





Trimble[®] PDLConfig Utility

for the PDL450 Data Radio-Modem HPB450 Data Radio-Modem



NORTH AMERICA

Trimble Engineering & Construction Group 5475 Kellenburger Road Dayton, Ohio 45424-1099 • USA 800-538-7800 (Toll Free) +1-937-245-5154 Phone +1-937-233-9441 Fax

EUROPE

Trimble GmbH Am Prime Parc 11 65479 Raunheim • GERMANY +49-6142-2100-0 Phone +49-6142-2100-550 Fax

ASIA-PACIFIC

Trimble Navigation Singapore Pty Limited 80 Marine Parade Road #22-06, Parkway Parade Singapore 449269 • SINGAPORE +65-6348-2212 Phone +65-6348-2232 Fax



USER GUIDE

Trimble[®] PDLConfig Utility

for the PDL450 Data Radio-Modem HPB450 Data Radio-Modem

Version 1.00 Revision B P/N 51950-SVC May 2006



Corporate Office

Trimble Navigation Limited 749 North Mary Avenue PO Box 3642 Sunnyvale, CA 94085 USA www.trimble.com

E-mail: trimble_support@trimble.com
European Tech support:

+49 6142 2100 555

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Notices

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
 Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

 Consult the dealer or an experienced radio/TV technician for help.
 Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission rules.

Canada

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications. Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe B prescrites dans le règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

Europe

This product has been tested and found to comply with the requirements for a Class B device pursuant to European Council Directive 89/336/EEC on EMC, thereby satisfying the requirements for CE Marking and sale within the European Economic Area (EEA). Contains Infineon radio module ROK 104001. These requirements are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential or commercial environment.

Taiwan – Battery Recycling Requirements

The product contains a removable Lithium-ion battery. Taiwanese regulations require that waste batteries are recycled.



Notice to Our European Union Customers

For product recycling instructions and more information, please go to

www.trimble.com/environment/summary.html. Recycling in Europe: To recycle Trimble WEEE (Waste Electrical and Electronic Equipment, products that run on electrical power.), Call +31 497 53 24 30, and ask for the "WEEE Associate".

Or, mail a request for recycling instructions to: Trimble Europe BV c/o Menlo Worldwide Logistics Meerheide 45



Safety Information

Introduction

Before using a Trimble[®] PDL450 or HPD data radio-modem, make sure that you have read this User Guide, as well as all equipment and job site safety requirements.

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CAUTION – Use only approved accessories with this equipment. In general, all cables must be high quality, shielded, correctly terminated, and normally restricted to two meters in length. AC adaptors approved for this product employ special provisions to avoid radio interference and should not be altered or substituted. Unapproved modifications or operations beyond or in conflict with these instructions for use may void authorization by the authorities to operate the equipment.

USA Regulatory Information

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is used in a commercial or residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not used in accordance with this User Guide, may cause harmful interference to radio communications.

Operation of this equipment is subject to the following two conditions:

- The device may not cause harmful interference.
- The device must accept any interference received, including interference that may cause undesired operation.

Cautions

Always follow the instructions that accompany a Warning or Caution. The information they provide is intended to minimize the risk of personal injury and/or damage to the equipment. In particular, observe safety instructions that are presented in the following formats:



WARNING – A Warning alerts you to a likely risk of serious injury to your person and/or damage to the equipment. A warning identifies the nature of the risk and the extent of possible injury and/or damage. It also describes how to protect yourself and/or the equipment from this risk. Warnings that appear in the text are repeated at the front of the service manual.



CAUTION – A Caution alerts you to a possible risk of damage to the equipment and/or loss of data. A Caution describes how to protect the equipment and/or data from this risk.

Safety Information

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CHAPTER

1

Introduction

In this chapter:

- About the data radio-modems
- Part number history
- Related information
- Technical Assistance

This reference manual is for Trimble Service Providers and describes how to use the Trimble PDLConfig utility to configure and troubleshoot the Trimble PDL450 & HPB data radiomodems.

Trimble recommends that you read this manual to learn about the special features of these products. The PDL450 and HPB data radio-modems are almost identical in operation, though the HPB modem has a different form factor.

In this manual, references to the PDL450 data radio-modem also apply to the HPB data radio-modem, unless otherwise stated.

About the PDL Config utility

The radio office kits currently ship with the PDLConfig utility version 2.42. However, the dealer version of the PDLConfig utility version 4.0 is available on the Trimble Partners website. The customer version is available in the support section of www.trimble.com. Version 4.0 is compatible with the Microsoft[®] Windows[®] XP operating system, and some issues from the previous version are resolved. Trimble recommends that you download the latest version from the appropriate Trimble website.

