-only Password' (masked with asterisks); 'RADIUS' with an 'Enable RADIUS' checkbox; and 'Serial Configuration' with an 'Enable Serial Configuration' checkbox that is currently checked. An 'Activate Changes' button is located in the top right corner of the main content area.

- 2 Clear the **Enable Serial Configuration** check box.
- 3 Click **Activate Changes** to save your changes.

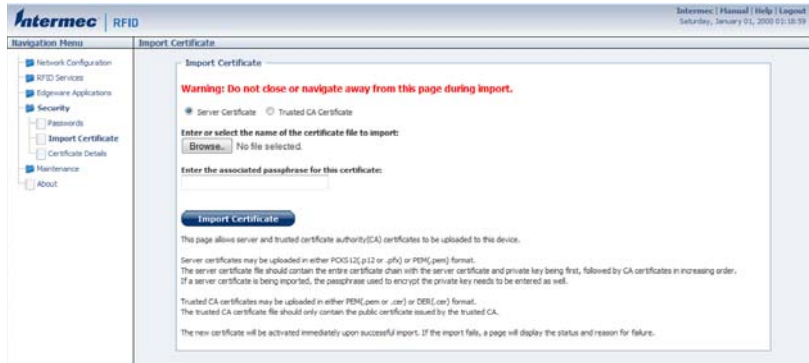
About Certificates

The default server certificate on the reader (ValidforHTTPSOnly) provides support for secure network applications, such as the secure web browser interface and secure LLRP client connections. You can also use a third-party CA to issue unique client certificates and a root certificate.

Import a Certificate

To enhance security, import a certificate to the reader.

- 1 Log in to the web browser interface and click **Security > Import Certificate**.



- 2 Select the type of certificate.
- 3 Click **Browse** and select the certificate.
- 4 If you selected a server certificate to import, enter the passphrase for the certificate.
- 5 Click **Import Certificate**. The certificate is imported.

View Certificates

Use the web browser interface to view the certificates loaded on to the reader.

- Log in to the web browser interface and click **Security > Certificate Details**. The Certificate Details screen appears.

3

Develop and Install RFID Applications

Use this chapter to help you develop and install applications on your IF1.

About RFID Applications

RFID applications that you develop communicate through one of two RFID services:

- BRI (Basic Reader Interface): Intermec proprietary protocol for controlling the reader. For more information, see the [Basic Reader Interface Programmer Reference Manual](#).
- LLRP (Low-Level Reader Protocol): EPCglobal standard for network interfaces between the RFID reader and its controlling software. The IF1 supports version 1.0.1 of the EPCglobal LLRP version 1.1. For more information on LLRP, see <http://www.epcglobalinc.org/standards/llrp>.

About the RFID Resource Kit

To create an application, use the RFID Resource Kit. The Intermec by Honeywell Developer Library RFID Resource Kit includes Java and C# tools you can use to develop applications that enable control of the reader and data management.

The resource kit is available as part of the Intermec by Honeywell Developer Library (IDL). To learn more about the RFID Resource Kit, go to www.intermec.com and select **Products > Applications and Software > Developer Library > Developer Resource Kits**.

About .NET Support

The reader supports applications based on .NET Framework 1.0, 1.1, and 2.0. The reader uses Mono open source software to provide support for .NET applications deployed on the Linux operating system of the reader.

About Java Support

The reader comes with a JDBC driver you can use to create applications that writes data directly from the reader to a remote database.

For more sophisticated Java development, the reader supports the open standard OSGi service-oriented architecture. This architecture allows system administrators to install, uninstall, enable, and disable system services (also known as bundles) without having to reboot the reader each time. To use OSGi effectively, you need an OSGi server. For more information, go to www.osgi.org.

How to Execute Java Applications

To execute a Java application on the reader, use this command:

```
$JAVA_HOME/bin/java myJAVAClass
```

How to Execute .JAR Files

To execute .jar files, use this command:

```
$JAVA_HOME/bin/java myApplication.jar
```

When you create a .jar file, you need to include manifest files:

- The manifest needs to include an attribute called “Main-Class” to specify the application’s entry point (for example, Main-Class: MyJavaClass).
- If the executable .jar needs to reference other .jar files, specify the files in the manifest file using the “Class-Path” attribute.

How to Enable the Java Just-In-Time Compiler

To enable the Java just-in-time (JIT) compiler for maximum performance, use this command:

```
$JAVA_HOME/bin/java -jit java -jar MyJar.jar
```

where:

`$JAVA_HOME` is an environment variable that indicates the Java runtime installation path (/usr/java). Always use this variable for simplicity and to make sure that the correct runtime files are used.

`$JAVA` is the name of the Java runtime executable installed in the reader.

