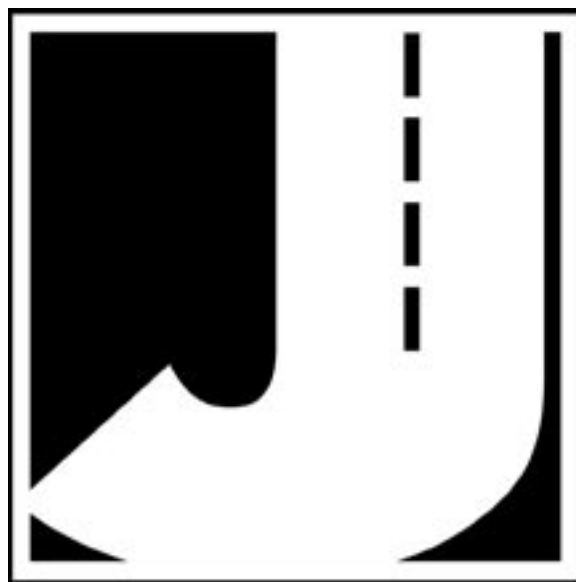


TRAXPDA

Portable Data Retrieval and Verification



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877-603-5844

Monday – Friday 8:00 AM to 5:00 PM Eastern time

You may also contact us by fax at:

1-215-491-4889

or via e-mail at:

support@jamartech.com

For more information on our products, the latest news in product development, and to download software updates, visit our web site at:

www.jamartech.com

For information on all known issues with TRAXPDA, go to:

www.jamartech.com/traxpdasupport.htm

Address any correspondence to:

**JAMAR Technologies, Inc.
151 Keith Valley Road
Horsham, PA 19044-1411**

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Chapter 1



Introduction and Installation

Introduction

What is TRAXPDA?

Welcome to TRAXPDA, a JAMAR Technologies software program designed to run on a Personal Digital Assistant (PDA). TRAXPDA works in conjunction with JAMAR's line of TRAX automatic traffic data recorders and TRAXPro software to make retrieval of traffic data a more convenient and reliable process. With TRAXPDA software running on your choice of PDA, it is possible to download and validate data from multiple TRAX recorders without taking them back to the office.



Figure 1-1:
TRAXPDA
Splash Screen

The primary job of TRAXPDA is to retrieve the data in your TRAX recorders and get that data into TRAXPro back in your office. However, because it runs on a PDA, TRAXPDA can do much more. The use of a PDA also gives you a good deal of processing power in the field. With TRAXPDA, your data is not only stored, but it is also checked for errors. This on-the-spot validation will let you know that something is wrong before you leave the study site, giving you the opportunity to find any problems with the TRAX setup. Once the source of the error is located (i.e. water in the road tube), it can be rectified and another study can be started if needed. You don't ever want to have to re-do a study, but it is better to find out in the field when the tubes are still in place rather than back in the office.

Supported PDAs



Important

TRAXPDA currently runs on Pocket PC based PDAs. It does not currently support Palm PDAs. In general, almost any Pocket PC version PDA made in the last couple of years should work. There are several companies that sell Pocket PC PDAs, with the most popular being those made by Dell Computers (the Dell Axim series) and Hewlett Packard (the Ipaq series). Regardless of brand, Pocket PC PDAs look very much the same since they run the same operating system.

Choosing which PDA is right for you can be complicated because there are many different features available that aren't necessarily needed for TRAXPDA, but they may still be useful to you for other applications. To make things a little easier, we have a web site for TRAXPDA support where we have information on PDAs, among other things. Point your browser to www.traxpda.com. We try to keep the information on this support web site as current as possible. If you can't find any information on the support web site about the PDA you are considering, then call us and we'll research that PDA and tell you what we find.

Software Updates

Updated versions of JAMAR software are released periodically and are posted on the JAMAR web site. Licensed owners of TRAXPDA may download updates to the program to make sure they always have the latest version of the software on their computer. To download the latest version of TRAXPDA, go to www.jamartech.com and then select Downloads from the list of options.

Software Support

If you encounter any problems while using the program, or have any questions on specific operations, refer first to this manual and the program's built-in Help system. For up to the minute information on all known issues with the program, refer to the TRAXPDA support web page at: www.jamartech.com/traxpdasupport.htm.

Installing TRAXPDA

It is a simple process to install TRAXPDA on your Pocket PC PDA. It is required, though, that you have set up an ActiveSync partnership with your desktop computer. If you are unsure of how to do this, consult the instructions that came with your Pocket PC PDA.

It is recommended that you place your PDA into its cradle and allow ActiveSync to run prior to starting the installation procedure. The installation software will use ActiveSync to copy the files to your PDA.

Place the TRAXPDA CD into the CD drive of your computer. The computer should recognize the new CD and show you the Installation Options, including one to **Install TRAXPDA**. Select this option and the installation for the program will begin.



Figure 1-2:
Installation
Startup

You will see a screen similar to the one shown in Figure 1-2. Make sure you have Active Sync running on your computer and the PDA is turned on and mounted in the cradle.

At the first screen click the **Next** button.

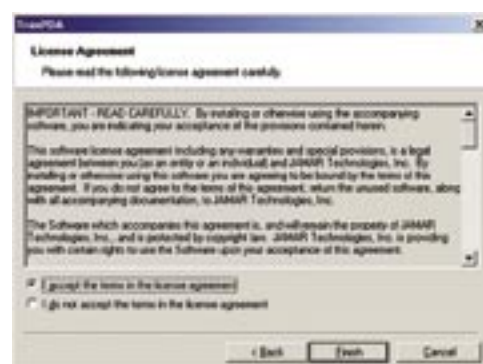


Figure 1-3:
License
Agreement

Next you will see the License Agreement displayed on the screen. If you agree to the terms of the agreement, select the *I accept the terms in the licence agreement* option and click the **Finish** button.



Figure 1-4:
Retrieve
Device Data

Next you will see a screen similar to the one shown in Figure 1-4. Active Sync connects to the PDA and then ask you if you want to install the application. Click **Yes** to continue with the installation.

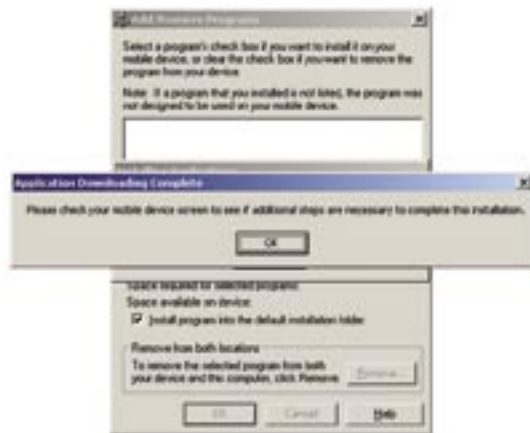


Figure 1-5:
Application
Installed

Finally, assuming everything goes OK, you will see a screen similar to the one shown in Figure 1-5. The program has been transferred to your PDA. Click the **OK** button to end the installation.

Launching TRAXPDA

Once you've installed your TRAXPDA software, you'll notice a couple of new icons on your Programs Screen on your PDA. The first one you'll see is a program called Booster. The Booster program is the middle man that allows JAMAR software to run on your PDA. Should you delete Booster, TRAXPDA will no longer run. The icon for TRAXPDA has also been added to your list of applications, as would be expected.

Tap on the **TRAXPDA** icon to run the software.

Enter Serial Number

Figure 1-6 is the first screen that you will see once you launch TRAXPDA. It shows the version number and serial number of this copy of the software, along with a pretty cool picture.



Figure 1-6:
TRAXPDA
Splash Screen

Figure 1-6 shows that this version of the software is in Demo mode. This is a fully functional version of the software; you can read, validate, and view studies you read from TRAX recorders. All features of the software are available to you. However, if you try to process the data in TRAXPro, you will get an error message. This allows you to fully test the software with the PDA and any other hardware you might use (GPS receivers, for example) before you buy the software.

You need to get a valid serial number from JAMAR to un-lock the software so that the data can be processed by TRAXPro. If you have purchased the program, your serial number can be found on the back of the CD case

the disc came in.

To enter a new serial number, run TRAXPDA and at this screen, tap the **Serial #** button. This will bring up the **Serial Number** screen shown on the next page.

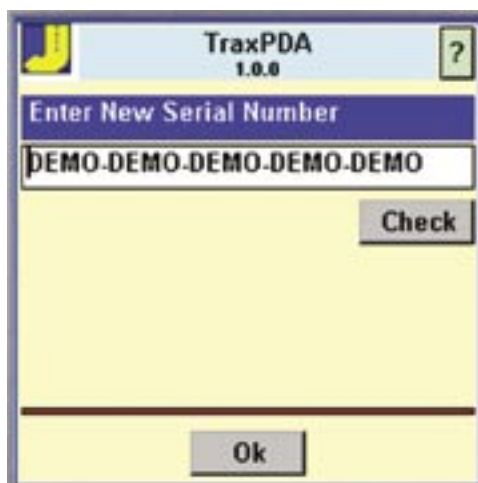


Figure 1-7:
Enter Serial
Number

Figure 1-7 shows the Serial Number screen. The white box has the current serial number, which in this case is the word DEMO five times.

Enter your serial number. Make sure you include the dashes ("-") between the groups of letters and numbers. There should be five groups of four characters, as shown in Figure 1-7.

Tap the **Check** button.

The software checks the serial number you entered, makes sure it is a valid number, and that is the right type of serial number (a serial number from other JAMAR software won't work).

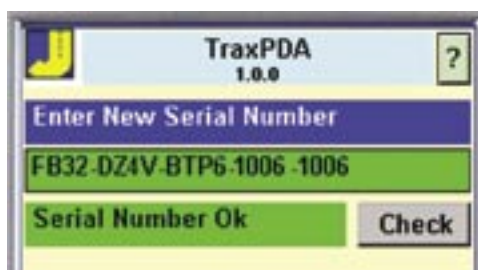


Figure 1-8:
Check Serial
Number

If the number is OK, then the screen changes as shown in figure 1-8. The message *Serial Number OK* is shown and the background color changes to green.

Tap the **OK** button at the bottom of the screen to return to the Splash screen.

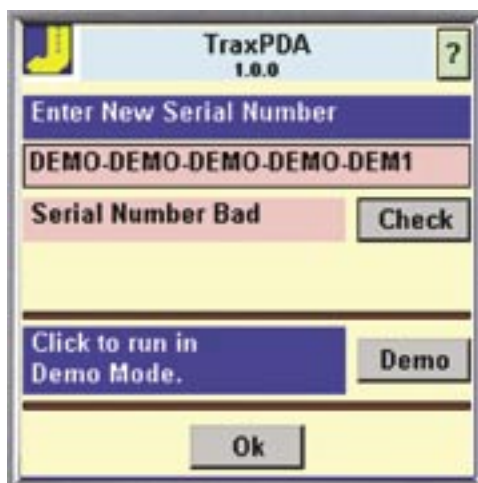


Figure 1-9:
Serial
Number Bad

If there is a problem with the serial number you entered you will see a screen similar to the one in Figure 1-9. You can edit the number if you made a mistake. Tap **Check** again.

