

IP4

Portable RFID Reader

User's Guide



Intermec

Intermec Technologies Corporation
Worldwide Headquarters
6001 36th Ave.W.
Everett, WA 98203
U.S.A.

www.intermec.com

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This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (www.openssl.org).

This product includes cryptographic software written by Eric Young (EAY@cryptsoft.com).

This product uses Regex++, Index software during its operational phases. The owner of Regex++ has granted use of the software to anyone provided such use is accompanied by the following copyright and permission notice:

Regex++, Index. (Version 3.31, 16th Dec 2001)

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Document Change Record

This page records changes to this document. The document was originally released as Revision 001.

Version Number	Date	Description of Change
005	12/5/08	Updated procedure for installing battery. Added chapters on: “Creating and Using RFID Applications” and “Upgrading and Troubleshooting.”
004	10/30/07	Added procedure for configuring IP4 as a keyboard wedge.

Contents

Before You Begin	vii
Safety Information	vii
Global Services and Support	vii
Warranty Information	vii
Web Support	viii
Telephone Support	viii
Service Location Support	viii
Who Should Read This Manual	ix
Related Documents	ix
Patent Information	x

1 Getting Started 1

Introducing the IP4	2
Unpacking the IP4	2
What You Need	2
Understanding the LEDs	3
Charging and Installing the Battery	4
Attaching the IP4 to Your Mobile Computer	6
Establishing a Connection With the IP4	7
Install .NET Compact Framework 2.0	8
Installing IVA Using an SD Card	8

2 Creating and Using RFID Applications ... 11

RFID Applications and the IP4	12
Configuring the IP4 as a Keyboard Wedge	12
Downloading Intermec's RFID Demo Application	14
Using the RFID Resource Kit	14
Configuring the RFID Settings	14
Configuring the BRI Settings	15
Upgrading Your Windows Mobile OS	16

Contents

Upgrading Firmware 18

Contacting Intermec Product Support 18

A Specifications 19

IP4 Specifications 20

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.

This section explains how to identify and understand dangers, warnings, cautions, and notes that are in this document. You may also see icons that tell you when to follow ESD procedures and when to take special precautions for handling optical parts.



Warning

A warning alerts you of an operating procedure, practice, condition, or statement that must be strictly observed to avoid death or serious injury to the persons working on the equipment.



Caution

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 web site 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 web site at www.intermec.com to download our current manuals (in PDF). To order printed versions of the Intermec manuals, contact your local Intermec representative or distributor.

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.

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 web site, click **About Us > Contact Us**.

Service Location Support

For the most current listing of service locations, go to www.intermec.com and click **Support > Returns and Repairs > Repair Locations**.

For technical support in South Korea, use the after service locations listed below:

AWOO Systems

102-1304 SK Ventium

522 Dangjung-dong

Gunpo-si, Gyeonggi-do Korea, South 435-776

Contact: Mr. Sinbum Kang

Telephone: +82-31-436-1191

E-mail: mjyun@awoo.co.kr

IN Information System PTD LTD
6th Floor
Daegu Venture Center Bldg 95
Shinchun 3 Dong
Donggu, Daegu City, Korea
E-mail: jmyou@idif.co.kr or korlim@gw.idif.co.kr

Who Should Read This Manual

This document is for the person who is responsible for installing, configuring, and maintaining the IP4.

This document provides you with information about the features of the IP4, and how to install, configure, operate, and maintain it.

Related Documents

This table contains a list of related Intermec documents and their part numbers.

Document Title	Part Number
<i>Basic Reader Interface Programmer's Reference Manual</i>	937-000-xxx
<i>Intermec Computer Command Reference Manual</i>	073529-xxx
<i>AC12 Dual Pack Charger Instructions</i>	930-131-xxx

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

To download documents

- 1 Visit the Intermec web site at www.intermec.com.
- 2 Click **Support > Manuals**.
- 3 In the **Select a Product** field, choose the product whose documentation you want to download.

To order printed versions of the Intermec manuals, contact your local Intermec representative or distributor.

Patent Information

Product is covered by one or more of the following patents:

5,673,037; 5,729,697; 5,777,561; 5,828,318; 5,850,187;
5,912,632; 5,942,987; 5,995,019; 6,032,127; 6,121,878;
6,172,596; 6,286,762; 6,288,629; 6,422,476; 6,429,775;
6,525,648; 6,529,880; 6,608,551; 6,639,509; 6,812,841;
6,812,852; 6,919,793.