How to Specify the Class Path for the Java Virtual Machine

If your application references third party Java libraries, such as the components from the Intermecc by Honeywell RFID Resource Kit, you must include the `-cp` option to specify the class path for the JVM to find the Java classes. Make sure to include the current path so classes in the current directory can be found as shown in this example:

```
$JAVA_HOME/bin/java -cp ../BasicRFID.jar  
MyClass
```

About Java Support for Microsoft SQL Server and Sybase

The reader jTDS driver (version 1.2) provides JDBC capabilities to Java applications running on the reader. You need to include the location of the JDBC drivers in the class path with the environmental variable `$JDBC_HOME`. The JDBC drivers support JDBC 1.0 and:

- Microsoft SQL Server versions 6.5, 7, 2000, and 2005.
- Sybase versions 10, 11, 12, and 15.

For more information, go to <http://jtds.sourceforge.net>.

Create an Installation Package

Before you can install your RFID application, you must create an installation package.

- 1 Create a configuration file.
- 2 Archive the installation files.

Create a Configuration File

When you create an application for the reader, you need to include a configuration file in the root directory of the archive so that the application can run on the reader.

- 1 Open a text editor and type this syntax:

```
AUTOSTART=true|false
```

```
RUNAFTERINSTALL=true|false
```

```
CMDLINE=<Command line to start the  
application>
```

where:

AUTOSTART specifies whether the application automatically starts when the reader boots.

RUNAFTERINSTALL specifies whether the application starts immediately after installation.

CMDLINE specifies the application name and optional parameters it accepts. Specify command line parameters as if the application is being executed from inside the directory containing the application.

- 2 Save the configuration file with the name **userapp.conf**.

Configuration File Example

This example auto-starts an application when the reader boots and runs an application named testapp.exe:

AUTOSTART=true

RUNAFTERINSTALL=false

CMDLINE=./testapp.exe



Note: The reader executes applications from their installation directories, so the userapp.conf file does not need to include path information.

Archive the Installation Files

To install an RFID application on the reader, you need to package the configuration file and application.

- 1 Create a configuration file named **userapp.conf**.
- 2 Package the **userapp.conf** file and your application into one of these formats: .zip, .tar/bz2, or .tar/gz file. Your application can now be installed on the reader.

How Install RFID Applications

There are two ways to install your RFID application:

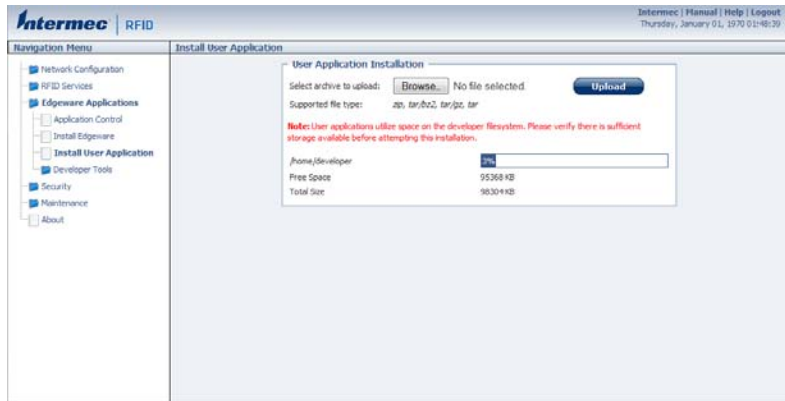
- Run the application on a remote server through TCP port 2189. All processing is performed by the server.
- Run the application locally on the reader. The application resides on the reader, and much of the processing occurs on the reader.

Install your application on the reader to improve system scalability by minimizing network traffic, so reader can handle processing tasks such as data filtering.

Install Applications On to the Reader

The reader provides up to 64 MB of storage for your applications. Use the web browser interface to install applications on reader.

- 1 Log in to the web browser interface and click **Edgeware Applications > Install User Application**.



- 2 Click **Browse** and follow the prompts to navigate to the location of the application file.
- 3 Click **Upload**. The application is uploaded to the reader, placed in the /home/developer/edgeware/userapp0 directory, and the application name appears in the Edgeware Applications list.

How to Manage Applications

To maximize resources, you can start, stop, or uninstall applications on the reader.

Start an Application

By default, an application is stopped. You can start the application from the web browser interface.

- 1 Log in to the web browser interface and click **Edgware Applications > Application Control**. The Application Control screen appears.
- 2 Click  to start an application.

Stop an Application

Stop an application from running to reduce the amount of resources that the reader is using.

- 1 Log in to the web browser interface and click **Edgware Applications > Application Control**. The Application Control screen appears.
- 2 Click  to stop an application.

Uninstall an Application

Uninstall an application that you are not using to free up storage space on the reader.