If necessary, you can tap the **Demo** button to force the software to run in Demo mode. You can still use the software to read, validate, and save traffic studies. If the data you retrieve is important, we can take the database files stored in the PDA and make them usable in TRAXPro. Contact us if you need us to help you.

Tap the **OK** button to return to the Splash screen. TRAXPDA is now installed, but before we start using it, we'll install the program used to transfer the data from TRAXPDA to TRAXPro.

Installing PDA2TRAXPro

PDA2TRAXPro is a utility program whose sole purpose is to allow you to transfer the data in your PDA to your computer for processing with TRAXPro.

The TRAXPDA CD **Installation Options** should still be running on your computer. If not, re-insert the CD.

Select the **Install PDA2TRAXPro** option and the installation for the program will begin. When the Welcome screen appears, click Next. The next screen details the license information for the program. To accept the license agreement and continue with the installation, click Yes.

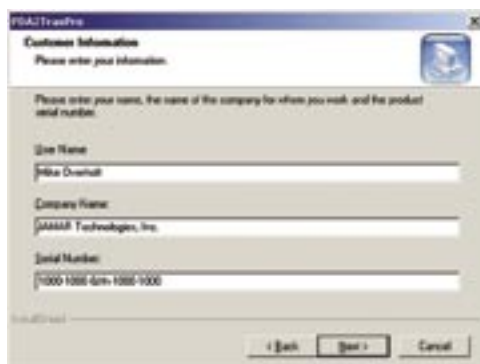


Figure 1-10:
Enter
Information

The Customer Information screen will then appear. Enter your name and Organization's name, as well as the serial number for the program. **The serial number used for PDA2TRAXPro is the same as the serial number used for TRAXPDA.** It can be found on the back of the CD case. Once the information is entered, click Next.

The Choose Destination Location screen then appears. You can use this screen to select where the program is installed. To use the default location, click Next.

The Select Program Folder screen allows you to select the program folder for the installation. To use the default location, click Next.



Figure 1-11:
Install
Complete

At this point you have provided all the information necessary to start installing the program. A summary of the information is provided. Click Next to begin copying files.

Once all the files have been copied, the InstallShield Wizard Complete screen will appear.

You are now ready to start using TRAXPDA.

Chapter 2



Learning the Basics of TRAXPDA

Getting Started

Once you have installed TRAXPDA, entered your serial number, and installed PDA2TRAXPro, you are ready to start using TRAXPDA. Tap on the **Start** button on the Splash screen. This loads the Main screen.



Figure 2-1:
Main
Screen

Main Screen

The Main Screen is arguably the most important screen in the software. Nearly all of the software's functions can be accessed from this screen. The smaller buttons along the bottom of the screen are stylus shortcuts that access the Preferences, Data View, Overall Statistics and Database Erasure functions respectively. If you don't happen to have your stylus in hand, all of these functions can be found by tapping the **Options** button with your finger.

The color of the main buttons are important. If the button is green, then the software thinks this is a possible option for you. If the button is yellow, then that option is available, but may not be the next logical step. If the button

is red, then there is a problem that may need your attention. If the button is gray, then that option is not available at this time. This color coding will make more sense as we go through the tutorial.

Once you initiate a task from the Main screen, you will be presented with another screen specific to that particular operation (such as clearing the traffic recorder). When the task is completed, you will return to the Main screen.

If this is your first time using TRAXPDA (if you're reading this, it probably is), then you will need to provide TRAXPDA with the proper settings. Tap the **P** at the bottom of the screen. This opens the Preference & Settings screen.

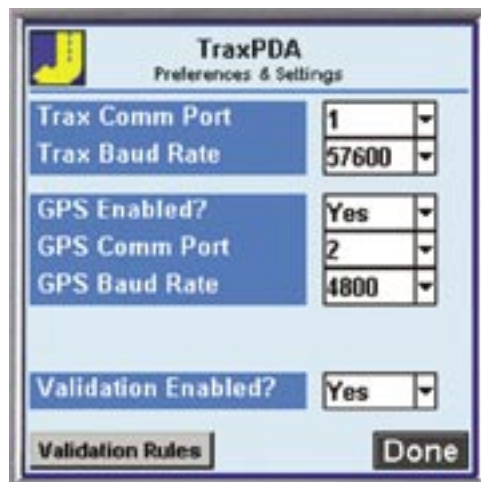


Figure 2-2:
Preferences &
Settings

Preferences & Settings Screen

The Preferences & Settings screen allows you to adjust the major parameters of TRAXPDA. You can select the port number and baud rate that will be used to communicate with the TRAX recorder by selecting the desired option from each drop-down box.

Set the **TRAX Comm Port Number** to **1** if you'll be connecting through your PDA's cradle port connector. If you're using a serial adapter card, or a Bluetooth adapter, then the number will be different. In this case you need to refer to the documentation that came with the adapter card to learn how to determine the serial port number to use.

Set the **TRAX Comm Port Baud Rate** as desired. Some older PDA's may not be able to handle baud rates over 19200 baud. For now, select 57,600 as the baud rate.

TRAXPDA allows you to use a GPS receiver to store the exact location of the study along with the data. This is explained in detail in Appendix 1 at the end of this manual. For now select **No** from the *GPS Enabled?* drop down box. The GPS Comm Port settings will become hidden once GPS is disabled.

There may be instances where you don't want the software to validate the data you collect. If so, then you can turn off validation by selecting **No** from the *Validation Enabled?* drop down box. For now (and probably always) leave it set to **Yes**.

From this screen you can see, turn on and off, and edit, the validation rules currently loaded in the software. Tap the **Validation Rules** button at the bottom of the screen. This brings up the Validation Rule screen showing the first rule in the validation database. Chapter 3 is a complete description of how TRAXPDA validates data, so we won't go into the details here. (Go ahead and take a peak at a few of the screens if you want.)

Now TRAXPDA's settings are tailored to your equipment and the program is ready to be put to work for you. Tap **Done** to return to the Main screen.

How to Use TRAXPDA

The intent with TRAXPDA is to make the software as easy to use and intuitive as possible. It should work the way *you* work with your recorders. Unfortunately, things aren't as simple as we would like them to be. When we designed the software we realized that there are basically two different ways to do traffic studies that impact the way the TRAXPDA software should work.

The first scenario we call **One TRAX - One Study**. In this method you always start with an empty recorder, do one study in the field, retrieve the data with TRAXPDA at the site, and then delete the data in the recorder. *The key point is that there is always only one count in the recorder*, and when you retrieve the data, you are at the site.

In this scenario it makes sense to enter information about the site into the PDA when you read the TRAX, since you are right there and you can make sure you correctly enter the information, such as street names and location information. It also makes sense to consider using a GPS receiver to load the latitude and longitude information (called geocoding) at the site while you are standing there to guarantee the location information is correct. (In general, if you use the GPS option, you don't need to enter street names or locations into the PDA since that can be found back in the office using the latitude and longitude information stored with the data.)

After you have read the TRAX recorder and validated the data, you can clear the data from the recorder, making it ready for the next study, which would begin the cycle again.

As you will see when we go through the tutorial, for this scenario you will use the Site Info screen in TRAXPDA to enter the information about the site for the data in the recorder. Consequently, you don't have to enter site information into the TRAX when you set it out. Since it is easier to enter the site information in a PDA than into the TRAX, this method saves time and results in more accurate data files.

The other scenario we call **One TRAX - Many Studies**. In this method you do two or more studies in the same TRAX recorder, moving the recorder from site to site, until you are ready to read the data. You then use your PDA with TRAXPDA to read the studies from the recorder. *The key point here is that only the data from the last study was collected at the site where you are running TRAXPDA*. The other data was at sites that you don't necessarily know much about.

TRAXPDA can read the data and store it in the memory of the PDA. It can validate the data and tell you if there are any problems, although you don't have much recourse since you aren't at that site anymore. But there isn't much point in entering the site information into the PDA; it is much easier to enter that information back in the office in TRAXPro. It also isn't practical to use a GPS receiver with TRAXPDA since only the last study in the recorder can be geocoded.

In this scenario, we won't use the Site Info screen in TRAXPro at all; we will just ignore it. You do need to enter some site information into the recorder. Usually this is done with a Site Code entered at the site, and street names and location information entered back in the office in the analysis software.

This scenario is the way most traffic recorders have been used in the recent past, since it wasn't practical to bring computers out to the site (even laptops are annoying outdoors), and it wasn't practical to bring the recorders back to the office after every study. It made sense to collect multiple studies in a recorder and then read all of the studies at once (usually back in the office).

Neither of these scenarios is right or wrong, although the One TRAX-One Study does keep things simpler. However, in your case it may not always be feasible to follow that format. Use whatever best suits your needs.

Below is a step by step tutorial to show you how to run TRAXPDA for each of the two scenarios. First, the steps required to set the recorder properly are briefly explained, then the individual steps in TRAXPDA are shown.

Scenario #1: One TRAX - One Study

This scenario assumes that you are doing one study at a time with the TRAX recorder. When the study is done, you retrieve the data and clear the TRAX's memory before doing a new study.

1 – Set the TRAX recorder at the site

It really doesn't matter what type of study you are doing, the steps are the same. You need to use the keyboard and display on the recorder to select the type of study, the interval if needed, and the layout. You don't need to enter anything for the Site Code, however, since you will enter that info when you retrieve the data. (We will assume that you are familiar with the operation of the TRAX recorder and not show each step here).

2 – Collect the data

Watch a few cars as they go over the road tubes to make sure the road tubes are working properly. If you have a TRAX Plus, then use the feature that shows the intensity of the road tube pulses on the screen of the recorder.

When you are convinced the recorder is getting clean pulses from the road tubes, start the study.

Leave the recorder at the site and let it collect the data.

3 – Retrieve and validate the data with TRAXPDA

Come back to the site and bring your PDA and cable.

Open the TRAX recorder case, press any key to turn on the display, and watch a few cars go over the road tubes. Make sure the recorder is still working properly.

Stop the count by turning off the recorder, then turn on the recorder and wait for the Main screen to show.

Connect the PDA to the recorder with the interface cable.

Now you are ready to run the TRAXPDA software.

Launch TRAXPDA on your PDA. The first thing to do is to enter the site information into the PDA. This data will be stored with the data from the recorder when you read the recorder.

At the Main screen, tap the **Site Info** button (it should be active and green). This will bring up the **Site Info** screen.

Figure 2-3:
Site
Info

The four fields shown on the screen match the site information used in TRAXPro. Whatever you put in here will show up in the corresponding fields in TRAXPro, and printed on the reports with the data.

Fill in the fields however you wish.

It takes a little bit of practice to enter text and numbers into a PDA. The easy way to do it is to use the popup keyboard and tap the letters and numbers to enter the information. You can also learn to enter letters and numbers using the handwriting recognition option that is part of all PDAs. With a little practice you can learn to enter the letters and numbers much faster than with the popup keyboard.

If you use the GPS option of TRAXPDA, you would see the latitude and longitude of where you are standing on this screen. This is explained in detail in Appendix 1.