About the data radio-modems

The Trimble PDL450 & HPB data radio-modems are the Trimble version of the Pacific Crest Corporation PDL450 radio-modem. They provide a low cost alternative in the radio market and an advanced, high speed, wireless data link for use in GPS/RTK applications. The features and benefits include:

- Interoperability with Trimble land survey products:
 - Provides an upgrade path for existing applications
 - Functions with the Pacific Crest Corporation PDL family of products
- Fast over-the-air data rate (19,200 bits per second)
- Low power consumption, which enables longer field operation
- Rugged construction:
 - Designed specifically for GPS/RTK field use
 - Double shock-mounted electronics
 - Waterproof housing

Part number history

Trimble first released the PDL450 radio-modem in 2004 for the European survey market. These radio-modems operate within a 10 MHz frequency range.

The last two sections of the part number (-*XX*-*XX*), specify the frequency range and power/bandwidth of the radio-modem.

For example, the part number 52085-50-00 identifies a top level kit that contains the radio kit P/N 51800-50-00, which in turn contains radio P/N 51950-50-00. The -50 shows that the radio has a 450-460 MHz frequency range and the -00 shows that it has a 2 W/25 KHz power/bandwidth.

Available frequency ranges	Available power range/bandwidth (modulation)
-30: 430-440 MHz	-00: 2 W/25 KHz
-40: 440-450 MHz	-01: 2 W/12.5 KHz
-50: 450-460 MHz	-10: 0.5W/25 KHz
-60: 460-470 MHz	-11: 0.5W/12.5 KHz

2004 European survey market release

Top level kit series: P/N 52085-XX-XX

All top level kits contained the following radio kit, the field kit P/N 51880-00 and the office kit P/N 52800-00.

- Radio kit series from the above kit: P/N 51800-XX-XX
 - Radio (part number on the radio): P/N 51950-XX-XX

2005 release

For 2005, Trimble began phasing out the 2004 version of the PDL450 radio-modem and introduced a new version that has a 20 MHz frequency range and a standard *Auto Power On* feature. This feature enables the radio-modem to automatically turn on when you apply power. You can manually turn off the radio-modem through the on/off switch. The new radio-modems are available world-wide from both the Survey and Agriculture divisions of Trimble. They have the following part numbers.

PDL450 radio-modem: Survey version

Available frequency ranges	Available power range/bandwidth (modulation)
-42: 410-430 MHz	-00: 2W/25 KHz,
-44: 430-450 MHz	-01: 2W/12.5KHz
-46: 450-470 MHz	-10: .5W/12.5KHz
	-11: .5W/25KHz

Top level kit series (Survey): P/N 56450-XX-XX

All top level kits contain the following radio kit, the field kit P/N 51880-00, and the office kit P/N 52800-00.

- Radio kit series from the above kit: P/N 56020-XX-XX
 - Radio (part number on the radio): P/N 56013-XX-XX

PDL450 radio-modem: Agriculture version

These use the same frequency range and power/bandwidth matrix as the Survey versions. They are available as base station kits and repeater kits. For more information about these systems, consult the Trimble list of products.

Top level kit P/N series (Agriculture)

- 56395-XX-XX Base station kit
- 567165-XX-XX Repeater kit
 - Radio (part number on the radio): P/N 56377-XX-XX

There is no upgrade available to convert the frequency range from 10 MHz to 20 MHz. If the customer requires a 2005 radio-modem for their application, they must order a new unit. They must also correctly specify the frequency range and bandwidth when they order the radio-modem because these are hardware specific.

Top level kit series (Survey): P/N 56450-XX-XX

All top level kits contain the following radio kit, the field kit P/N 51880-00, and the office kit P/N 52800-00.

- Radio kit series from the above kit: P/N 56020-XX-XX
 - Radio (part number on the radio): P/N 56013-XX-XX

HPB450 radio-modem: Survey version

The HPB450 radio-modem has a different form factor that efficiently handles the heat generated by its 35 W power capabilities. These radio-modems operate and are configured exactly the same as the PDL450 radio-modem except that they can operate at 35 W or 2 W. They are currently available under the following part numbers.

Radio (part number on the radio): P/N 56651-XX-XX

Available frequency ranges	Available power range/bandwidth (modulation)
-42: 430-450 KHz	-00: 2 W/25 KHz
-44: 450-460 KHz	-01: 2 W/12.5 KHz
-46: 460-470 KHz	

Top level kit series: P/N 56666-XX-XX

All top level kits contain the following radio, the the field kit P/N 51880-00, and the whip antenna assembly (P/N 51870-50-70).

- Radio (part number on the radio): P/N 56651-XX-XX
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Related information

Sources of related information include the following:

- Help the PDLConfig utility has built-in, context-sensitive help that enables you to quickly find the information you need. To access it, click Help.
- The PDL-Config 4.0 CD (P/N 524703-03) that comes in every Survey series 56020-XX-XX retail kit contains both a User Manual and an Accessories Manual.
- Trimble training courses Consider a training course to help you use your GPS system to its fullest potential. For more information, go to the Trimble website at www.trimble.com/training.html.