- 1 Log in to the web browser interface and click **Edgware Applications > Application Control**. The Application Control screen appears.
- 2 Click  to uninstall an application.

Auto-Start an Application at Boot Time

There are two ways to configure your application to auto-start when the reader boots:

- Through the web browser.
- Through the configuration file you deliver with the application.

Auto-Start an Application with the Web Browser

After an application is installed, you can easily configure the application to auto-start through the web browser interface.

- 1 Log in to the web browser interface and click **Edgeware Applications > Application Control**. The Application Control screen appears.
- 2 Select the **Auto-Start** check box and then click **Activate Changes**.

Auto-Start an Application with the Configuration File

When you package an application for installation on the reader, you need to include a configuration file. You can specify Auto-Start in the configuration file.

- 1 With a text editor, open the **userapp.conf** configuration file packaged with your application.
- 2 In the command syntax, make sure **AUTOSTART=true**.
- 3 Save the **userapp.conf** file.
- 4 Repackage the updated configuration file with your application.
- 5 Upload the application to the reader through the web browser interface.

About Edgeware Applications

Edgeware applications are supplied by Honeywell and its partner developers, and provide immediate functionality for your RFID system.

Edgeware Applications

Name	Description
Developer Tools	Used for basic testing of your RFID system. You can read RFID tags, send BRI commands, and run BRI scripts through these tools.
SAP Device Controller	Communicates with the SAP backend module on your server.
Application Level Events Engine	The ALE Engine lets the reader communicate with your ALE application.
ALE Store and Forward	Reads tags, saves tag data, and forwards the data to a folder on a host OC or to a TCP/IP socket.

Install or Upgrade Edgware Applications

Some Edgware applications, such as the SAP Device Controller or the Application Level Events Engine (ALE), are not installed on your reader. You can easily download, install, or upgrade your Edgware applications through the web browser interface.

- 1 Log in to the web browser interface and click **Edgware Applications > Install Edgware**.



- 2 Click **Browse** to browse to the location of the firmware file, and then double-click the file.
- 3 Click **Install**. The Edgware application is installed on the reader. When the installation is complete, the reader reboots.

About the Developer Tools

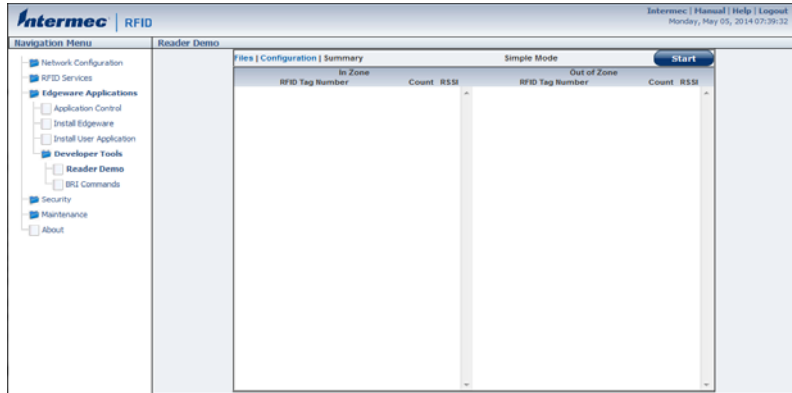
Developer Tools are used for basic testing of your RFID system. You can:

- read RFID tags through the demo application.
- send BRI commands.
- run BRI scripts.

Read RFID Tags Through the Demo Application

Use the demo application to verify that your reader can read RFID tags.

- 1 Log in to the web browser interface and click **Edgware Applications > Application Control**. The Application Control screen appears.
- 2 If the Developer Tools are not enabled, click  .
- 3 Click **Developer Tools > Reader Demo**.



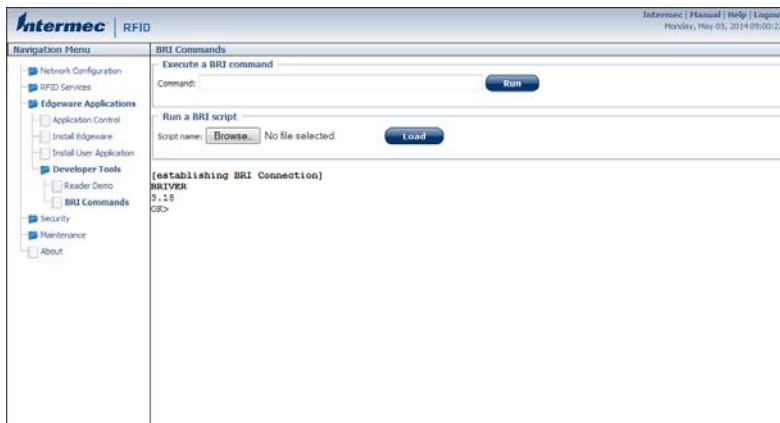
- 4 Place a tag near the antenna and then click **Start**.