Notice that you filled out this screen before you read the TRAX recorder. Since there is only one count in the recorder (this is Scenario 1 remember), then you know the data you will read will be from this site. If you want, you can enter this information before you actually get to the site, or before you connect the cable to the recorder.



Important

It is important that you enter the Site Info data before you read the TRAX. Whatever entries are in these fields are stored with the data when the recorder data is stored in the PDA.

When you are satisfied with the information you've entered, tap **Done**. This will return you to the Main screen.

You are now ready to read the TRAX recorder. At the Main screen, tap the **Read** button (it should be active and green). This will bring up the **Read Counter** screen.

From this point on, the operation of TRAXPDA is identical for the two scenarios. The second scenario will now be described, followed by the common procedures used in both scenarios.

Scenario #2: One TRAX - Many Studies

JAMAR's TRAX recorders are often used at many different count sites before their data is processed with TRAXPro. As discussed earlier, this is traditionally the way most users do studies when they have to do more than one study in a relatively short time period. Site codes (and/or GPS coordinates if you have TRAX models that support it) can be entered into the TRAX units at each count location, so this information will be included in the traffic count data that you'll read with TRAXPDA.

1 – Set the TRAX recorder at the site

It really doesn't matter what type of study you are doing, the steps are the same. You need to use the keyboard and display on the recorder to select the Study Type, the Interval if needed, and the Layout Number. You also need to enter a Site Code or use a GPS receiver to store the latitude and longitude so that you have a way to match the data to a location when you process the data in TRAXPro back in the office. (We will assume that you are familiar with the operation of the TRAX recorder and not show each step here.)

2 – Collect the data

Watch a few cars as they go over the road tubes to make sure the road tubes are working properly. If you have a TRAX Plus, then use the feature that shows the intensity of the road tube pulses on the screen of the recorder.

When you are convinced the recorder is getting clean pulses from the road tubes, start the study. Leave the recorder at the site and let it collect the data.

3 – Repeat Steps 1 & 2 As Needed

Move the recorder from site to site as needed and collect your traffic data until you are ready to retrieve the data. Typically you would do two or three counts during a week and then retrieve the data on the final day. Bring your PDA and cable to the final site location.

4 – Retrieve and validate the data with TRAXPDA

Come back to the site and bring your PDA and cable.

Launch TRAXPDA on your PDA.

At the Main screen, tap the **Read** button (it should be active and green). This will bring up the **Read TRAX** screen.



Note

Note that in this scenario you don't use the Site Info screen at all. You immediately read the recorder. It isn't practical to try to enter information about sites into the PDA when you aren't actually there at the site. You will have a chance to enter the site information back in the office when you run TRAXPro.

Read the TRAX Data

Below is the **Read TRAX** screen.

Make sure the display is still active on the TRAX recorder. This tells you that the serial port is also active. If the display is off, then tap a key on the recorder to turn the display back on.



Figure 2-4:
Read TRAX
Screen

You don't need to touch the TRAX to read the data from it (except to turn it on and possibly to re-enable the display). As long as the display is on, and the recorder is not collecting data, you can read the recorder.

Tap the giant **Read Now** button to read the data from the recorder. The gray label below the button will keep you informed of the proceedings as TRAXPDA communicates with the recorder.

Several steps are shown on the display as the data is read and processed. The blue **Read Now** button is replaced with a yellow message that shows the progress of each step.

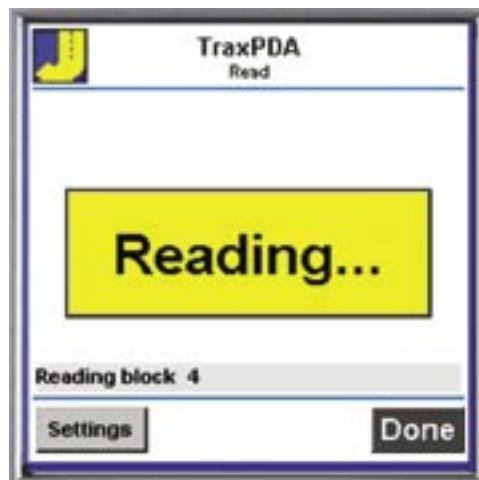


Figure 2-5:
Reading Data
from TRAX

First the software initializes the database files in the PDA used to store the recorder data. The yellow message shows **Initializing...** while this happens. Then TRAXPDA attempts to communicate with the recorder. The yellow message shows **Connecting...**. Then the software reads the data from the recorder. The yellow message shows **Reading...** during this step. Data is sent from the recorder in blocks of approximately one thousand characters. TRAXPDA reads the block of data and checks it. If it is OK, then it sends a command to the recorder to send the next block. The status line shows the current block number. TRAXPDA doesn't know how many blocks the recorder is going to send, so it just processes each block until the recorder is done.

It may come to pass that something goes awry while TRAXPDA is attempting to communicate with the recorder. In such an event, the gray status label will display an error message, such as **Couldn't Connect**. See Chapter 4 for a complete discussion of troubleshooting read problems.

Once data has been read from the recorder, the **Read Now** button will show **View Data**; tap it to proceed to the first of the Data View Screens.

Study Number 1 of 3	
Validation	Passed
Start Time	10/03 12:15
End Time	10/04 15:00
Study Type	Volume
Layout	L1 [?]
Interval	15
# Chans	2

View Data > Done

Figure 2-6:
Data Header
Information

Figure 2-6 displays general information that was read from the header of each study in the TRAX recorder. The screen also shows the results of the Validation process on the data in each study. Validation is explained in detail in Chapter 3.

The Layout field shows the tube or loop layout that was used to collect the data. If you aren't sure about a particular layout number, tap the [?] to pop up a screen with an image of the layout.

If you scroll down the page you will see more parameters that show information about the TRAX. These include Starting and Ending Battery Voltages, Serial Number, Model Number, and Firmware Version. Normally you will not need to look at these. They may be useful if you have problems with your data.

Study Number 1 of 3	
# Chans	2
Start Voltage	6.5 volts
End Voltage	6.4 volts
Serial Number	
Dead Time	35 msec
Model Number	Trax I
Firmware Ver	1.2

View Data > Done

Figure 2-7:
Additional
Information

Use the > and < buttons at the bottom to go from study to study. The top of the screen shows the current study number and the total number of studies you can view. If you want to see the actual data read from the TRAX, you can.

Typically, if the validation shows the data is OK, then you don't need to check it. If the validation shows there may be a problem with the data, then you definitely want to take a look to see how serious the problem may be.

Tap the **View Data** button to proceed to the Data Detail screen where you can look at individual data points.

Time	Ch1	Ch2	Time	Ch1	Ch2
19:50	137	138	20:50	190	190
19:55	190	190	20:55	190	190
20:00	180	180	21:00	180	180
20:05	190	190	21:05	190	190
20:10	190	190	21:10	190	190
20:15	180	180	21:15	180	180
20:20	190	190	21:20	190	190
20:25	190	190	21:25	190	190
20:30	180	180	21:30	179	180
20:35	189	190	21:35	189	190
20:40	190	190	21:40	190	190
20:45	180	180	21:45	180	180

> Done

Figure 2-8:
View
Volume Data

Volume Counts

Shown in Figure 2-8 is a two channel volume count. You can see the times (with a yellow background) and the counts for each interval (with a green or red background depending on the validation results).

Four channel counts have a slightly different format, but basically looks the same. You can check the data to see if it looks reasonable. The validation routines in the software will help point out possible bad data points, but your eyes are still the best judge of the quality of the data.

Use the [>] and [<] buttons at the bottom of the screen to move from screen to screen.

	C1	C2	C3	C4	C5	C6	C7
09:00	4	20	8	4	4	4	4
10:00	33	66	66	33	33	33	32
11:00	33	66	66	33	33	32	33
12:00	33	66	66	33	33	33	33
13:00	33	66	66	33	32	33	33
14:00	33	66	66	32	33	33	33
15:00	33	66	66	33	33	33	33
16:00	33	66	65	33	33	33	33
17:00	33	66	65	33	33	33	33
18:00	33	65	66	33	33	33	33
19:00	33	66	66	33	33	33	33

Figure 2-9:
View
Binned Data

Bin Studies

Bin studies, such as Axle Classification (*shown here*), Speed, or Gap studies, show the time down the left side of the screen, and the bins for each interval across the screen.

Since the PDA screen is so small, you can only see 8 columns at a time; you need to scroll horizontally to see all of the bins. Use the scroll bar below the data. You can tap on the arrows at either side, or drag the center bar with your stylus.

Use the [>] and [<] buttons at the bottom of the screen to move from screen to screen.

Time	A	B	Time	A	B
12:16	1288	1288	10:31	1845	1845
13:00	1846	1846	01:00	1848	1848
14:00	1841	1841	02:00	1846	1846
15:00	1848	1847	03:00	1846	1846
16:00	1842	1843	04:00	1848	1847
17:00	1843	1843	05:00	1845	1846
18:00	1848	1848	06:00	1846	1846
19:00	1842	1842	07:00	1845	1845
20:00	1843	1843	08:00	1848	1848
21:00	1848	1848	09:00	1846	1846
22:00	1844	1844	10:00	1846	1846
23:00	1844	1844	11:00	1841	1841

Figure 2-10:
View
Basic Data

Basic (Raw Data) Studies

These studies are handled in a different manner from volume counts or binned studies, since there isn't any practical way to show the actual raw data points on a PDA screen.

The reason to view the data in TRAXPDA (whether it is a volume count, a bin study, or a basic study) is to determine if the data is OK before you remove the road tubes and go back to the office. What this really means for a Basic study is that you want to make sure the road tubes and recorder airswitches were working properly for the entire study period.

For Basic studies, TRAXPDA shows you the total number of hits that were recorded for each of the sensors, broken down into hourly intervals. You can check these totals to make sure they make sense. Some of the common sensor layouts used for Basic studies, such as L5 or L6 (2 tubes separated by 4-8 feet), require that the number of hits on the A hose equal the number of hits on the B hose, since every axle that hits one sensor must also hit the other. You can easily see if there is a problem with the data by checking the totals for each sensor for each hour. They should be very close. If one is considerably larger than the other, then you know there is a problem. The validation routines in the software will help identify these situations.

Once you have checked the data, tap **Done**. This brings you back to the View Study Parameters screen. Tap **Done** again to go to the Main screen.

You have now read and validated the data from the recorder!

The data is safely stored in the PDA so you don't need to keep the data in the TRAX recorder any longer. The next step is to clear the data in the recorder so it will be ready the next time you need it.

TRAX recorders must be cleared using the keyboard and display of the recorder. Refer to the User's Manual of your TRAX for specific instructions.

Transferring Data from TRAXPDA to TRAXPro

Once you have read the data from your TRAX recorder into TRAXPDA, you'll need to transfer that data to TRAXPro for data processing and producing reports. This transfer is accomplished using a utility program called PDA2TRAXPro.