Patent Application 2002-0046173.

There may be other U.S. and foreign patents pending.

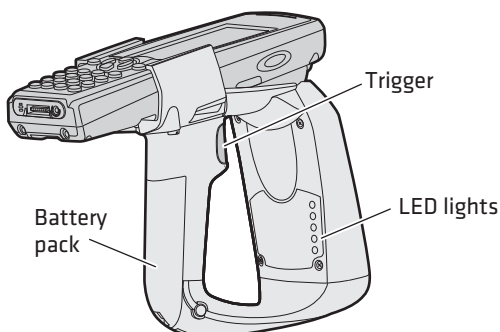
1 Getting Started

Use this chapter to familiarize yourself with the IP4 Portable RFID Reader. This chapter covers these topics:

- **Introducing the IP4**
- **Learning About the IP4**
- **Charging and Installing the Battery**
- **Attaching the IP4 to Your Mobile Computer**
- **Establishing a Connection With the IP4**

Introducing the IP4

The Intermec IP4 Portable RFID Reader is designed for the 700 Color and the 730 Series Mobile Computers. The IP4 connects to your mobile computer via Infrared Data Association (IrDA). Together, the IP4 and your mobile computer provide a high-performance mobile RFID solution that allows you to bring the read/write device to the tagged product rather than moving tagged products past a fixed reader.



Note: There is a lightpipe on the IP4 that helps communicate the IrDA signal between your mobile computer and the IP4. Do not remove the lightpipe.

Unpacking the IP4

When you unpack the IP4, these items are included:

- IP4 Portable RFID Reader (P/N 245-299-xxx)
- Product Documentation (P/N 943-002-xxx)
- Battery Model AB12 (P/N 318-014-xxx)

What You Need

To use the IP4, you need these items:

- Battery charger or dock with power supply
- 700 Color or 730 Series Mobile Computer
- A custom application to read and write tags. For help, see **[“RFID Applications and the IP4” on page 12.](#)**

You may also need to upgrade your Windows operating system and the IVA version before you can connect the IP4 to your mobile computer.

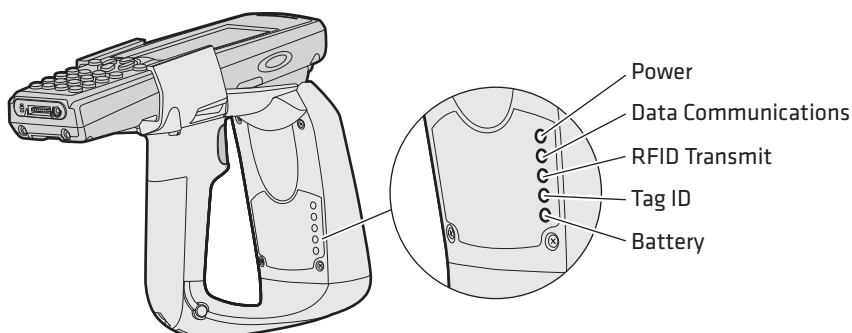
For the 700 Color or the 730 Series Mobile Computers, you need:

- Windows Mobile Version 4.95.1 Premium or 4.96.4 Phone GSM or later.
- IVA version 4.03.35.1064 or later.




For more information on downloading and installing system software, see, **“Establishing a Connection With the IP4” on page 7.**

Understanding the LEDs



The IP4 has five LEDs that show you the operating status of the reader.



IP4 LED Descriptions

Icon	LED	Description
	Power	Green LED remains on when an IP4 is connected to the mobile computer. For more information, see Power LED Description.
	Data Communications	Flashes green when there is data communication between the reader and the mobile computer.
	RFID Transmit	Flashes green when the IP4 RFID reader is transmitting data

IP4 LED Descriptions (continued)

Icon	LED	Description
	Tag ID	Flashes green when an RFID tag ID is successfully read or written to.
	Battery	<p>This LED indicates the status of the battery:</p> <ul style="list-style-type: none">• Green: The battery is fully charged (more than 80% capacity).• Orange: The battery is charged (from 20% to 80% capacity).• Red: The battery is low (less than 20% capacity).

The green power LED shows when a connection is established between your mobile computer and IP4. The Power LED Description table explains the different states of the power LED.

Power LED Description

LED	Description
Off	The IP4 is not yet ready for operation, or the IP4 is in low power mode.
Blinking	The IP4 is not associated with or connected to the mobile computer.
Steady	A connection has been established between the IP4 and the mobile computer.