Send BRI Commands

Use the Developer Tools to easily send BRI commands through the web browser interface.

- 1 Log in to the web browser interface and click **Edgware Applications > Application Control**. The Application Control screen appears.
- 2 If the Developer Tools are not enabled, click  .

3 Click **Developer Tools > BRI Commands**.

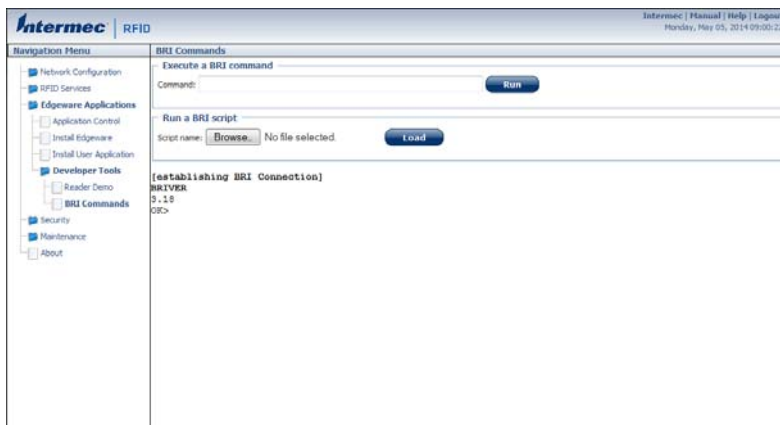


- 4 Enter a BRI command in the Command field and then click **Run**. The command is executed and a value returns onscreen.

Run BRI Scripts

Run a BRI script to send multiple BRI commands to the reader.

- 1 Log in to the web browser interface and click **Edgware Applications > Application Control**.
- 2 If the Developer Tools are not enabled, click .
- 3 Click **Developer Tools > BRI Commands**.



- 4 Click **Browse** and browse to the location of the BRI script.

- 5** Double-click the BRI script file.
- 6** Click **Load**. The script is loaded and run, and values are returned onscreen.

4

Troubleshoot and Maintain the Reader

Use this chapter to find answers to any problems you may encounter while using the reader. You will also find information on routine maintenance.

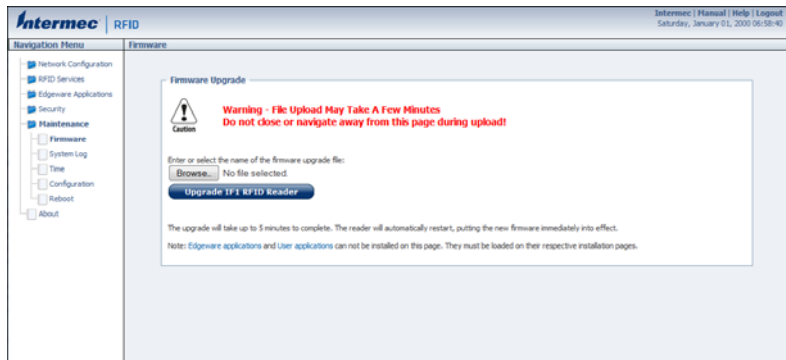
Upgrade Firmware

Easily upgrade the firmware on the reader by through the web browser interface.



Make sure the reader is connected to a reliable power source before you upgrade the firmware. Do not cycle power to the reader during the upgrade. If power is lost during the upgrade, the reader may require factory repair.

- 1 Download the reader firmware file from www.intermec.com.
- 2 Double-click the file you downloaded follow the prompts to extract the file to your PC.
- 3 Log in to the web browser interface and click **Maintenance > Firmware**.



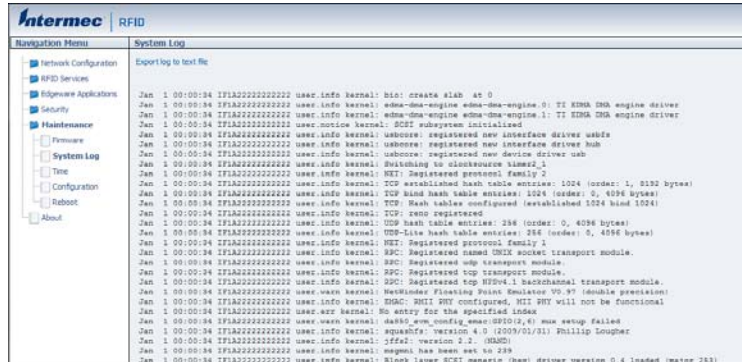
- 4 Click **Browse** to browse to the location of the firmware file, and then double-click the file.
- 5 Click **Upgrade IF1 RFID Reader**. The upgrade process begins and the firmware is transferred to the IF1.