You use TRAXPDA to read, validate, and store the traffic data from your TRAX recorders. The data is stored in four different database files on your PDA. You then bring the PDA back to the office and run PDA2TRAXPro. The software uses Active Sync, the program that is included with Pocket PC-type PDAs, to copy the database files to a folder on your office computer. Once you have the database files on your computer, PDA2TRAXPro converts the files into TRAXPro data files.

The PDA2TRAXPro program was included with your TRAXPDA CD. If you have not already installed the program, do so now. Directions on how to do this can be found in Chapter 1.

Once PDA2TRAXPro is installed, connect your PDA to your computer and let them connect via ActiveSync. If your PDA is already connected, the easiest thing to do is remove it from the cradle then replace it.



Figure 2-11:
Start
Screen

PDA2TRAXPro Start Screen

PDA2TRAXPro is simple to run; there are only two screens and most of the time you don't have to do anything except click two buttons. Figure 2-11 shows the screen you see when you run the software.

This screen reminds you to have the PDA in the cradle and to have Active Sync running on your computer. Click the **Copy** button when you are ready. The software goes through a fairly complicated process to connect to the PDA using the Active Sync software and copy the database

files from the PDA into a folder on your computer. There are various messages shown below the two buttons as this process occurs. Normally you can ignore them. If there is a problem, the messages may help determine what is wrong.

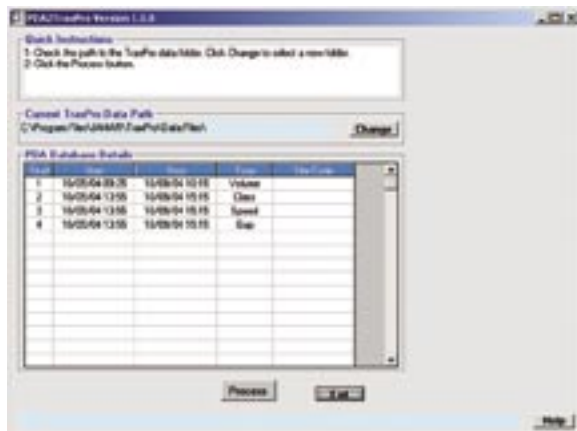


Figure 2-12:
Process
Screen

PDA2TRAXPro Process Screen

Once the software has copied the PDA database files to your computer, the screen shown in Figure 2-12 is displayed. This is the Process screen. At the top are some simple instructions. Below that is the **Current TRAXPro Data Path**. This is where the converted TRAXPro data files will be copied.

The first time you run the PDA2TRAXPro program the software checks to see if you have TRAXPro installed in the standard location on your computer (C:\Program Files\Jamar\

TRAXPro) and if there is a folder called **Data Files** under that folder. If there is, then the software assumes this is where you will want the program to copy the converted database files from the PDA

and sets the Current TRAXPro Data Path to that folder. If the program can't find the Data Files folder, then it sets the Current TRAXPro Data Path to a folder called TRAXProDataFiles which is created when you install the PDA2TRAXPro software.

There are many reasons you may want to change the path shown on the screen. You may store your TRAXPro data files on a network drive, or you may have the TRAXPro program loaded somewhere else on your computer. If you do want to change the path, then click on the **Change** button next to the current path.



Figure 2-13:
Change
Data Path

Clicking the **Change** button brings up the screen shown here. You can navigate to the folder you want to use as the destination for your converted data files. When the proper folder is highlighted, click **OK**. The path you selected is now set as the Current TRAXPro Data Path and will be automatically used the next time you run PDA2TRAXPro. Typically you would only change this path once and then would never worry about it again.

The software re-displays the Process screen, with the new Current TRAXPro Data Path shown.

Below the data path are details of the studies that are in the data copied from the PDA. You can see the Start and Stop date and times, the Type of study (Volume, Class, Speed, Gap, or Basic Data), and the Site Code. This is primarily shown so that you can make sure that this is the data you expected. This is especially important if you use different folders on your computer for different types of data.

Once you have the path set to the correct location for the data files, click on the Process button. The software will convert the data in the database files, create the TRAXPro data files, and then copy the data files to the folder you specified.

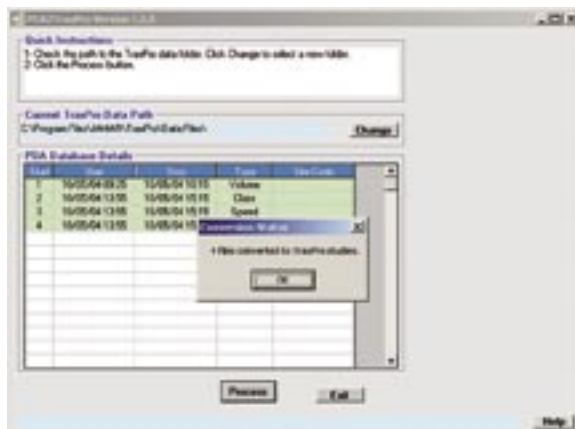


Figure 2-14:
Conversion
Complete

As each TRAXPro data file is created, the appropriate study line in the grid will change to a green background. After all of the files are converted the screen will show the Conversion Status in a little pop-up box, as shown here. This will tell you how many files were successfully created, and copied. Click **OK** to clear the pop-up box.

If the software has any trouble converting a study, the appropriate line in the grid will change to a red background. The software will then go to the next study and try to convert it. **If you find any studies that won't convert, call us**

for help. We will ask you to send or email us the database files so we can find the problem. There is a good chance we will be able to get the data converted properly, so don't delete the database files until you have sent us a copy.

When you are done, click on **Exit** to end the program.

File Naming Convention in PDA2TRAXPro

The software automatically creates standard TRAXPro files from the database files stored on the PDA. The name for the file is generated by combining the Type of study with the Site Code for each study. Here is the structure of the file name: **Type of Study - Site Code.twf**.

For example, if the first study is a Class study, and the Site Code is 000000000001. The TRAXPro file for this data is called *Class-000000000001.twf*.

If a study already exists with the same name, then the software appends a -x to the file name to make it unique. For example, if there already were a Class-000000000001.twf file, then the software would use Class-000000000001-1.twf.

You probably will want to change the names of these files. Typically, you would run TRAXPro and retrieve each of the files created by PDA2TRAXPro. You then would edit the parameters that were not entered into the PDA, such as the location, direction headings, or comments. Then save the study using a name that makes more sense to you (typically using the location name in some way).

Erasing TRAXPDA Data from the PDA

After you've copied your TRAXPDA data from your PDA to your desktop you can delete the traffic count files from your PDA.



Figure 2-15:
Main
Screen

Shown in Figure 2-15 is the Main screen with one study stored in memory. Notice that the Erase button is enabled and the screen shows that there is one study stored in the memory of the PDA.

Tapping the **Erase** button will bring up the Erase Studies screen shown in Figure 2-16.



Figure 2-16:
Erase Studies
Screen

To permanently erase the data, tap the large **Erase** button. The software will erase the data from the database files in the PDA. **This is a permanent operation**; make sure the data is safely on your computer before you perform this step.

The TRAXPDA memory has now been cleared and is ready to read more recorders.

Note: To be as safe as possible, you should process the data you copied to your computer using PDA2TRAXPro and check the data in TRAXPro **before** erasing the data in the PDA. Once you erase the data it is gone for good.

Chapter 3



How Data Validation Works

The Concept of Data Validation

An important feature of TRAXPDA is the ability to validate the data just read from your TRAX and verify that it is good before you remove the road tubes and leave the site. It is very frustrating to do a study and then find out that a car was parked on one of the road tubes for twelve hours, making the data worthless. You have to bring the equipment back to the site, re-install the road tubes, and re-do the study. It would be better, (still annoying, but better) if you knew right there at the site that the data wasn't any good.

Normally, when you pick up a TRAX you can't really tell if the data collected is OK unless you bring a laptop out to the field and read the data with TRAXPro, which very few users choose to do. In the past we told users to verify that the recorder is collecting data when the recorder is installed and then verify that the recorder is still collecting data when you return to end the study. If the system was working fine when you left and fine when you return, then chances are it worked fine for the whole study. This is true and we still recommend this procedure. However, with TRAXPDA you can get a much more accurate assessment of the quality of your data.

TRAXPDA validates the data in the same manner you would. It looks at the data and tries to decide if it looks reasonable. When you look at a volume count report, you would look for certain patterns, or more commonly, breaks in the expected pattern. For example if one channel suddenly went from relatively high counts to zero, you would suspect that something went wrong with that channel.

TRAXPDA uses the same type of logic to check the data. There are a set of rules that are stored in the PDA, one set for each type of study. A rule for a volume count might look like this:



Figure 3-1:
Validation
Volume Rule 1

Vol1 - No Zero Volumes: If the DailyTotal > MinDayTot [200] then IntervalVol from Time1 [7:00] to Time2 [23:00] > MinVol [0]

This rule says that counts between 7 AM and 11 PM should never be zero. If the total for an interval in this time period is zero, then flag the interval as suspicious. It may be that you do a count at an isolated location where no vehicles were counted during an interval in this time frame. That's fine. The software will flag those intervals but you can use your own engineering judgement to decide if there is a problem or not.

There are several rules for each type of study. Volume counts are treated a little differently from Speed, Axle Class, or Gap studies, and Basic (Raw Data) studies also have a unique set of rules. We expect these rules to be improved and expanded as we get more experience. You will be able to download and install a new set of rules from our web site (www.jamartech.com) as they are developed.

Figure 3-2:
Validation
Passed

The screenshot shows a handheld device screen titled "Study Number 1 of 3". It displays a list of study parameters with their corresponding values. The "Validation" status is highlighted with a light green background, indicating it has passed. At the bottom, there are three buttons: "View Data", a right arrow ">", and "Done".

Validation	Passed
Start Time	10/03 12:15
End Time	10/04 15:00
Study Type	Volume
Layout	L1 [?]
Interval	15
# Chans	2

TRAXPDA validates the data when you view the header data in the View Study Info screen. It shows the result on the screen, using a light green background if the validation passed, and a light red background if the validation failed.

Normally, if the validation passes then you probably don't need to view the actual data on the PDA.

If however, the validation fails, then you should take a look at the data so you can determine if there really is a problem or not.

Remember, the validation rules are only guidelines and there will be times when a rule is violated that doesn't

require you to re-do the study. Our philosophy is that it is better to have some false positives (apparent errors when the data really is OK) than to miss some situations where the data is bad and you don't find the problem while you are in the field. As we refine the rules we should eliminate many of the false positives.

The rules only have to do with the data in the study; there is no checking to see if the totals are consistent with past studies at the same location. You still need to do that back in the office. Think of the validation routines as a way to check if something serious happened to the traffic recorder data collection system, including the road tubes, air sensors in the recorder, and the recorder electronics themselves.

What to do if the Validation Fails

Time	Ch1	Ch2	Time	Ch1	Ch2
19:50	197	106	20:50	132	59
19:55	185	104	20:55	134	64
20:00	193	112	21:00	120	61
20:05	190	78	21:05	115	19
20:10	170	52	21:10	113	0
20:15	167	59	21:15	109	0
20:20	160	47	21:20	98	0
20:25	150	61	21:25	103	0
20:30	152	68	21:30	92	0
20:35	147	74	21:35	97	0
20:40	134	66	21:40	94	0
20:45	136	65	21:45	89	0

Figure 3-3:
Validation
Failed

You retrieved a study and the Validation failed. Now what?