Charging and Installing the Battery

To charge the IP4 battery, you need to have:

- Power Supply (P/N 851-061-306 in North America or P/N 851-061-106 outside of North America)
- AC12 Dual Pack Charger (P/N 852-062-003)
- AC power cord (P/N 1-974028-025 in the USA)

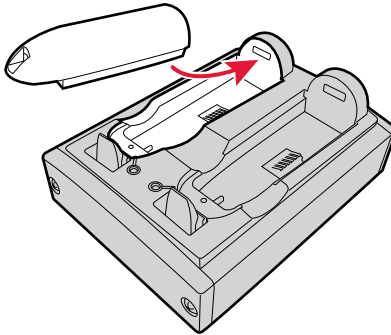
The IP4 does not ship with any of these accessories. For more information on these accessories, contact your local Intermec sales representative.



The Model AC12 Dual Pack Charger is suitable for use only with Intermec battery pack specified in this document. Use of any other battery pack may present risk of fire or explosion hazard.

To charge the IP4 battery

- 1 Insert the battery into a slot on the battery charger. A fully discharged battery charges to full capacity in approximately 4 hours.
- 2 Plug the battery charger into an AC power source.



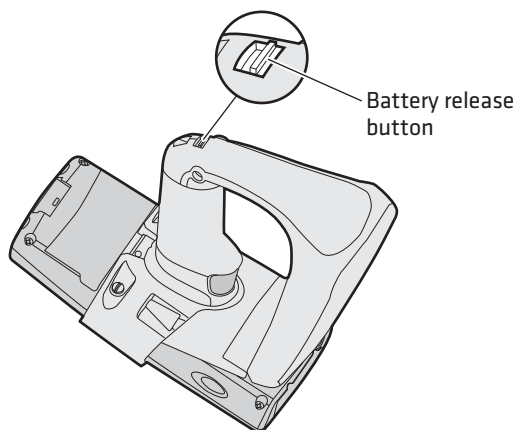
To install the battery

- 1 Insert the battery into the slot with the battery tab end first.
- 2 Push down on the tapered end of the battery until it clicks into place.



To remove the battery

- Push the battery release button on the bottom of the IP4 to remove it



Note: Charging the IP4 battery does not charge the mobile computer that it is connected to. See the mobile computer user's manual for charging options.

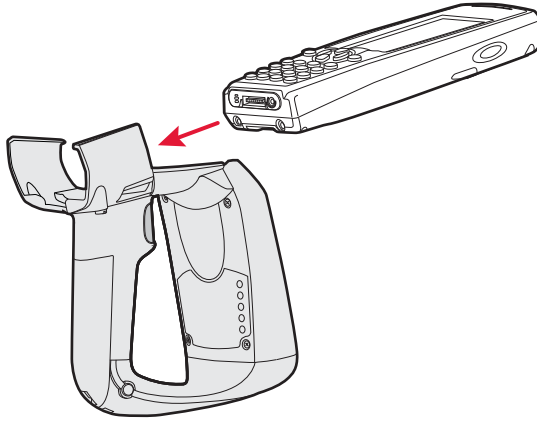
Attaching the IP4 to Your Mobile Computer

This section explains how to attach the IP4 to your mobile computer.

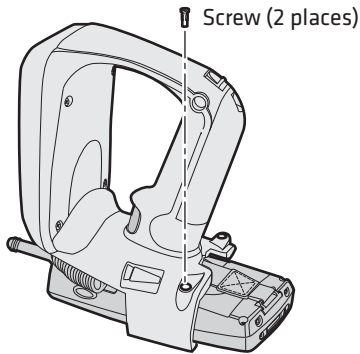
To attach the IP4 to your mobile computer

- 1 Remove the two Phillips screws from the underside of the mobile computer.

- 2 Slide your mobile computer into the IP4 until it clicks into place.



- 3 Replace the two Phillips screws to the underside of the IP4.



To remove the IP4 from your mobile computer

- 1 Remove the two Phillips screws.
- 2 Placing your hand over the mobile computer display, slide your mobile computer out of the IP4.

Establishing a Connection With the IP4

This section explains how to establish a connection between your mobile computer and the IP4. You need:

- a Secure Digital (SD) card (64 MB or larger).
- an SD card reader.
- a Phillips screw driver.