During the upgrade, the web browser interface screen does not auto-refresh. Click **Refresh** in the web browser to check the progress of the upgrade. When the login screen appears, the upgrade is complete.

View the System Log

The system log shows events logged by the reader. You may need this information to troubleshoot the reader or when you call Product Support.

- 1 Log in to the web browser interface and click **Maintenance > System Log**.

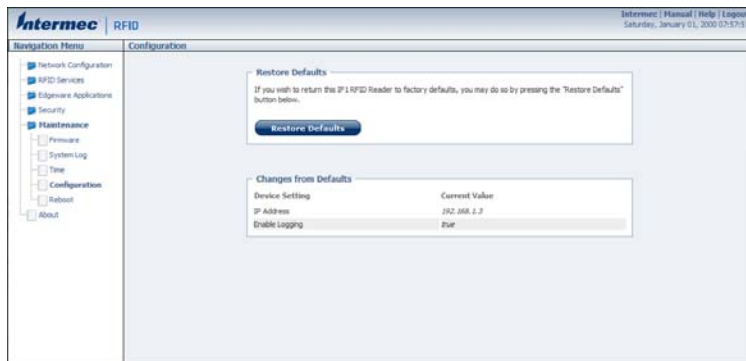


- 2 (Optional) Click **Export log to text file** and follow the prompts to save the log file to your desktop PC.

Restore Default Settings

If you have problems with the reader, use the web browser interface to restore the default settings.

- 1 Log in to the web browser interface and click **Maintenance > Configuration**.

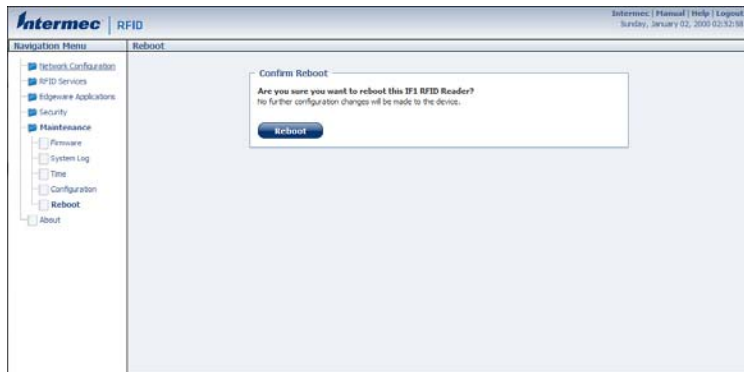


- 2 Click **Restore Defaults**, and then click **OK**. The reader reboots and restores the default configuration.

Reboot the Reader

If the reader or an application locks up, or if the reader does not respond, you may need to restart the reader.

- 1 Log in to the web browser interface and click **Maintenance > Reboot**.



- 2 Click **Reboot**, and follow the prompts to reboot the reader. The reader reboots and restores the default configuration.

- Log in to the web browser interface and click **About**.



- use the troubleshooting tables in this manual to find your problem and possible solutions.
- visit the Intermec by Honeywell knowledge base, Knowledge Central at intermec.custhelp.com.

1-800-755-5505

- Configuration Number (CN) and serial number (SN)
- Device software version
- RFID module firmware version

53

Troubleshoot the Reader

This section includes lists of problems and possible solutions.

Problems While Working with RFID

You can solve many problems you may encounter when working with your RFID system by carefully checking the RFID settings and changing them accordingly.

RFID Problems and Solutions

Problem	Solution
The reader is unable to read RFID tags, or seems to read tags slowly or inconsistently.	Check these conditions: • Your RFID antennas must be connected correctly to the reader and mounted in optimum locations. Make sure all antenna connections are tight and that the cables are in good condition. For help, contact your RFID system consultant. • Make sure you selected the correct tag types for your application.
The reader does not respond to your RFID application.	• Your application may not be communicating with the reader BRI server. • You may need to change BRI server settings to communicate with your application. For example, if your application is running on a desktop PC, you need to enable external BRI connections to the reader.

Problems with Connectivity

When you troubleshoot problems with connectivity, make sure you know your:

- TCP/IP settings.
- COM port settings for serial connections.

You should also make sure all physical network connectors and cables are in good working order.

Connectivity Problems and Solutions

Problem	Solution
You cannot connect to the reader through the USB port	• Make sure you downloaded the reader USB drivers. • Verify that your serial connection is configured to 115200, N, 8, 1, no flow control.
You cannot connect to the reader using a web browser.	• Verify that you have the correct IP address for the reader. • If you access the Internet through a proxy server, make sure you add the IP address of the reader to the Exceptions list.
You cannot load a security certificate.	You must use a secure web browser connection to load certificates.
You assigned a static IP address to the reader but cannot connect the reader over your network.	Make sure that DHCP is disabled and that your TCP/IP parameters are set correctly.