First of all, don't panic. There is a good chance the data is fine. One of the rules may not really apply to this location or this data set.

Sometimes the news is bad, however. Here is a two channel volume count where the validation failed. The suspicious data points are shown with a light red background. You can see that at about 9:00 PM the channel two totals went to zero.

You can check to see why TRAXPDA flagged these data points (although it is probably pretty obvious).

Time	Ch1	Ch2	Time	Ch1	Ch2
19:50	197	106	20:50	132	59
19:55	185	104	20:55	134	64
20:00	193	112	21:00	120	61
20:05	190	78	21:05	115	19
20:10	170	52	21:10	113	0
20:15	167	59	21:15	109	0
20:20	160	47	21:20	98	0
20:25	150	61	21:25	103	0
20:30	152	68	21:30	92	0
20:35	147	74	21:35	97	0
20:40	134	66	21:40	94	0
20:45	136	65	21:45	89	0

Figure 3-4:
Select Failed
Data

Tap on the first red cell, with the 19 total.

The screen changes as shown in Figure 3-4. The cell you tapped is highlighted and the display at the bottom of the screen shows the Rule Number that is violated. In this case it is Rule 2

Not sure what Volume Rule 2 is? No problem. Tap on the ? next to the Rule Number. This pops up the screen that explains the validation rule listed.

TraxPDA
Validation Rules

Type	Vol	Rule #
Name	No Large Changes	2

If an interval volume > [20] then the next interval volume must be within [20] percent of that volume. First and last intervals are not included.

Status: This rule is enabled.

Figure 3-5:
View
Failed Rule

Figure 3-5 shows that this is Rule #2 of type Volume. The name of the rule is No Large Changes.

This rule has to do with sudden changes in volumes from one interval to another. Normally traffic volumes don't make large changes (increases or decreases) from one interval to another. If there is a sudden change it might indicate a problem. It also just might be the way the traffic happened to flow that day.

The numbers in the brackets [] are numbers that you can edit to change the behavior of a given rule.

The Status line shows that this rule is enabled. You can turn on or off any of the rules if you don't think they

apply to your data. The status line is color coded; green means the rule is enabled and red means it is disabled.

You can scroll back and forth through the other rules using the [>] and [<] buttons.

Figure 3-6:
Check
Validation

Time	Ch1	Ch2	Time	Ch1	Ch2
19:50	197	106	20:50	132	59
19:55	185	104	20:55	134	64
20:00	193	112	21:00	120	61
20:05	190	78	21:05	115	19
20:10	178	52	21:10	113	0
20:15	167	59	21:15	109	0
20:20	160	47	21:20	98	0
20:25	150	61	21:25	103	0
20:30	152	68	21:30	92	0
20:35	147	74	21:35	97	0
20:40	134	66	21:40	94	0
20:45	136	65	21:45	89	0

> Rule: 1 ? Done

TraxPDA
Validation Rules

Type	Vol	Rule #	1
------	-----	--------	---

Name: No Zero Volumes

If the daily volume > [200] then interval volumes from [7:00] to [23:00] must be > [0]

Status: This rule is enabled.

> < Done

The next intervals are obviously the killers.

Tap on the second red cell, with the zero total. You can see that the Rule Number is now 1, which says that interval totals shouldn't be zero between 7 AM and 11 PM as shown in the second screen shown.

Again, this might be OK. However, since the channel 1 volumes are just slowly decreasing and don't drop to zero, it is a safe bet that something happened to channel 2, probably with the road tube, and the data is bad from this point on.

Do you have to re-do the study? Maybe, maybe not. That is your decision. The software just tries to find suspicious data so you can use your own engineering judgement. If this is the last day of the study and you have several good days of data before this point, then there may not be any need. If this is part of a 24 hour study and you need a 24 hour ADT then you need to fix the problem with the road tube and re-do the study. That is annoying, of course, but not as annoying as finding it out back in the office.

The validation routines are there to help you find potentially bad data. It won't find all bad data. For example, if you have a little bit of water in a road tube, the water may deaden the response so that you miss some cars, but not all. The software won't always catch this. And the routines will occasionally flag good data. On balance, however, the validation routines will make your job a little easier, which is all anybody can ask of a tool.

Validation Rules

This section contains a list of the validation rules in TRAXPDA, along with how they are structured and how they can be edited. We expect to add new rules as the software evolves.

Volume Count Rules

These rules apply to axle counts and vehicle counts using 1 to 4 road tube sensors.

Vol1 - No Zero Volumes: If the DailyTotal > MinDayTot [200] then IntervalVol from Time1 [7:00] to Time2 [23:00] > MinVol [0]

This rule checks for complete failure of a road tube or sensor. On most traffic counts you would not expect an interval total to be zero, except for certain times of the day, or if the site is a very low volume site. The software calculates the total counts for the day (DailyTotal) and then checks the counts for each interval (IntervalVols). MinDayTot, Time1, Time2, and MinVol are settings in the rule.

If there is less than MinDayTot of vehicles for the entire day then it might be expected to have zero counts in some of the intervals. The default value for MinDayTot is 200, but you can change that easily. Time1 and Time2 set when the software should allow an interval count of zero without raising a flag. Even a busy street may have zero traffic at 4:00 AM. The defaults are 7:00 AM and 11:00 PM. The MinVol setting is normally zero, but that is editable as well.

Vol2 - No Large Changes: If IntervalVol > MinIntTotal [20] then next interval total must be within MinDev [20] percent of IntervalVol.

This rule has to do with sudden changes in volumes from one interval to another. Normally traffic volumes don't make large changes (increases or decreases) from one interval to another. If there is a sudden change it might indicate a problem. It also just might be the way the traffic happened to flow that day. The software compares successive interval totals, if they change by more than MinDev percent then the interval is flagged.

The MinIntTotal setting protects against false positives at low volume sites, where a relatively small change in counts may produce a large percentage change (if an interval total goes from 10 to 5, that is a 50% decrease, but probably is not a problem). There are two settings you can edit, the MinIntTotal and MinDev.

Violations of this rule may indicate a partial failure of a sensor or road tube. There may be water in a road tube, which can decrease the sensitivity without a complete failure. The road tube may have a small leak, which again decreases the sensitivity.

Bin Study Rules

These rules apply to axle classification, speed, or gap studies.

Bin1 - No Zero Volumes: If the `DailyTotal` > `MinDayTot` [200] then `IntervalVol` from `Time1` [7:00] to `Time2` [23:00] > `MinVol` [0]

Bin2 - No Large Changes: If `IntervalVol` > `MinIntTotal` [20] then next interval total must be within `MinDev` [20] percent of `IntervalVol`.

These rules are the same rules used in Volume counts (explained on the previous page). You may want to have slightly different values for the settings for bin studies, so they are duplicated here. These rules use the totals of all of the bins as the value of `IntervalVol`. Individual bin counts are not considered here.

Bin3 - Primarily Small Vehicles: For an FHWA Axle Class study only, if `IntervalVol` > `MinIntTotal` [20] then `MinPerCent` [80] percent of the vehicles must be in the following selected [X] classes 1[], 2 [X], 3 [X], 4 [], & 5 [].

This rule is for FHWA Scheme F Axle Classification studies only, which is the standard way to do axle classification studies using road tubes. This rule checks to make sure that most of the vehicles are in the most common bins. On a typical highway or road, most of the vehicles are passenger cars and small trucks (classes 2 & 3). If your data shows a very different distribution of vehicles, then there may be a problem.

As with many of the rules the `MinIntTotal` setting protects against false positives at low volume sites. You can select the minimum percentage `MinPerCent`, and you can select which classes to include, from Class 1 through Class 5. The default is to include Classes 2 & 3 (the settings with the X in the bracket), but you can edit this easily.

Violations of this rule may be due to an incorrect Sensor Spacing setting in the TRAX recorder. If you install the road tubes 10 feet apart, but enter 5 feet in the TRAX recorder, then even though the road tubes and sensors work perfectly, you will get bad data. The firmware in the recorder will calculate the speed of each vehicle based on the wrong spacing between the road tubes. This will make the speed wrong. If the speed is wrong, the axle classification will be wrong. This rule will help discover this bad setting.

You may also get this error if the road tubes or sensors are not working perfectly. The recorder may get pulses from the road tubes that translate into vehicles, but the vehicles are not correct so the distribution of vehicles will not be correct.

Basic (Raw Data) Study Rules

These rules apply to raw data collected with TRAX recorders.

For Basic studies, TRAXPDA shows you the total number of hits that were recorded for each of the sensors, broken down into hourly intervals. It is these interval totals that the software checks to make sure the data is OK.

Raw1 - No Zero Volumes: If the DailyTotal > MinDayTot [200] then IntervalVol from Time1 [7:00] to Time2 [23:00] > MinVol [0]

Raw2 - No Large Changes: If IntervalVol > MinIntTotal [20] then next interval total must be within MinDev [20] percent of IntervalVol.

These rules are the same rules used in Volume counts (explained on the previous page). You may want to have slightly different values for the settings for these studies, so they are duplicated here.

Raw3 - Balanced Totals: If IntervalVol > MinIntTotal [20] then the hourly hit totals for each sensor must be within MinDev [10] percent of each other. Not all sensor layouts are supported.

This rule applies to Sensor Layouts 5, & 6, which have two road tubes separated by 4-10 feet across one or two lanes. These layouts are commonly used to collect data that can be analyzed in TRAXPro to provide speed, axle class, and/or gap reports. These layouts require that the number of hits on the A hose equal the number of hits on the B hose since every axle that runs over one sensor must also run over the other. If these totals are not balanced, then there is something wrong.

As usual, there is protection against very low volume sites with MinIntTotal, although the default value is very low since even one vehicle should generate balanced hits. You can also set the MinDev value to different values if needed.

Violations of this rule may indicate a problem with a road tube or sensor. It also may be produced with good sensors and tubes at very busy sites if the road tubes are set across more than one lane. Occasionally two axles from different vehicles will be on the same road tube at the same time, which means the traffic recorder will only get one pulse when it should get two. This can cause the two sensor totals to become unbalanced. This will lead to problems analyzing the data back in the office.

How To Edit Validation Rules

It is easy to edit the validation rules to meet your requirements. You get to the Edit Validation Rules screens via the Preferences screen.

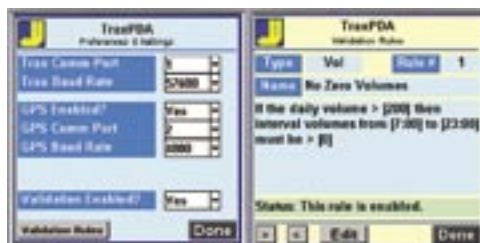


Figure 3-7:
Select
Rule

Tap on the **Validation Rules** button at the bottom of the screen, as shown in the far left image here. This brings up the Validation Rules screen, with the first rule shown.

Now tap on the **Edit** button.