Technical assistance

If you have a problem and cannot find the information you need in the product documentation, *contact Trimble Technical Support*.

- 1. Go to the Trimble website (www.trimble.com).
- 2. Click the **Support** button at the top of the screen. The Support A–Z list of products appears.
- 3. Scroll to the bottom of the list.
- 4. Click the submit an inquiry link. A form appears.
- 5. Complete the form and then click Send.

Alternatively, you can send an e-mail to trimble_support@trimble.com

For the latest information, go to http://partners.trimble.com/.

1 Introduction

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Specifications

In this chapter:

- Specifications
- Display and LED indicators

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Specifications

Unless otherwise noted, specifications are the same for the PDL450 and HPB data radio-modems.

Physical specifications

PDL450

Size	8.25 inch L x 2.40 inch D (21.0 cm L x 6.1 cm D)
Weight	0.65 Lbs (0.30 Kg)
Mount	5/8 inch range pole
Interface connector	5-pin Lemo #0 Shell

HPB

Size	6.23 inch W x 2.77 inch H x 6.58 inch L (15.8 cm W x 7.0 cm H x 16.7 cm L)
Weight	2.96 Lbs (1.34 Kg)
Mount	Tripod bracket
Interface connector	5- pin Lemo #1 Shell

Electrical specifications

Voltage Input	9 - 16 VDC
Power consumption PDL450	Receive: 0.9 W Transmit: 11 W at 12.5 VDC
Power consumption HPB	Receive: 1.9 W Transmit: 110 W at 12.5 VDC
Serial interface	RS232: 1200 - 38400 Baud, 1 start bit, 8 data, optional parity, and 1 stop bit.
Antenna output impedance	50 Ohms
Front panel indicators	PWR, TX & RX LEDS, channel display window On/Off Switch. HPB has 3 W/35 W power switch.

Environmental specifications

Operating temperature	-22 - 140 °F (-30 - 60 °C)
Storage temperature	-67 - 185 °F (-55 - 85 °C)
Shock and vibration	Per ANSI/ASAE EP455
Protection	Per IEC 144/85520 I.P. 66, dust & air tight

Radio-modem performance

Modes	Base, Repeater, Rover, Auto
Frequency control	Synthesized 12.5 KHz resolution ±2.5 ppm
Frequency bands	See current Trimble Catalogue for frequency bands available.
Transmission protocols	Transparent, packet switched, auto-repeater, fast asynchronous, TRIMTALK™
Link rate/modulation	4800 & 9600 bps/GMSK, 9600 & 19200 bps/4 GMSK
RF transmit out	PDL450: 0.5 - 2 W; HPB 3/35 W Max, range switch
Sensitivity	-116 dBm (12 dB SINAD)

Display and LED indicators

Numeric display

The seven-segment numeric display shows which channel or mode is selected. To conserve power, the display is lit only for a short time after you press the CHANNEL or ON/OFF button. Channel selections range from Channel 0 to Channel 15. To show two-digit channel numbers, the display alternately flashes "1" then the second digit.

Power LED

The power LED is lit when power is turned on, and shows the power status. The LED blinks when the external power supply is at low voltage.

If the power LED does not respond to the ON/OFF button, check the external power supply.

• Receiver LED

The receiver (RX) LED indicates that the PDL450 data radio modem is receiving an RF carrier signal from another PDL450 base or from another source of interference. During normal operation, the RX LED will flash at a once-per-second rate indicating the transmissions from the PDL450 Base. If the RX LED is on continuously, then a source of interference may be impacting the ability of the PDL450 data radio modem to receive data. Try repositioning the antenna, or you may need to change to another channel at both the base and repeater to reduce or eliminate the interference.

• Transmitter LED

The transmitter (TX) LED indicates that the PDL450 data radio-modem is broadcasting. In most GPS RTK applications, the TX LED will flash approximately once per second.

CHAPTER

3

Interfacing to the Computer

In this chapter:

- Setting up
- Installing the PDLConfig utility
- Setting up the Com Port
- Interface capture
- Activating the PDLConfig utility
- Troubleshooting the computer interface
- Upgrading the firmware

The CD-ROM that customers receive when they purchase the PDL450 and HPD retail kit contains a downscaled version of the PDLConfig utility.

To achieve full service provider level configuration options in the PDLConfig utility, authorized Trimble service providers can download the *dealer* version from the Trimble Partners website.

From the *Survey*/*PDL450 Radio*/*Service*/*Service Downloads* section, download the file *Install_TNLCONFd_x.xx.exe*. In the filename, "*d*" identifies this as the dealer version, and "*x.xx*" shows the version number of the utility.