5

About the GPIO Ports

Use this chapter to learn about the GPIO ports.

About the GPIO Interfaces

The reader has two general purpose input and output (GPIO) interfaces. You connect external controls such as motion sensors or indicator lamps to the GPIO interfaces, which can then trigger reader operations.

Each interface is electrically isolated from the reader and designed for low voltage DC loads. The reader can also supply 5 VDC at 0.30 A to external devices.

How the inputs and outputs are used depends on the RFID application software being used in the system. You need to coordinate input and output control wiring with the software developer.

How to Use the Input Interfaces

Each of the two inputs is compatible with input signals of 4.5 to 28 VDC. Both the high and low signal contacts are exposed and isolated to 1500 V. Input impedance is 1.8 K ohms minimum.

GPIO Input Signals

Signal	Description	Min.	Typical	Max.
V _{in} (High)	High input voltage	4.5 V	24 V	28 V
V _{in} (Low)	Low input voltage	-1 V	0 V	.8 V

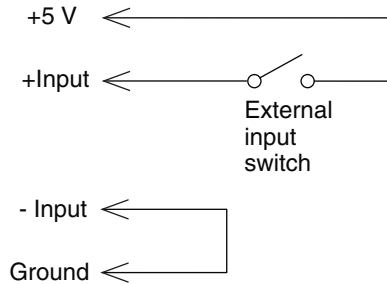
In a typical application, the reader senses input from an external control like a switch and then starts a tag read operation.

There are three basic ways to connect input controls to the reader input interfaces:

- Supply the input interface with power from the reader.
- Isolate the reader from the input power source.
- Use an open collector solid state drive from a remote device to control the inputs.

Powered Input Example

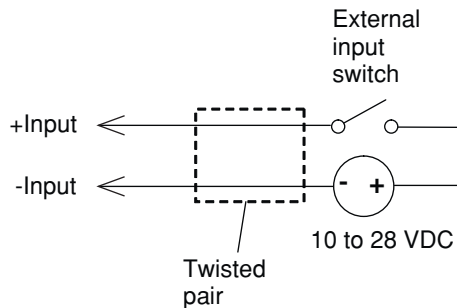
The reader powered input the simplest way to connect a control to a reader input interface. If the external control device is a switch, you can connect one side of the switch to a reader +Input pin and the other side of the switch to one of the +5 VDC sources.



Reader Powered Input

Isolated Input Interface Example

Isolate the input interface to minimize noise induced by distance or grounding characteristics. The isolated input avoids induced noise by referencing a remote input to chassis return of the reader.

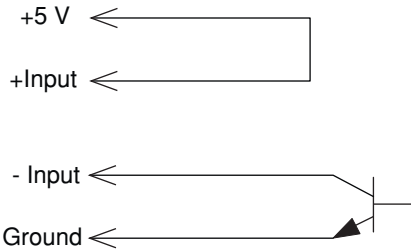


Isolated Input Interface

Open Collector Input Interface Example

The input can be connected to an open collector interface of an external device. This open collector input interface typically implies that the grounds are tied together for the two systems. The common ground can be a source of input noise, so you should follow good grounding practices for both the reader and the input device.

In this situation, the reader provides power to the pull-up resistor for the open collector. Connect the +Input pin to the +5 VDC source.



Open Collector Input Interface

How to Use the Output Interfaces

Each reader output interface is optically isolated from the reader, polarized, and rated for 5 to 30 VDC at 0.4 A.

GPIO Output Specifications

Signal	Description	Min.	Typical	Max.
Leakage current (High)	Switch output, high leakage current	0 mA	1 mA	10 mA
V_{sat} (Low)	Switch output on, saturation voltage with 0.25 A load	0 V	1 V	1.5 V

Because the outputs are optically isolated, each one can be configured to switch the high side or the low side of the load. You can power the load directly from the reader or from an external power supply.

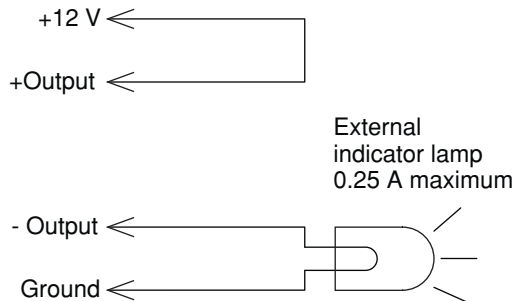
In a typical application, the outputs control indicator lamps that signal good reads or errors. The basic methods for connecting external devices to the GPIO outputs include:

- switching the high side, with the load powered by the reader.
- switching the low side, with the load powered by the reader.
- switching the high side, with the load powered externally.
- driving a DC relay that controls an AC load.