To establish a connection between your mobile computer and the IP4

- 1 Remove the screws attaching the top lid on the 700 Color (if you are using an SD card).
- 2 Upgrade your operating system to Windows Mobile 4.951 CDMA.
You only need to perform this step if the OS on your mobile computer is earlier than 4.951 CDMA. For help, see **“Upgrading Your Windows Mobile OS” on page 16.**
- 3 Install .NET Compact FrameWork
- 4 Install the latest version of IVA

Install .NET Compact FrameWork 2.0

This section explains how to install the .NET Compact FrameWork onto your mobile computer.

To install the Compact FrameWork 2.0

- 1 Go to www.microsoft.com.
- 2 In the search box type “.NET Compact Framework 2.0” and press **Enter**.
- 3 On the download page for Compact FrameWork, click **Download** to download the files to your PC.
- 4 Insert the SD card into the card reader.
- 5 Attach the SD card reader into the PC.
- 6 Copy the files for Compact FrameWork from your PC to your SD card.
- 7 Remove the SD card from the card reader and insert it into your mobile computer.
- 8 Tap **Start > Programs > File Explorer > SDMMC Disk**.
- 9 Tap NETCFSetupv2 to install .NET Compact FrameWork.

Installing IVA Using an SD Card

This section explains how to install the IVA using an SD card.

To upgrade the IVA using an SD card

- 1 Go to www.intermec.com > **Support > Downloads > Search Product and Software Downloads.**

- 2** From the drop-down menu, choose **Computers: 700 Series: 741B, 751B, 761B Downloads**.
- 3** Click the link to download the files for IVA version 4.03.35.1064 or later on the PC.
- 4** Insert the SD card into the card reader.
- 5** Attach the SD card reader into the PC.
- 6** Copy the files for IVA from your PC to your SD card.
- 7** Remove the SD card from the card reader and insert it into your mobile computer.
- 8** Go to **Start > Programs > File Explorer > SDMMC Disk > IVA** to load IVA.

2

Creating and Using RFID Applications

This chapter explains how you can use RFID applications for the IP4 and includes these topics:

- **RFID Applications and the IP4**
- **Configuring the RFID Settings**
- **Configuring the BRI Settings**
- **Upgrading Your Windows Mobile OS**
- **Upgrading Firmware**
- **Contacting Intermec Product Support**

RFID Applications and the IP4

To read an RFID tag using the IP4 you must either:

- configure the IP4 as a keyboard wedge,
- run Intermec's demo application, or
- write your own application for the IP4.

When you have made the appropriate installations and configurations on your IP4 and mobile computer, you can begin scanning RFID tags using the IP4.

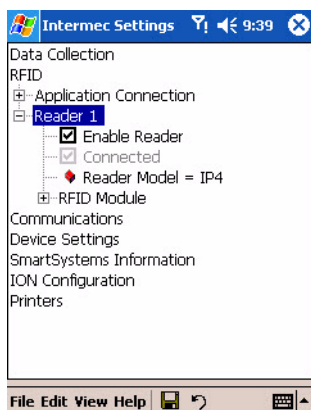
Configuring the IP4 as a Keyboard Wedge

This section explains how to configure the IP4 as a computer wedge. To configure the IP4 as a keyboard wedge, your mobile computer must have:

- at least 64 MB of flash ROM.
- the latest version of IVA and Compact FrameWork installed. For detailed steps on installing IVA and compact FrameWork, see [“Establishing a Connection With the IP4” on page 7](#).

To configure the IP4 as a keyboard wedge

- 1 Attach the IP4 to your mobile computer.
- 2 Tap **Start > Settings > System > Intermec Settings > RFID Reader > Reader 1**. The Reader 1 module will appear.
- 3 Select the **Enable Reader** check box.
- 4 Tap **File > Save Settings**.
- 5 Tap **View > Refresh**.
- 6 In Intermec Settings, tap **RFID > Reader > Reader 1**. The **Enable Reader** checkbox should be selected and the **Connected** checkbox should be selected and grayed out.



To read an RFID tag

- 1 Start Microsoft Pocket Word.
- 2 Position the front of the IP4 within 91 cm (3 ft) of an RFID tag.
- 3 Pull the trigger. You can scan at least six RFID tags per second with the IP4.

If your IP4 does not read tags immediately, you may need to change the type of tags it is configured to read. Or, you may need to configure another RFID setting. For help, see [“Configuring the RFID Settings” on page 14](#).



Note: Continuously reading tags with the IP4 may cause the IP4 to overheat. If the IP4 temperature rises above the maximum operating temperature of 50°C (122°F), it will stop reading tags. If this occurs, let the IP4 cool down until its temperature is within the operating temperature range.