Setting up

To use the PDLConfig utility, you need the following items:

- The I/O cable P/N 51861-00 (from office kit P/N 52800-00)
- The battery charger P/N 51589 or P/N 51856-00 (from office kit P/N 52800-00)
- The file *Install_TNLCONFd_4.00.zip* (download from the Partners website, if required)
- An office computer with an available COM Port, and the following minimum requirements:
 - 486 MHz processor or higher
 - Microsoft Windows 98 operating system or later
 - Minimum of 250 MB RAM
 - CD-ROM drive (if installing from a CD)

Connecting the radio-modem to the computer

Do the following. See Figure 3.1.

- 1. Plug the power cable connector on the I/O cable into the power connector of the battery charger.
- 2. Insert the AC adaptor plug into an AC outlet.
- 3. Plug the DB9 serial port cable into the COM port of the computer.
- 4. Plug the Lemo connector into the radio-modem.



Figure 3.1 Connecting the radio-modem to the computer

Installing the PDLConfig utility

- 1. Unzip the downloaded file *Install_TNLCONFd_4.00.zip* to a directory of your choice.
- 2. In that directory, double-click the file *Install_TNLCONFd_4.00.exe*.
- 3. Follow the prompts as the installation wizard places the program files in the directory *C:\programfiles\PCC\PDLCONF4.0\Dealer*.
- 4. The installation program creates a desktop shortcut named *Trimble PDLCONF Dealer Version 4.00.*

Setting up the Com Port

1. Run the PDLConfig utility. The first time you start the utility, the *Select Serial Port* dialog prompts you for the COM port that you want to use. If that dialog does not appear, click the PDL icon:

PDL	PdlConf for Trimble	Dealer				_ 🗆 🗙
	Move		· ·			
-	Minimize		Radio Link	Serial Interfa	ace Frequencies Memory Map	
×	Close	Alt+F4	formation			
	Select Serial Port Set Capture Method	+	Model:		Frequency Range:	
	Upgrade modem firmw	are	Revision:		Power:	-
	About PDLCONF		Modem ID:		Channel Bandwidth:	
	Program					
	Close	Seri	al Number:		Call Sign:	
		Owner:				
	Print					
	Exit		Undo C	hanges	Factory Defaults	

- 2. Choose Select Serial Port.
- 3. Select a COM port from the list in the dialog that appears and then click **OK**.

Interface capture

To establish serial port communication with the radio-modem, use one of the following methods.

Power on capture

This is the recommended way to ensure that serial port handshaking can be established.

- 1. In the main dialog of the the PDLConfig utility, click **Load**.
- 2. *Within 10 seconds*, turn on the radio-modem.

The radio-modem immediately polls for handshaking.

This method forces COM port settings of 9600 baud and a parity of none.

Soft break

On the *Serial Interface* tab, the *Soft Break Enabled* setting is on by factory default. To establish RS232 handshaking, this feature searches through different baud rates until it finds the one that the radio-modem is set at, without requiring the power to be recycled.

For this feature to operate correctly, set parity to none.

Selecting a capture method

- 1. In the main dialog of the PDLConfig utility, click the PDL icon in the top left corner.
- 2. Click Select Capture Method.
- 3. From the drop-down menu that appears, select a method.

The selected method has a check mark next to it.

Activating the PDLConfig utility

- 1. Make sure that the radio-modem is turned off.
- 2. Run the PDLConfig utility and then click **Load**.
- 3. Respond as required to one of the following:
 - If you are using the *Power On Capture* method, the utility prompts you to turn on the radio-modem.
 - If you are using the *Soft Break* capture method, the utility reports that it is searching baud rates to capture the modem.

Once a baud rate is synchronized, the utility reports that it is reading the radio-modem settings. When communication is established, information appears in the screens on the *Identification* tab.

Troubleshooting the computer interface

If the radio-modem is working correctly, the PDLConfig utility can establish communications. If the interface is not successful, try one or more of the following:

- Whichever capture method you are using, try the other one.
- Make sure that the interface and power cables are correctly connected.
- Make sure that the power source is working and that the radio-modem is turned on.
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• Check for any error codes flashing on the radio-modem.

An error code appears on the display as "E" followed by a number. Error codes do not normally prevent the computer interface from working, and the *Power On Capture* method should always synchronize with the computer.

- Make sure that the Microsoft ActiveSync[®] technology is disabled. You may need to then reconfigure it so that it does not load when you start the computer. Restart the computer and then run the PDLConfig utility again.
- To test whether it is the radio-modem or the computer interface that is not working, try interfacing the computer with a known good radio-modem.

Upgrading the firmware

To upgrade the firmware, you must use the PDLConfig utility:

- 1. Download the latest firmware files from the Trimble Partners website.
- 2. Save the file in the same directory as the PDLConfig utility (normally, *C:\programfiles\PCC\PDLCONF4.0\Dealer*). You cannot upgrade the firmware until this file is in the correct folder.
- 3. From the main, click the PDL icon.
- Select Upgrade Modem Firmware. The directory C:\programfiles\PCC\PDLCONF4.0\Dealer appears with the available firmware files. If this directory does not appear automatically, click Browse and then locate it yourself.
- 5. Highlight the firmware file that you want to program into the radio-modem and then click **Open**.
- 6. When prompted, click **Yes** to confirm the file to copy into the radio-modem.