These methods are shown in the next examples.

How to Switch the High Side with Reader Power

In this example, an external indicator lamp (0.25 A maximum current) is connected to the -Output and Ground pins, and the corresponding +Output pin is connected to the +12 VDC source.

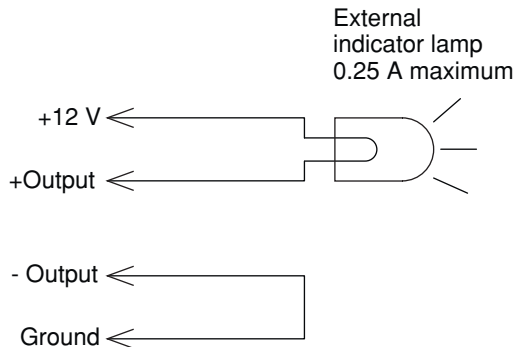


Switching the High Side

How to Switch the Low Side with Reader Power

For low side switching applications, the lamp power is routed to all the lamps in common and the low side of the load is routed to the switch.

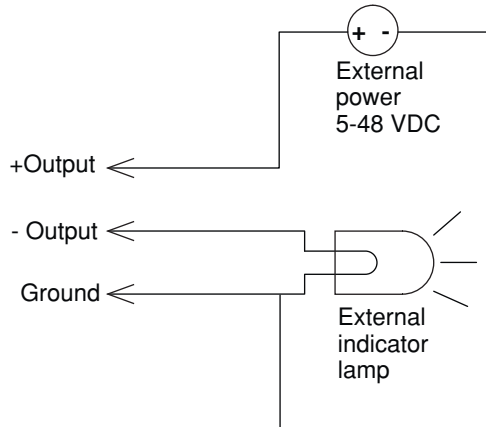
Connect the external indicator lamp to the +Output and +12 VDC pins, and short the corresponding -Output pin to ground.



Switching the Low Side of the Output Load

How to Switch the High Side with External Power

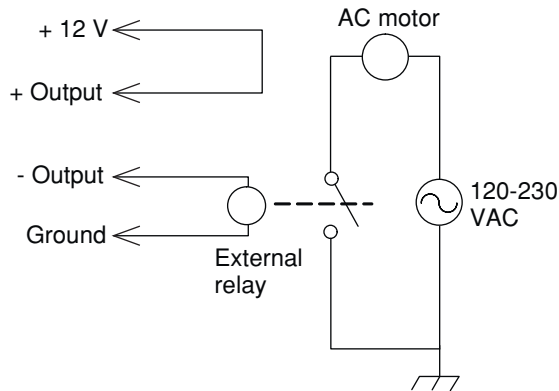
To use external power (5 to 48 VDC) to switch the high side, connect the Ground pin to the ground system of the external power supply, and connect the positive side of the external supply to the +Output pin. The external indicator lamp is connected to the corresponding -Output and Ground pins.



Switching the High Side with External Power

Drive a DC Relay to Control an AC Load

While the reader outputs are designed to switch DC loads, they can also drive relays that control AC loads.



Driving a DC Relay: The external relay provides dry contacts to the AC motor.



Note: In many installations, the relay and AC wiring must be placed in an enclosure that meets local fire code regulations.

How to Use the Power Interface

The reader GPIO interface provides 5 VDC at 0.30 A for powering external inputs and loads, eliminating the need for an external DC supply and simplifying the system installation.

The GPIO interface power has an internal thermal fuse that trips if the load exceeds 0.5 A. The fuse is self-recovering after the excessive load is removed.

The total load on the GPIO interface power must stay within the 0.5 A limit. When you design a system that uses the GPIO interface power, make sure to complete a power budget assessment to ensure that the supply is adequate for the system.

If your system needs more than +12 VDC at 0.5 A, you can connect an external power supply to the +12 V and Ground pins. The external supply powers the external loads, and that power is available at all +12 V pins on the GPIO port.

A

Specifications

This appendix contains specifications and the port pin assignments for the IF1.