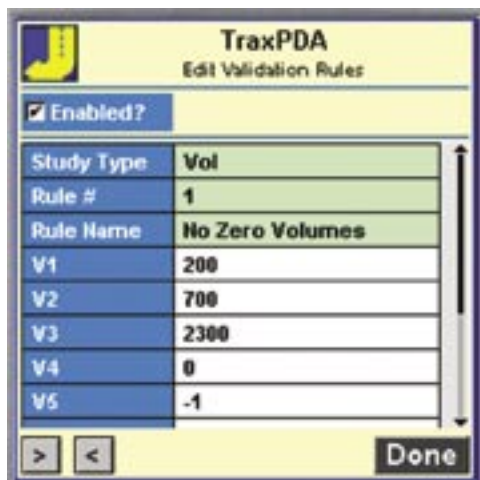


Figure 3-8:
Edit Validation
Rules Screen

Figure 3-8 shows the **Edit Validation Rules** screen. Each rule has a separate screen. You can navigate to different rules using the [>] and [<] buttons at the bottom of the screen.

Near the top is the **Enabled?** checkbox, which is checked to show that this rule is currently enabled. You can disable this rule by un-checking the checkbox. Disabled rules are ignored when your data is tested.

The first three lines show the Study Type, Rule Number, and Rule Name for this rule. You can't edit these values. The background is color coded to remind you if the rule is enabled (green) or not (red).

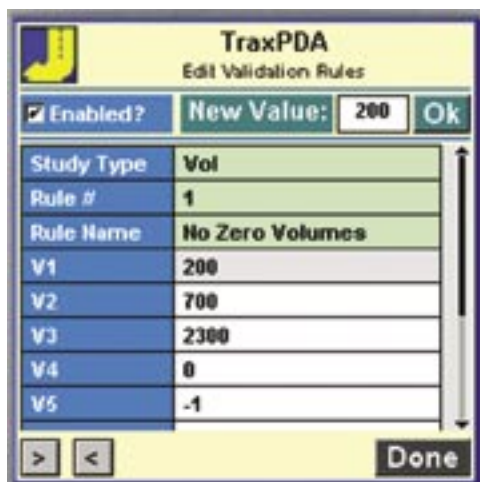


Figure 3-9:
Change
Value

Fields V1 through V10 are the fields you can edit. Each field has a number that is used by the software to evaluate the rule. In this case V1 = 200. This is the DailyTotal variable used in this rule.

If you want to change a value, tap on the field you want to change. The screen changes as shown here. A text box is displayed with the current value. You edit this value and then tap the OK button. Here you can see the V1 value is being edited.

Some fields represent times, like V2 and V3 in the example shown here. These times are stored as numbers in the database on the PDA, so they must be entered as numbers on this screen. In this example 700 means 07:00 AM, and 2300 means 11:00 PM.

Each rule uses a different number of variables. Unused fields are given a value of -1. You normally should never have to edit a value of -1.

It helps to understand how a rule works before you can understand how to edit the variables used in that rule. Most of the time the variables are pretty obvious. If you want to change the time from 7:00 AM to 5:00 AM in the Vol 1 rule shown above (because you often have sites where the morning commute starts at 5 AM for example), then you just edit the 700 to 500.

Other rules aren't quite so simple. Here is one that may need a little explanation.

The screen shown in Figure 3-10 below is rule Bin 3.

Bin3 - Primarily Small Vehicles: For an FHWA Axle Class study only, if IntervalVol > MinInt-Total [20] then MinPerCent [80] percent of the vehicles must be in the following selected [X] classes 1[], 2 [X], 3 [X], 4 [], & 5 [].

Field	Value
Study Type	Bin
Rule #	3
Rule Name	Primarily small vehicles
V1	20
V2	0
V3	1
V4	1
V5	0

Figure 3-10:
Edit
Values

You can choose which of classes 1-5 to include when the rule is evaluated. You do this by editing the values of fields V2-V6 as follows:

V2 is the setting for Class 1

V3 is the setting for Class 2

V4 is the setting for Class 3

V5 is the setting for Class 4

V6 is the setting for Class 5

If you want to include the class totals in the evaluation, then set the variable to 1, otherwise set it to 0.

In this case, V3 and V4 are set to 1, so Classes 2 & 3 will be included. If you want to include Bin 1, then tap on V2, enter 1 in the New Value box at the top of the screen, then tap **OK**.

At this time, this is the only rule where the editing is a little confusing. The others are pretty straightforward.

Whatever changes you make to a rule are stored in the PDA and kept there until you change them again. The rule is updated when you tap on the **Done** button, or go to another rule using the [**>**] and [**<**] buttons.

Technical Information on the Validation Rules Database

The following information is not needed to use the TRAXPDA software, but if you are interested in the technical details of the software you might find this interesting.

The validation rules are stored in a database on the PDB.

Figure 3-11:
Validation
Database

Unique ID	Enabled	StudyType	RuleNum	Name	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
1	☒	Vol	1	No Zero Volumes	200	700	2300	0	-1	-1	-1	-1	-1	-1
2	☒	Vol	2	No Large Changes	20	20	-1	-1	-1	-1	-1	-1	-1	-1
3	☒	Raw	1	No Zero Volumes	200	700	2300	0	-1	-1	-1	-1	-1	-1
4	☒	Raw	2	No Large Changes	20	20	-1	-1	-1	-1	-1	-1	-1	-1
5	☒	Raw	3	Balanced Totals	10	10	-1	-1	-1	-1	-1	-1	-1	-1
6	☒	Bin	1	No Zero Volumes	200	700	2300	0	-1	-1	-1	-1	-1	-1
7	☒	Bin	2	No Large Changes	20	20	-1	-1	-1	-1	-1	-1	-1	-1
8	☒	Bin	3	Primarily small vehicles	20	0	1	1	0	0	0	-1	-1	-1

This image shows the structure of the database file, TRAXPDAValRules.pdb, that is stored in the PDA. A .pdb file is a database file that is commonly used on PDAs.

Figure 3-12:
Edit Validation
Rules

The screenshot shows the 'TraxPDA Edit Validation Rules' screen. At the top, there's a header with the TraxPDA logo and the title 'Edit Validation Rules'. Below the header, there are two buttons: 'Enabled?' (checked) and 'New Value:' (with a dropdown arrow). To the right of these is an 'Ok' button. Below this is a table with the following fields and values:

Study Type	Bin
Rule #	3
Rule Name	Primarily small vehicles
V1	20
V2	0
V3	1
V4	1
V5	0

At the bottom of the screen, there are navigation buttons: a left arrow, a right arrow, and a 'Done' button.

You can see that each line (called a record) is a single rule. Each record is made up of several columns (fields). The fields correspond exactly to the items shown on the Edit Validation screens discussed in the last few pages, and shown in Figure 3-12.

Each screen shows one record. When you edit a variable on the screen, it translates directly into a change in a field in the record.

Does this mean you can add a new rule by editing the database file yourself (assuming you know how)? No. It isn't that simple. Every rule has code in the program to implement that rule. There isn't any way for you to add that code so all new rules will have to come from us.

Have an idea for a new rule?

If you have an idea for a new rule, please contact us. We know from experience that the best ideas always come from the people who use the software. So let us know if you encounter a situation where a smart rule would have flagged a bad study before you got back to the office. Remember, any new rule has to be structured in a form similar to the rules we already have, so it can be added to the database.



Chapter 4



Troubleshooting

Troubleshooting Read Problems

You tried to read your TRAX recorder with TRAXPDA and it didn't work? Don't despair. Think of reading a recorder as a chain, with many individual links in the chain. Every link in the chain has to be perfect for this process to work. Your job is to figure out which of the links is causing the problem. Our job here is to help you do that.

First, let's categorize the problem. Basically there are two broad types of problems:

1) "I just got this stupid system and I can't get it to work." We call this the *Initial Setup* problem. This is the most common problem. Once you get it working once, with all of the links intact, then things tend to work pretty well. The task here first is to verify that all of the links are available and working. Usually the problem is a missing link or an incorrect link.

2) "It was working the other day and now it doesn't work." We call this the *Stopped Working* problem. This isn't as common but in some ways is more annoying. It is more likely a failure of some kind, rather than a setup problem.

It helps to understand the steps TRAXPDA goes through to read a TRAX. First the software initializes the database files in the PDA used to store the recorder data. The yellow message shows *Initializing...* while this happens. Then TRAXPDA attempts to communicate with the recorder. The yellow message shows *Connecting...*

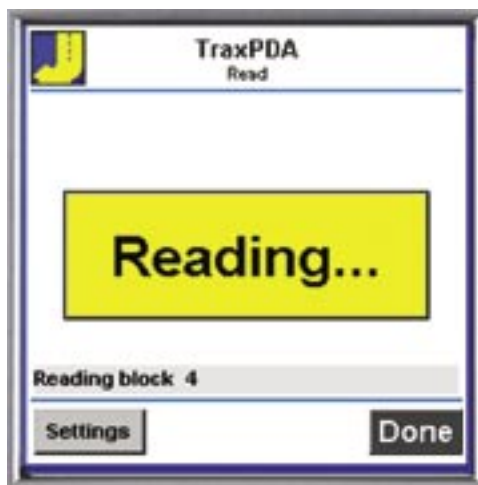


Figure 4-1:
Reading
TRAX

At this point you know that the hardware is basically OK; the cables are correct and the recorder and PDA have set up a connection.

Then the software reads the data from the recorder. The yellow message shows *Reading...* during this step, as shown in Figure 4-1. Data is sent from the recorder in blocks of approximately one thousand characters. TRAXPDA reads the block of data and checks it. If it is OK, then it sends a command to the recorder to send the next block. The status line shows the current block number. TRAXPDA doesn't know how many blocks the recorder is going to send, so it just processes each block until the recorder is done.

Once the data is read from the recorder, TRAXPDA takes the data and saves the data into the database files used to store the studies in the PDA. The display shows *Saving...* during this period. Then the display changes to show *View Data* (with a blue background) so you can see the data you just read. This is how it should go.

Errors can occur during any of these steps. We will discuss the three major steps: Connection, Reading, and Saving. If you are trying to solve a specific problem right now then skip to the section that applies to you.

Connection Errors

These are problems where you can't make a connection with the TRAX recorder. After the initial *Initializing...* message (on a yellow background) the display freezes for a few seconds and then displays the screen shown in Figure 4-2.



Figure 4-2:
Couldn't
Connect

This error message lets you correct a minor problem (the cable isn't plugged in securely, for example) and then try to read the recorder again.

You also can check and change the settings and make sure the Comm Port Number and Baud Rate are set properly. Tap the **Settings** button at the bottom of the screen to show the Preferences and Settings screen. Make any changes needed and then tap **Done**. You will be brought back to this screen.

Chances are you have already done this a few times and haven't gotten past this screen, otherwise you wouldn't be reading this section.

Now it is time to carefully and systematically try to find the source of the problem. Here are a few things to check:

1 – Verify that you have the proper components. This seems obvious but it is the most common problem. Cables are a particular source of problems. You must use the proper cable or cables from the TRAX to your PDA. Some PDA cables are designed to connect PDAs to the serial ports on office computers (called sync cables). These usually need adapters (called null-modem adapters) to make them work with TRAX recorders. Other PDA cables are designed to connect to GPS receivers or other serial based equipment. These usually are what you want.