A progress bar appears while the file is being transferred.



CAUTION – Do not interrupt the power once programming begins. If you do so you may interrupt the programming of the boot instructions and the radio will no longer work.

7. Once programming is complete, click **OK** in the dialog that appears.

Firmware Upgrade Complete 🛛 🔀				
Firmware revision 2.40 written to modem.				
OK				

8. Click **OK** in the dialog that appears.



The Identification screen appears.

9. Manually turn off and then turn on power to the radio-modem.

CHAPTER

4

Using the PDLConfig Utility

In this chapter:

- Identification tab
- Radio Link tab
- Serial Interface tab
- Frequencies tab
- Memory Map tab

The PDLConfig utility version 4.0 includes help that describes the setup features. To access it, click **Help**. Because the help gives complete descriptions of each field, this chapter only contains additional information that may not be apparent.

The dealer version of the PDLConfig utility version 4.0 contains *Frequencies* and *Memory Map* setup tabs, which are not available in the user version.

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Identification tab

📴 PdlConf for Trimble	e - Dealer	
		(and Englanding Managemetrics)
		ace riequencies Memory Map
	Model Information	i
	Model: PDL LP Base	Frequency Range: 460-470 MHz
Help	Firmware Revision: 2.40	Power: 0.5 Watts
	Modem ID: 1038-7	Channel Bandwidth: 25 K
Program	Serial Number: 04364955	Call Sign:
Close	,,	
	Owner:	
Print		
Exit	Undo Changes	Factory Defaults

The information on this screen does not appear until you click **Load** and then establish a successful interface.

All of the information is for references purposes only, except for *Call Sign* and *Owner*, which can be manually entered in both the user and the dealer versions of the PDLConfig utility.

Call Sign

The FCC and other governing regulatory commissions may require radio operators to obtain a license and use an identifier (call sign). This entry can be up to ten digits long. When this field contains an entry, the call sign is broadcast every 15 minutes in Morse code. When the field is blank, no call sign is broadcast.

• Owner

This field can contain the name of the company or the owner. It can also be left blank without affecting radio-modem operation.

Channel Bandwidth

This information is hardware specific and cannot be changed by a dealer. The customer must specify the bandwidth at time of purchase.

Radio Link tab

📴 PdlConf for Trimble	e - Dealer			
	Identification Radio Link	Serial Interface	Frequencies	Memory Map
Trimble	Channel Select	Channel	TX 470.0000	BX
Help	AutoBase: O AutoRover: O		mport Channel 1	able
Load	Link Rate: 48	00 💌	Forward El	rror Correction: 🔽 Scrambling: 🔽
Program	Modulation Type: GN Digisquelch: Hi	4SK <u>▼</u> gh ▼	(CSMA Monitor: 🔽
Close	Transmit Retries:	3	Local Add	ress:
Print	TX ACK Timeout:	0.1	Remote Add	ress; 255
Exit	Undo C	hanges	Factory D	efaults

The *Radio Link* tab settings affect the way the radio-modem operates.

Channel Select

This group is closely linked to the settings on the *Frequencies* tab. When more then one frequency channel is programmed into the channel table, and you have a customer who wants the radio-modem to always start with a default channel when they select *AutoRover* or *AutoBase*, do the following.

Note - Customers can also do this with the user version of the PDLConfig utility.

- a. Select the *Manual* check box.
- b. From the drop-down list, select the channel you want as the default.
- c. Select the *AutoBase* or *AutoRover* check box as required.
- d. Click **Program** to save the settings.

The easiest and simplest way to use these radio-modems is to keep them in manual mode at the specific channel that you want to use.



CAUTION – Incorrect setup of the Frequency Table on the *Frequencies* tab, combined with an incorrect selection on the *Channel* tab, can cause an error code to appear on the front display. For example:

- If you import a frequency table that contains frequency channels that are out of range for that particular model of radio-modem.

- If there is no RX frequency programmed on a channel, and that channel is selected to be the default, setting the radio-modem to AutoRover causes Error 16. For more information, see Error codes, page 30.

Link Rate

This is the baud rate used when communicating over-the-air between radio-modems. This is not the same as the baud rate setting used to interface with the computer. This setting must match each radio-modem being used in your system. • Modulation Type

This field is unavailable and cannot be changed when *TRIMMARK II/IIE* or *TRIMTALK 450* is selected in the *Protocol* group on the *Serial Interface* setup tab. All other radio-modem protocol settings allow you to change this field.

Disquelch

This setting varies according to whether the radio-modem is being used as a base, rover, or repeater. For more information, see Chapter 5, Radio-Modem Interface Setup.