IF1 Specifications

IF1 Specifications

Dimensions	26.5 cm x 18.6 cm x 5.85 cm (10.2 in x 7.3 in x 2.3 in)
Weight	1.6 kg (3.5 lb)
Integrated antenna	7.5 dBi integrated antenna depending on option
External antenna ports	Up to 2 external RP-TNC antenna ports depending on option
Optional GPIO ports	2 inputs, 2 outputs
Memory	64 Mb
Air interface protocol	• EPCglobal UHF Class 1 Gen2 • ISO 18000-6C
Receive power	-82 dBm at 1 W
Transmit power*	30 dBm
DC electrical rating	55 V, 0.3 A
Power consumption	10 W maximum
Power source	802.3 af Power Over Ethernet
Operating temperature	-20 °C to 65 °C (-13 °F to 149 °F)
Storage temperature	-30 °C to 75 °C (-22 °F to 167 °F)
Humidity	10% to 90% (Non-condensing)
Environmental protection rating	IP66 with Ethernet cable housing.
Operating system	Linux
Application interface	• Basic Reader Interface (BRI), • Low-Level Reader Protocol (LLRP)
Application support	.Net, Java

* Specifications listed may be different due to individual country regulations.

IF1L Enhanced Specifications

IF1L Enhanced Specifications

Dimensions	26.5 cm x 18.6 cm x 7.5 cm
Weight	1.6 kg (3.5 lb)
Integrated antenna	Internal linear polarized
External antenna ports	1 external RP-TNC antenna port
GPIO ports	2 inputs, 2 outputs
Memory	64 Mb
Air interface protocol	• EPCglobal UHF Class 1 Gen2 • ISO 18000-6C
Receive power	-82 dBm at 1 W
Transmit power*	30 dBm
DC electrical rating	55 V, 0.3 A
Power consumption	10 W maximum
Power source	802.3af Power Over Ethernet
Operating temperature	-25 °C to 65 °C (-13 °F to 149 °F)
Storage temperature	-30 °C to 75 °C (-22 °F to 167 °F)
Humidity	10% to 90% (Non-condensing)
Environmental protection rating	IP66 with Ethernet cable housing
Operating system	Linux
Application interface	• Basic Reader Interface (BRI), • Low-Level Reader Protocol (LLRP)
Application support	.Net, Java

* Specifications listed may be different due to individual country regulations.

Optional Integrated Antenna Specifications

Integrated Antenna Specifications

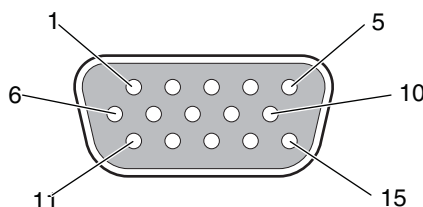
Antenna type (Gain)	Linear polarized (7.5 dBi)
RF connector port	RP-TNC connector
Air interface protocol	• ISO 18000-6C • ARTEFACT PA • SINIAV G0

Port Pin Assignments

Use this section to understand the port pin assignments for the ports located on the reader.

GPIO Port

The GPIO port allows GPIO communications with your reader. The GPIO port is standard with two-antenna port options of the reader, and optional with the integrated antenna options of the reader.



GPIO Port Pin Assignments

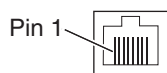
Pin	Function	Description
1	+5 VDC +/-10%	Non-isolated wetting supply, 300 mA max
2	HOST_RX1	Non-isolated host RS232 (output from IF1)
3	HOST_TX1	Non-isolated host RS232 (input from IF1)
4	NC	
5	GND	Non-isolated signal ground
6	NC	
7	NC	
8	NC	
9	ISO_V-	Isolated common return for GPIO input and outputs
10	ISO_V-	Isolated common return for GPIO input and outputs
11	GP output 0+	Isolated GP output (open collector, 30 V max, 40 mA maximum continuous)
12	GP output 1+	Isolated GP output (open collector, 30 V max, 40 mA maximum continuous)
13	GP input 0+	Isolated GP input (28 VDC maximum, $V_{in\ low} = 0.8\ V\ max$, $V_{in\ high} = 4.5\ V\ max$)

GPIO Port Pin Assignments (continued)

Pin	Function	Description
14	GP input 1+	Isolated GP input (28 VDC maximum, $V_{in\ low} = 0.8\ V\ max$ $V_{in\ high} = 4.5\ V\ max$)
15	ISO_V+	Isolated external power for GP out pullups (28 VDC max)

Ethernet Port

The Ethernet port allows Ethernet communications and Power-Over-Ethernet. Use the illustration to understand the port pin assignments.

***Ethernet Port Pin Assignments***

Pin	Description
1	Ethernet TX+/Spare POE return
2	Ethernet TX-/Spare POE return
3	Ethernet RX+/Spare POE 48 VDC
4	POE 48 VDC
5	POE 48 VDC
6	Ethernet RX-/Spare POE 48 VDC
7	POE return
8	POE return

Honeywell Scanning & Mobility

9680 Old Bailes Road
Fort Mill, SC 29707
www.honeywellaidc.com

IF1 Fixed RFID Reader Series User Manual



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