Warning

RF Exposure regulations limit exposure to radio frequency (RF) radiation. To comply with these regulations, operators of this device must maintain a distance of at least 20 cm (8 in) from the cover on the antenna assembly. (The cover on the antenna is the dome-shaped surface.) While the device is on, the operator’s body and parts of the body such as eyes, hands, or head, must be 20 cm (8 in) or farther from the cover of the antenna assembly.

Downloading Intermec's RFID Demo Application

This section explains how to download Intermec's RFID demo application.

To download Intermec's RFID demo application

- 1 Go to www.intermec.com and choose **Support > Downloads**. The Download screen appears.
- 2 Select **IP4 Handheld RFID Reader** from the **Downloads** list. The Downloads page displays all of the downloads available for the IP4.
- 3 Download the installation (.cab) file you need and install it onto your mobile computer. For information on how to install applications onto your mobile computer, see the mobile computer user's manual.

Using the RFID Resource Kit

You can also write your own applications for the IP4. The Intermec Developer Library RFID Resource Kits includes Java and .NET tools you can use to develop applications that control the reader and data management.

Intermec recommends this general outline for developing your own RFID application:

- Write your application on a development workstation (your desktop PC)
- Install and test the application on your mobile computer

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

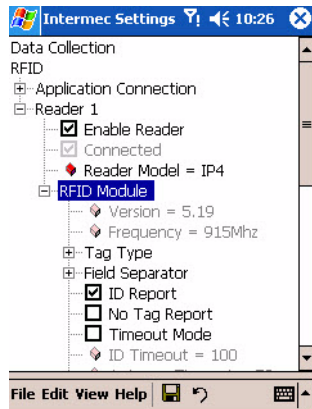
Configuring the RFID Settings

This section explains how you use Intermec Settings to change the settings for the RFID module in the IP4. As you install and test applications, you can configure the RFID settings for the best system performance.

To change RFID tag type settings

- 1 On your mobile computer, tap **Start > Settings > System > Intermec Settings**. The Intermec Settings window appears.

2 Tap **RFID > Reader 1 > RFID Module> Tag type**.



3 Select a check box for the tag type you are scanning. If you do not know what tag type you are scanning, select the **Mixed** check box.

4 Tap **File > Save Settings** or tap the save icon to save your settings.

For more help on configuring other RFID settings, see the *Basic Reader Interface Programmer's Reference Manual* (P/N 937-000-xxx) or the *Intermec Computer Command Reference Manual* (P/N 073529-xxx).

Configuring the BRI Settings

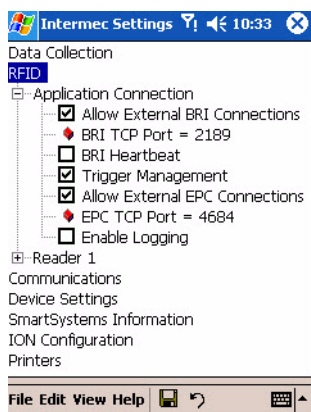
The IP4 BRI server handles communications between your application and the RFID module. You can configure many settings for the BRI Settings. For help, see the next section.

To configure BRI server settings

1 On your mobile computer, tap **Start > Settings > System > Intermec Settings**. The Intermec Settings window appears.



- 2 Tap **RFID > Application Connection**. The BRI application server settings appear.



- 3 Change the BRI application server settings as needed. For help, see the *Basic Reader Interface Programmer's Reference Manual* (P/N 937-000-xxx) or the *Intermec Computer Command Reference Manual* (P/N 073529-xxx).
- 4 Tap **File > Save Settings** or tap the save icon to save your settings.

Upgrading Your Windows Mobile OS

This section explains how to upgrade the Windows Mobile operating system (OS) on your mobile computer.

To upgrade your Windows Mobile OS

- 1 Go to www.intermec.com > **Support** > **Downloads** > **Search Product and Software Downloads**.
- 2 From the drop-down menu, choose **Computers: 700 Series: 741B, 751B, 761B Downloads**.
- 3 Double-click the appropriate link to download the files for upgrading your operating system to the 4.951 CDMA. The download will contain multiple files inside of a zip folder.
- 4 Insert the SD card into the card reader.
- 5 Attach the SD card reader to the PC.
- 6 Copy all of the files inside the zip folder from your PC to your SD card.