Serial Interface tab

📴 PdlConf for Trimble	e - Dealer
	Identification Radio Link Serial Interface Frequencies Memory Map
Strimble	Port Baud Rate: 9500 Soft Break Enabled: Parity: None Data Security Code: 00000000
Load Program Close	Protocol Mode: TrimMark II/IIe BREAK to Command: Repeater: EOT Count: 20 Digipeater Delay: 0.00
Print Exit	Undo Changes Factory Defaults

Port group

Baud Rate and Parity

This is the baud rate of the radio-modem's COM port. Match these to the speed and parity needed to interface to the computer COM port.

Modem Enabled

This setting is enabled by default (the check box is selected). The setting is not available in the customer version of the PDLConfig utility. If this check box is not selected, the radio-modem does not operate.

Protocol group

Mode

For correct operation, you must select the appropriate protocol for the device you are interfacing with. For older Trimble devices, choose either *TRIMMARK I/IIe* (4800 baud only) or *TRIMTALK450*. For more information, see Chapter 5, Radio-Modem Interface Setup.

EOT Count

This is the time the radio-modem waits before sending the next packet. For optimum use, keep this setting at 5 ms, regardless of whether the unit is being used as a base, rover, or repeater. For more information, see Chapter 5, Radio-Modem Interface Setup.

Frequencies tab

PdlConf for Trimble	- Dealer		
	Identification B	adio Link Serial Interface Fre	equencies Memory Map
Trimble			
	Channel	TX Frequency (MHz)	RX Frequency (MHz)
	0		
	1		
Help	2		
	3		
Load	4		
	5		
Program	6		
Close	7	464.0000	464.0000 👽
	,		
	Export Channe	el Table 📔 Import Channel Tab	ole Clear Channel Table
Print			
Exit		Undo Changes	Factory Defaults

This is the tab you may need to use most often, for example to create and export a frequency channel table for a customer. Customers may request a different table for different projects. Details on how to perform some common tasks are described below.

Frequency channel(s): Adding to an existing list

To *save* any changes or additions, you must click **Program**.

To add another frequency to an existing list, ask the customer which channel and frequency they require. Key points to consider are:

- If you are interfacing the PDLConfig utility directly to the customer's radio, enter the new frequency into the channel the customer specifies.
- If you enter a frequency within the radio's frequency range, the entry remains **Black**.
- If you enter a frequency outside the radio's frequency range, the entry turns **Red**.



CAUTION – If the frequency you enter remains red, *do not* click **Enter** and then continue to program the radio. If you do, Error 16 (E16) flashes on the front display screen when you resume normal operation. You must then connect to the PDLConfig utility again and enter a frequency that is within the radio's range. For more inforamtion, see Error codes, page 30.

- If you overwrite a valid frequency on that channel, when you click Enter, the entry reverts to the previous frequency rather then accepting the wrong one.
- If the channel was blank, the field accepts an out-of-frequency-range entry.
 When you click **Enter**, the entry changes from red to black.
- Trimble recommends that you enter the same frequency in both the TX and RX fields, rather then leave one of those fields blank.

Frequency channel(s): Removing from an existing list

To *save* any changes or deletions, you must click **Program**.

To remove a frequency, delete the entries from the TX and RX fields of the channel you want to change. The **Program** button becomes available so that you can re-program the unit.

Generating a channel list with the PDLConfig utility

To generate a new frequency list and then e-mail it to a customer, use the *Frequency* tab and the **Export Channel Table** button. To ensure that you create a channel table that will work with the customer's radio, consider the following:

- Obtain the model, part number, and serial number of the radio-modem from the customer. Verify that the frequencies the customer wants you to put in the channel table are within the frequency range of their radio.
- If you use the PDLConfig utility as a stand-alone channel table generator, you must determine the frequency range of the customer's radio from the information obtained above. Otherwise, the PDLConfig utility cannot determine the frequency range of the radio you are creating the channel table for. If you write a frequency that is out of range for that customer's radio, the PDLConfig utility still programs it into the radio.
- To remove a frequency from a channel, enter a zero in the *TX* and *RX* fields of that channel.
- To place a different frequency on a channel that is already being used, enter the new TX and RX frequency on the channel they want to be changed.
- Channels with no entries will not blank out any channels on their radio that already contain a frequency.
- When you export the file, Trimble recommends that you enter the serial number of the customer's radio-modem into the *Filename* field. However, once you save the export file, you can then rename it as required through Microsoft Windows Explorer.
- When you import a Channel Table file, as long as the filename has the *.upg* extension, the PDLConfig utility and the radio-modem accept the file, even if the filename is not the serial number or is alphanumeric.

Example 1

A customer currently has a frequency channel table with 7 different frequencies on their radio, and they request an additional frequency of 470 MHz to be added to channel 3. Create a channel table to look like the following example. Note that all the other frequencies are blank.