If you bought your own cables and you get connection errors, then call us so we can help sort it out. The support web site (www.traxpda.com) has more information on cables for some of the more popular PDAs.



Note

Note: Using the wrong serial cable is **overwhelmingly** the most common problem with initial connection problems. Please check carefully that you are using the proper cable.

2 – Make sure the settings in the Preferences & Settings screen are correct. The Comm Port Number will almost always be 1 if you use a cable that plugs into the cradle connector at the bottom of your PDA. If you use some other method to add a serial port to your PDA (Compact Flash adapter or Bluetooth adapter) then the setting will probably be different. Check the support web site or call us for more details.

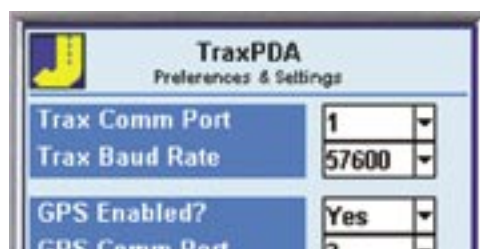


Figure 4-3:
Baud Rate
Setting

The Baud Rate setting isn't as critical since the TRAX recorder will recognize the baud rate setting and adjust accordingly. However, if you have an older (slower) PDA you may need to lower the setting if you can't connect. You never should need to go below 9600 baud, however.

3 – Make sure the TRAX is awake when you try to connect. The recorder is awake when the LCD display is on. To save power, the serial port electronics are turned off when the display is off. Tap any button on the keypad to wake up the recorder.

4 – Make sure the TRAX is not collecting data when you try to connect. You must end the study by turning off the recorder before you can read the data from the recorder. The normal sequence is to turn off the recorder to end the study, then turn on the recorder so you can read it.

5 – Make sure the TRAX and PDA batteries are in good shape. Serial communications takes a relatively large amount of power. If the batteries in either the recorder or PDA are marginal, then it is possible the serial communications will fail even though the PDA and recorder still seem to run properly. This is an uncommon problem, but something to keep in mind.

6 – Make sure another program isn't using the serial port. If you run a program that uses the serial port and then apparently exit that program, the serial port may still be *owned* by that program. This is potentially a problem in Active Sync, which is the program on Pocket PC PDAs used to synchronize data in your PDA with your computer. If you use a serial connection to the cradle then Active Sync uses the same serial port that TRAXPDA wants to use.

There are two solutions. The best solution is to use a USB interface between your cradle and your computer. A USB interface is much faster than a serial interface, which will help with all of your PDA software, not just TRAXPDA. In this way the serial port on the PDA isn't used and this problem doesn't arise. Almost all PDAs sold now *only* come with a USB interface, so this really is only an issue for older PDAs.

If USB isn't an option for you, then you need to learn to disable Active Sync on the PDA before you run TRAXPDA. Look in the Active Sync section of your PDA to find the section where you can disable Active Sync (Hint: Start, Active Sync, Tools, Options).

If you carefully check all of these items and still can't connect, then call us for help.

Read Errors

These are situations where you can connect to the TRAX, but can't complete the read process for some reason.

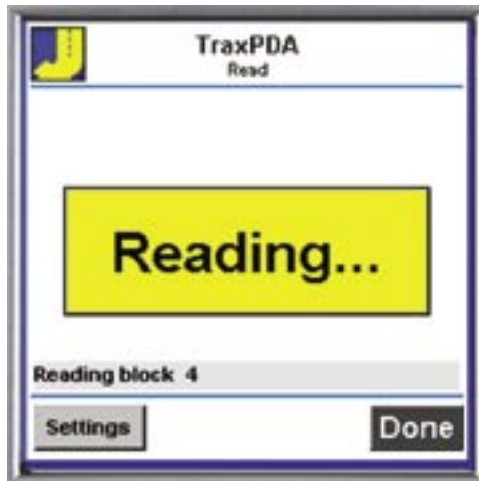


Figure 4-4:
Reading
TRAX Data

Typically, you will get to the screen shown in Figure 4-4, but no further.

You may get an error message on the recorder while the PDA screen shows *Reading...* .This means the TRAX and PDA lost the connection for some reason.

If this happens, the display on the PDA will freeze. You need to tap **Done** on the PDA to go to the Main screen, turn off the TRAX, and then turn it back on to reset it. Then you need to figure out what is causing the problem.

Here are a few things to check:

1 – Repeat the procedure to read the recorder. If the *Reading Block x* message always freezes at the same place, then that implies the data coming from the TRAX may be corrupted. If the screen freezes at different points (and maybe sometimes works OK), then that implies something random is occurring. Check the cable connections carefully, especially the PDA connector. Make sure the contacts are clean. Try another cable if possible.

2 – Try lowering the Baud Rate. Your PDA may be just a little slow for the Baud Rate you have in the settings. You shouldn't have to go below 9600 baud, however.

3 – Make sure you have free memory available on your PDA. It is easy to fill up the memory of your PDA if you are not careful. This isn't much of an issue unless you do Basic (Raw Data) studies with the TRAX, since these are the only types of studies that use much memory. If you do Basic studies then you should have a megabyte or more to store the new data from the TRAX.

You may see other error messages on the PDA. If the program breaks at the same point with the same error message each time then there probably isn't much you can do in the field. Bring the TRAX back to the office so you can read the data directly with TRAXPro and then call us for technical support with the problem with TRAXPDA.

Saving Errors

TRAXPDA reads the data from the recorder into one database file, then takes the data from that file and adds records to the appropriate study type database files. The display on the PDA shows *Saving...* as shown here, while this occurs.



Figure 4-5:
Saving Data
to Memory

Normally it just takes a few seconds to save the new data to the database files. Slower PDAs may take up to 10-20 seconds to save the data if you had many studies in the recorder and/or collected Basic data.

If the display seems frozen on this screen, then tap **Done** which should bring you back to the Main screen. The data hasn't been saved properly so don't clear the recorder until you have read the data successfully.

Problems in this part of the program are usually problems with the data that was transmitted by the recorder, and there normally isn't much you can do about it in the field. Bring the recorder back to the office so you can read the

data with TRAXPro and then call Jamar for technical support for the problem with TRAXPDA.

Conclusion

We obviously don't want you to have any problems reading your recorders with TRAXPDA. But if you do, then we want to know about it so we can try to make the software more reliable.

If you can't read the TRAX with TRAXPDA in the field, then you still may be able to read the TRAX in the office with TRAXPro. Bring the recorder to your office and try it.

If you have no problems reading the data in the office with TRAXPro, then the original problem is most likely with TRAXPDA (assuming all cabling issues are OK). Please call and let us know what happened. We may ask you to email us a file generated by TRAXPro when you read the TRAX. This file is called TRAXPro.dmp and is stored in the TRAXPro folder. We can take this file and try to duplicate the problem you had in the field. Then we can fix the problem in TRAXPDA and send you an updated version.

If you can't read the recorder with TRAXPro either, then the problem is most likely with the TRAX itself. Contact us so we can go over a few things with you and, if necessary, arrange to have you send us the TRAX for repair.



Appendix

Using GPS with TRAXPDA

One advantage of using a PDA for a data retriever is the ability to use other features of the PDA to make the data retrieval and analysis process easier and better. One option of PDAs is that they can interface to standard GPS receivers and receive and store the latitude and longitude of the location. This can help solve a small, but annoying problem with traffic studies; figuring out where the study was done.

Normally, users will enter a numerical Site Code into the TRAX at the site. This Site Code is used in the office to enter the street address and location of the study. Alternatively, users will use a field sheet to write down the location of a study. Occasionally the Site Code is entered incorrectly, or the field sheet is lost, so that you end up with a TRAX with data but no way to know exactly where the study was done. (If this has never happened to you, then you probably don't need this option. If however, this strikes a chord...)

One way to avoid this problem is to store the exact location of the study with the recorder data so there can't be any question where the study was done. GPS is perfect for this. A modern GPS receiver that you can buy for under \$200 will give you your location to within a few yards, certainly more than accurate enough to locate a traffic recorder.

GPS Receivers and PDAs

For our purposes, there are essentially two types of GPS receivers to consider. One type plugs into a PDA using the Compact Flash socket (or possibly the newer SDIO socket). This potentially leaves the cradle socket connector available for the serial cable to the TRAX recorder. This is the best possible combination since it doesn't require any juggling of cables and/or external devices in the field.



Figure A-1:
PDA with
GPS Receiver

The other type of receiver uses standard serial connectors to connect to PDAs or computers. These will work fine but require a little more work in the field since typically the GPS receiver will use the same connector on the PDA as the TRAX recorder. This means you have to plug and unplug cables to go from GPS mode to read mode. This isn't terrible, but it isn't as nice as the first type.

Shown in Figure A-1 is an example of the type of GPS receiver we like. This one is made by Holux, but there are several others that are similar. It plugs into the Compact Flash socket on the top of many PDAs.

There are many possible combinations of PDA and GPS receiver that will work. The TRAXPDA support web site, www.traxpda.com, has more information on GPS receivers and where you can buy them.

How to Use Your GPS Receiver with TRAXPDA

Let's assume you have a compatible GPS receiver and PDA. The first thing you need to do is tell TRAXPDA how to find the GPS data. This is done in the **Preferences & Settings** screen.

From the Main screen, tap the **P** button at the bottom, or tap the **Options** button and then tap the **Preferences** button. This brings up the Preferences and Settings screen as shown here.

Figure A-2:
Check if GPS
is Enabled

If the **GPS Enabled?** is set to **No**, then tap on the down arrow and select **Yes** from the drop down list. This enables the **GPS Comm Port** settings which are now visible on the screen.

You now need to enter the Comm Port number used by the GPS receiver. You also need to select the baud rate to use to talk to the GPS receiver.

It can be tricky to determine these values. Usually the documentation for the GPS receiver will show you how to find them.

Let's assume you find these values and enter them into the software. Tap **Done** to return to the Main screen. TRAXPDA will store the values you entered so you won't have to enter them again.

GPS data is stored when you enter the site information for the study. Tap on the **Site Info** button on the Main screen to show the Site Info screen.

Figure A-3:
Site Info
with GPS

A new line is visible, labeled Lat/Long. TRAXPDA tries to read the location information from the GPS receiver. If it gets good data, then it shows the latitude and longitude on the screen with a light green background to tell you that the GPS data is good. If the software can't find the GPS receiver, then the field will be blank, with a light red background. You want to wait until the background is green so you know the location data will be accurate.

Tap **Done** when you have finished entering data on this screen. The latitude and longitude values on the screen are saved with the other site data.

GPS Detail Screen

When you tap on the **GPS** button on the Site Info screen, you are able to see more of the information that is output by your GPS receiver. This screen is handy if you want to double check the accuracy of your GPS coordinates.