Alternatively, you may copy the Windows Mobile OS files using an FTP or ActiveSync connection instead.
- 7 Remove the SD card from the card reader and insert it into your mobile computer.
- 8 On your mobile computer, tap **Start** > **Settings** > **System** > **Utilities** > **Registry Save**.
- 9 Clear the **Enable Registry Storage check box**.
- 10 Tap **Start** > **Programs** > **File Explorer** > **SDMMC Disk**.
- 11 Tap flashkbd.exe to load the files.
- 12 Tap **Select**.
- 13 Choose the 7X0cup.kbf file.
- 14 Tap **Reflash** and accept the warning that appears.
- 15 Choose the option to reset the unit.

Your mobile computer will find the files on the SD card and complete the upgrade process. When the upgrade is complete, the message “Reflashing complete” will display.
- 16 Remove the battery on the mobile computer.
- 17 Remove the SD card.
- 18 Press and hold the reset button for two seconds to perform a cold boot.
- 19 Replace the battery.

Upgrading Firmware

To upgrade the IP4 firmware, you need:

- an SD card.
- an SD reader (optional).

You can use any file transfer method (ActiveSync, FTP server, and so on) to copy the upgrade files to your SD card. Intermec recommends using an SD card reader.

To upgrade firmware using an SD card

- 1** Download the device upgrade (.cab) file from the Intermec web site to your desktop PC.
- 2** Load the upgrade (.cab) file onto the SD card.
- 3** Insert the SD card into your mobile computer.

Contacting Intermec Product Support

You may need to call Intermec Product Support if you have problems operating the IP4. Before calling, be sure you can answer the following questions:

- What were you doing when the error occurred?
- What error message did you see?
- Can you reproduce the problem?
- What versions of the IP4 and RFID software are you using?
For help viewing software versions, refer to the mobile computer user's manual.

When you have gathered this information, call Intermec Product Support at 1-800-755-5505.

Alternatively, you can also search for answers on the intermec website.

To search for answers online

- 1** Go to www.intermec.com.
- 2** Click **Support > Knowledge Central > Find Answers**.
- 3** On the Find Answers page, enter criteria for your search.

Specifically, if you have questions on upgrading your IVA, enter “9059” in **Search by Keyword**, select **Answer#** from **Search by** and click **Search**.

A

Specifications

This appendix includes physical and electrical specifications for the IP4.

IP4 Specifications

Environmental Specifications

Specification	Value
Operating temperature	-20°C to 55°C (-4°F to 1°F)
Storage temperature	-30°C to 70°C (-22°F to 158°F)
Relative humidity	5 to 95% non-condensing

865 MHz Frequency

Specification	Value
Source type	4 channel selectable
Frequency band	865-868-MHz
Output power	Minimum = 26.0 dBm
0.5 W maximum	Typical = 26.5 dBm Maximum = 27.0 dBm

869 MHz Frequency

Specification	Value
Source type	Single Channel
Frequency band	869.525 MHz
EIRP/ERP	0.5 watt ERP
Output power	Minimum = 26.0 dBm
0.5 W maximum	Typical = 26.5 dBm Maximum = 27.0 dBm

915 MHz Frequency

Specification	Value
Source type	Frequency hopper
Frequency band	902-928 MHz

915 MHz Frequency

Specification	Value
EIRP/ERP	1 watt EIRP
Output power	Minimum = 28.5 dBm
1 W maximum	Typical = 29.5 dBm Maximum = 30.0 dBm

Performance

Specification	Value
RFID tag identification rate	At least six tags per second with one to ten tags in the RF field, located at half the maximum reading distances from the IP4 front panel.
RFID tag read distance	91 cm (3 ft)
RFID tag data exchange rates	Read a tag containing 8 bytes of data within 50 ms. Perform a verified write to tag at an average rate of 75 ms per byte per tag.

Firmware Architecture

Specification	Value
Firmware	Communicates in Basic Reader Interface (BRI) mode.
Protocol/Compatibility	ANSI NCITS 256.2000 for API, part 2, part 3-1

Reader Configuration Access Summary

Function	Control	Responsible Party
Change Country Code	Hardware key or configuration tag	Factory or Intermec Field Technician
Download updated firmware	Intermec-only password	Remote or on-site field technician
Setup, system configuration not secured at higher level, such as change battery or wake up default	Configuration file	Customer System Administrator



Worldwide Headquarters
6001 36th Avenue West
Everett, Washington 98203
U.S.A.

tel 425.348.2600

fax 425.355.9551

www.intermec.com

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IP4 Portable RFID Reader User's Guide



P/N 943-002-005