📴 PdlConf for Trimble	- Dealer		
	an an a la		
	Identification H	adio Link Serial Interface Fr	equencies Memory Map
Trimble			
	Channel	TX Frequency (MHz)	RX Frequency (MHz) 🔼
	0		
	1		
Help	2		
	3	470.00	470.00
Load	4		
	5		
Program	6		
Close	7		~
Print	Export Channe	el Table Import Channel Tal	clear Channel Table
			4
Exit		Undo Changes	Factory Defaults

Example 2

A customer currently has a frequency channel table with 7 different frequencies on their radio, and they request that you program channel 3 with a frequency of 470 MHz and program the remaining channels with no frequency. Create a channel table to look like the following example. Note that all the other frequencies have a zero in them. Once the customer imports a file, the zeros blank out the channels on the radio.

📴 PdlConf for Trimble	e - Dealer			
	Identification R	adio Link Serial Interface Fr	equencies Memory Map	
Strimble (Channel	TX Frequency (MHz)	RX Frequency (MHz)	
	0	0	0	
Help	2	0	0	
	3	470.00	470.00	
Load	4	0	0	
	5	0	0	
Program	6	0	0	
Close	7	0	0	~
Print	Export Channe	el Table Import Channel Tal	clear Channel Tab	le
Exit		Undo Changes	Factory Defaults	

Importing a channel table

When you import a frequency channel table, consider the following:

- In the dealer version of the PDLConfig utility, there is an **Import Channel Table** button on the *Frequencies* tab. In the customer version, the **Import Channel Table** button is on the *Radio Link* tab.
- When you import a channel table, if the new table affects the channel that was the default setting, you must select a new default frequency on the *Radio Link* tab to enable the **Program** button so that you can program the changes.

Memory Map tab

CAUTION – Do not change the memory map, unless directed to do so by a technical support person. See Factory default settings, page 26.

💀 PdlConf for Trimble	- Dealer										
	Identification Ra	dio Link Se	erial Int	erface	Fre	quenci	ies N	1emorg	/ Мар]	
Trimble	Print	0×0100	03	B9	18	75	29	88	00	42	^
		0×0108	9A	9B	B9	00	00	00	00	00	
		0x0110	00	00	00	00	00	00	00	00	
Help		0×0118	00	00	00	00	00	00	00	00	
		0x0120	00	00	00	00	00	00	00	00	
		0x0128	00	00	00	00	00	00	00	00	
Load		0x0130	00	00	00	00	00	02	88	08	
Program		0x0138	02	44	00	00	00	00	00	00	
		0x0140	00	00	00	00	00	00	00	00	
Close		0x0148	00	00	00	00	00	00	00	00	
		0x0150	00	00	00	00	00	00	00	00	
Print		0x0158	00	00	00	00	00	00	00	00	~
Exit		Undo Char	ges			Fact	ory De	efaults			

CHAPTER

5

Radio-Modem Interface Setup

In this chapter:

- Radio-Modem pinouts
- Factory default settings
- Common radio-modem settings
- Base setup
- Repeater setup
- Rover setup

This chapter describes how to configure a PDL450 or HPD radio-modem to work as a base, rover, or repeater. On the *Serial Interface* tab of the PDLConfig utility, select either the TRIMMARK II/IIe or the TRIMTALK[™] 450S mode in the *Protocol* drop down menu, according to the Trimble radio-modem you are interfacing to.

Radio-Modem pinouts



Factory default settings

In a new radio-modem, all settings are at the factory defaults. In addition, if you press the **Default** button in the PDLConfig utility and then program the radio-modem through the **Program** button, the settings revert to the factory defaults. To clear the frequency table, press the **Clear Channel Table** button on the *Frequencies* tab.

Any user settings that can be changed in either the customer version or the dealer version of the PDLConfig utility also change the corresponding address in the memory map. If you press **Default** and then press **Program**, the address fields are permanently changed to their default values.

However, there are many addresses in the memory map that are not changed through the user interface.

If one of these fields has been programmed and you then press **Default** and **Program**, the field settings do not change to their previous values. This is why Trimble strongly recommends that you do not change any memory map fields

Setting	Factory default
Identification Tab	
Call Sign	Blank from the factory. Must be manually cleared.
Owner	Blank from the factory. Must be manually cleared.
Radio Link Tab	
Channel Mode	Manual
Default Channel Field	Channel 0
	Note – If Channel 0 is blank, it could cause RX frequency error code E16 to appear.
Link Rate	4800 bps (raw data)
Modulation	GMSK
	Note – If the Protocol Mode on the Serial Interface tab is set to TRIMTALK 450s, this field is automatically set.
Disquelch	Moderate
	Note – If the Protocol Mode on the Serial Interface tab is set to TRIMTALK 450s, this field is automatically set.
Transmit Retries	3
TX ACK Timeout	0.10
FEC	Enabled
Data Scrambling	Enabled
CSMA	Enabled
Address (Local)	0 (or blank)
Address (Remote)	255
Serial Interface tab	
GPS Port Data Rate	9600 Baud
Parity	None
Modem Enabled	Enabled
Soft Break Enabled	Enabled
Data Security Code	0000000
Mode	TRIMTALK 450s
EOT Count	5
Break-To Command	Off
Repeater	Off
Digipeater delay	0.0
Frequencies Tab	This is based on the radio-modem part number.
Memory Map Tab	There is no specific default for this tab. Do not change any data in these fields.

Radio-modem default settings

Common radio-modem settings

5

Typical settings for PDL450 and HPB radio-modems to interface with Trimble products

-	
Base	setup

- Serial Interface tab
 - Protocol mode TRIMMARK II/IIe or TRIMTALK 450S

Note - Match the protocol to whichever Trimble radio-modem you are interfacing to.

EOT Count

Radio Link tab

Link Rate 4800 or 9600

Note – This is preset when you select TRIMMARK II/IIe or TRIMTALK 450S as the protocol mode in the Radio Link tab.

Disquelch Low

Repeater setup

Serial Interface tab

Protocol mode TRIMMARK II/IIe or TRIMTALK 450S

Note – Match the protocol to whichever Trimble radio-modem you are interfacing to.

EOT Count 5 ms (factory default)

Select the *Repeater* check box.

Note – EOT is the amount of time that the modem waits before sending the next packet. When you use the radio-modem as a repeater, this default value does not apply.

• Radio Link tab

Link Rate 4800 or 9600

Note – This is preset when you select TRIMMARK IIIIe or TRIMTALK 450S as the protocol mode in the Radio Link tab.

Disquelch High

Rover setup

You can set up the radio-modem as a rover to receive base signals from a TRIMMARK II/IIe or TRIMTALK 450S radio.

Serial Interface tab

Protocol mode TRIMMARK II/IIe or TRIMTALK 450S

Note - Match the protocol to whichever Trimble radio-modem you are interfacing to.

EOT Count 5 ms (factory default)

Note – EOT is the amount of time that the modem waits before sending the next packet. When you use the radio-modem as a rover, this default value does not apply.

To carry out a DTE to DCE interface, make sure that the port settings are:

Baud rate 38,400

Parity None

Radio Link tab

Link Rate 4800 or 9600

Note – This is preset when you select TRIMMARK II/IIe or TRIMTALK 450S as the protocol mode in the Radio Link tab.

Disquelch High

CHAPTER 6

Troubleshooting

In this chapter:

- Error codes
- Most common failures and possible causes

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Error codes

If an error code appears, turn off the radio-modem and then turn it on again. If the error code persists, do the following:

- 1. Check the channel table settings.
- 2. Contact Trimble technical support for assistance.

Description of error codes

Code	Description	Notes
E01	External voltage too high	
E02	External voltage too low	
E03	External volatage too low for transmission	
E04	Rover internal battery requires replacement	
E05	Rover internal battery charge current too high	
E06	Rover internal battery charge current too low	
E07	Unit temperature exceeds safe limit for 35 W operation	Only HPB radio-modem
E08	Unit temperature exceeds safe limit for 2 W operation	
E09	Current consumption too high for 35 W operation	
E10	Current consumption too high for 2 W operation	
E11	Checksum Error	See Most common failures and possible causes, page 31 #4
E12	Ram Error	
E13	MCU Config register error	
E14	FLASH	
E15	Transmit synthesizer not locked	See Most common failures and possible causes, page 31 #3
E16	Receive synthesizer not locked	See Most common failures and possible causes, page 31 #1
E18	Battery not charging	See Most common failures and possible causes, page 31 #2
E19	EEPROM write error	

Action to take

Codes	Do one or more of these
E01 - E03	Check the battery or power supply voltage level
	Check the power cables
	Recharge or replace the battery
	Check the battery charger
EO7 - E10	Check the antenna and antenna cables
	Use 19,200 link rate to reduce duty cycle
	Select low RF power
EO4 - E06	Contact Trimble technical support
E11 - E16	
E99	

Most common failures and possible causes

- #1 E16 Receiver Synthesizer not Locked
 - Incorrect or missing setting in the frequency channel table. For example, if a customer enters a TX frequency and either no RX frequency, or an out of range RX frequency.
 - No frequency entered for the default channel. For example, when the channel defaults to zero after a factory reset.
- #2 E18 Battery not Charging
 - Only in a radio, such as a rover, that has an internal battery. The PDL 450 radio-modem is not affected because it does not have an internal battery.
 - The customer's battery charger may not be plugged into an AC source.
- #3 E15 Receiver Synthesizer not Locked
 - Out-of-range or missing frequency in the TX field of the selected channel.
 - Incorrect data in one of the memory map fields. If the values in the channel table do not relate to the frequency range of the radio, then the memory map may be corrupted. Contact Trimble technical support.
- #4 E11 Checksum Error

To correct this, reprogram the firmware. Otherwise, contact Trimble technical support.

6 Troubleshooting