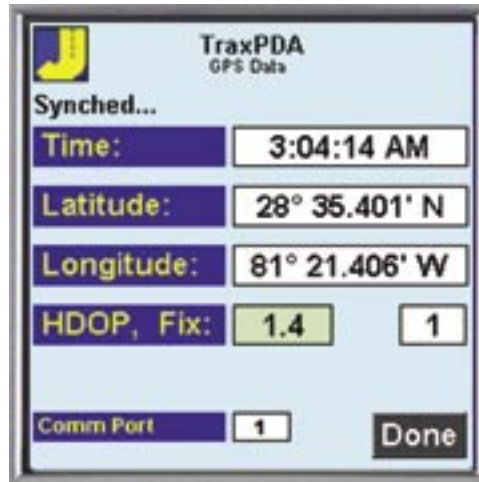


Figure A-4:
GPS Detail
Screen

The first three values are self explanatory. The next two may require a little explanation if you are not experienced with GPS receivers.

HDOP stands for Horizontal Dilution of Precision. It is a number from 0 to 50 that tells you roughly how accurate the location data can be based on the current configuration of satellites in the sky. The lower the number, the better.

If all of the satellites used for the current fix are in the same portion of the sky, then the math doesn't work as well as when the satellites are scattered in different portions of the sky. The receiver will try to use satellites that give the lowest HDOP, but this isn't always possible if

the reception is not ideal. Any value below 4 is fine. TRAXPDA shows any HDOP values below 4 with a green background. Others are shown with a red background.

If the HDOP is a little high (4-10) while you are at the site then you might wait a few minutes to see if a new set of satellites will give a better value. The receiver will keep looking for new satellites all of the time and often finds a better set within a few minutes. If the reception is just not very good and you don't get a low value for HDOP, then use what you have. It probably is more than accurate enough to locate the site.

Fix refers to the type of signals received by the GPS receiver. There are three possible values:

0 : The GPS receiver is not getting sufficient data from the satellites to calculate a location.

1: The GPS receiver is using the signals from the satellites to calculate the location.

2: The GPS receiver is using the signals from the satellites and also another set of signals (usually something called WAAS that we won't get into here) to calculate a more accurate location.

Not all GPS receivers are WAAS enabled, and not all WAAS enabled receivers can get the WAAS signals all of the time. Just make sure the Fix is 1 or 2 and the data will be fine.

Tap **Done** to return to the Site Info screen.

How to Scan for GPS Data

The GPS receiver you connect to your PDA communicates with the PDA with a serial connection. TRAXPDA needs to know the serial port number to read the GPS data. If you use a GPS receiver that connects to the connector at the bottom of the PDA this is not an issue, that connector is always Comm 1. If you use a Compact Flash or Bluetooth based GPS receiver, it isn't quite as simple. The PDA will assign a comm port to the device, but figuring out what that port number is can be a challenge. Fortunately TRAXPDA has a simple way to find the proper port number to use.

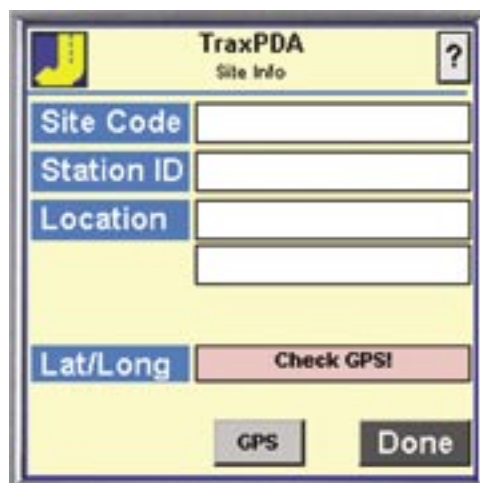


Figure A-5:
No GPS Data
Available

You may see a screen similar to the one shown in Figure A-5 when you first go to the Site Info screen after connecting your GPS receiver. Normally you would see the latitude and longitude read from the GPS receiver. The **Check GPS!** message tells you that the software isn't getting any GPS data from the receiver.

Tap on the **GPS** button at the bottom of the screen to go to the GPS Data screen.

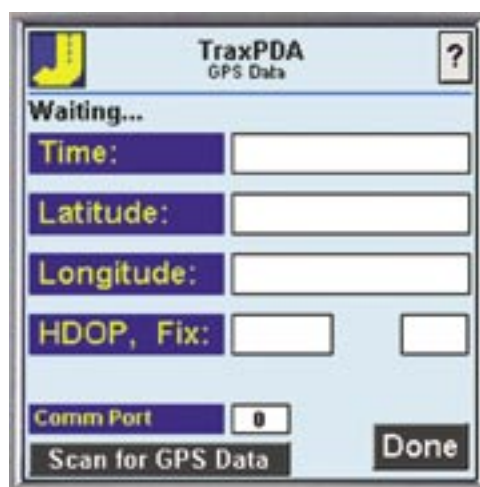


Figure A-6:
GPS Data
Screen

Figure A-6 shows the **GPS Data** screen. The Status line at the top of the screen shows *Waiting...*, which means the software is waiting for GPS data. The data fields are blank, since there is no data to show. The Comm Port is showing 0, which means the software tried to open the serial port listed in the Preferences screen for the GPS receiver, but it didn't work. It may show another number besides 0. This means the port shown does exist on the PDA, but it isn't getting any reasonable looking GPS data.

At the bottom of the screen is a button labeled *Scan for GPS Data*. Double check to make sure the GPS receiver is properly connected and then tap on the Scan for GPS Data button.

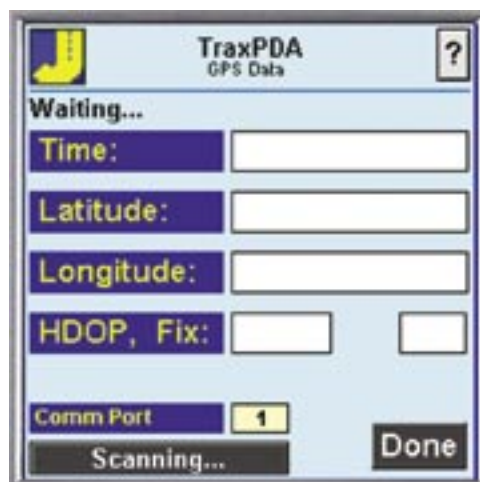


Figure A-7:
Scanning for
GPS Data

The **Scan for GPS Data** changes to *Scanning...* and the software starts scanning from port 1 to port 16 looking for GPS data. The port number field changes to a yellow background and the port number being tested is shown. In this case the software is checking port.

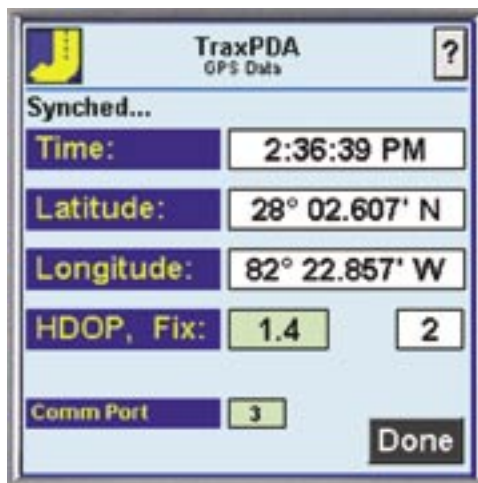


Figure A-8:
GPS Data
Synched

If it finds data that looks like standard GPS data, it stops scanning and changes the background color to green. The button disappears and the software starts showing the GPS data on the screen. The software also stores the comm port number with the other settings for the software so that you won't have to do this again unless you change the hardware in some way. Tap **Done** to return to the Site Info screen.

If the software scans from 1 to 16 without finding any data then it displays a little error message to that effect. First try to run the scan again, sometimes it takes two passes to find the proper port. If that doesn't work then you need to try to figure out what might be causing the

problem. **Check the Baud Rate setting.** The scan routine only uses the baud rate set in the Preferences screen (trying all of the possible options would take all day). If your GPS receiver is set to an odd baud rate (almost all use 4800 baud) then this would make the scan fail. If all else fails, call us and we'll see if we can help.

Troubleshooting GPS Reception Problems

There are two primary types of problems you might have with the GPS option, connection problems and reception problems.

Connection Problems

These are problems that can occur when you first try to use your GPS receiver with your PDA. Several things have to be exactly right for TRAXPDA to see the GPS data. If any of these things are out of whack, you don't get any data. Check the following:

Serial Port Settings – These are the primary problem areas. You need to know the serial port number and the baud rate so that TRAXPDA can talk to the GPS receiver. These values aren't always easy to find. The software has a special feature to allow you to find the proper port number used by your GPS receiver by scanning all of the possible port values to see if there is anything there. Refer to the previous section for details.

Output Format – TRAXPDA expects to see a specific format called NMEA, which is a text based format used with all GPS receivers. Some manufacturers also have a different format they use with their own software. There almost always is a way to set the output format to NMEA, usually using software that comes with the receiver. If you use other GPS based software, it may set the receiver to a format that is incompatible with TRAXPDA. This isn't a common problem, but it is something to consider if all else fails.

Cable Issues – If you use a CF type receiver that plugs directly into the PDA, this isn't an issue of course. Otherwise you should make sure you only use the cable that came with your GPS receiver. Most PDAs have a unique cradle connector, as do many of the GPS receivers, so you have to get a special cable that has the proper connectors on both ends. The cable that connects a Garmin GPS receiver to a Dell Axim PDA will not work with any other type of receiver or PDA. Usually the best place to get the cable is from the GPS manufacturer. We can help you with this if you can't find a source for your cable.



Note

Note: In general, the sync cable that comes with many PDAs will not work (without a couple of little adapters) with GPS receivers. You should use a cable specifically designed for GPS receivers.

Serial Port Contention Problems – Another possible source of problems is if the serial port on the PDA is being used by another program. TRAXPDA will try to open that serial port but since it is in use, you will get an error message saying that the port number is invalid or in use, or something similar.

This is much easier to happen than you might think, due to the way PDAs handle programs. When you exit a program on a PDA it doesn't always get flushed from memory. It often is just suspended but still keeps any resources, like serial ports, in its control.

You might run into this problem if you run software that uses the GPS receiver and then run TRAXPDA. Even if it seems you exited the other program properly, it still may have control of the serial port and not allow TRAXPDA to use it.

Fortunately there is a fairly simple answer to this problem. **Reset your PDA.** This is usually done by using a paper clip to press a recessed button on the back or bottom of the PDA. The screen will clear and any programs currently running or suspended will be ended. Nothing is hurt or lost doing this. In general, anytime your PDA is acting odd (a very common situation unfortunately) then you should reset it and usually that will clear things up.

Active Sync Contention Problems – This is really similar to the previous discussion since the underlying problem is the serial port on the PDA is *owned* by another program and TRAXPDA can't get at it. In this case the culprit is Active Sync, the program that comes with all Pocket PC PDAs and is used to synchronize data between the PDA and your PC. If you use a serial connection between the PDA cradle and your computer then you easily could have this problem.

There are two solutions. The best solution is to use a USB interface between your cradle and your computer. In this way the serial port on the PDA isn't used and this problem doesn't arise. Almost all PDAs sold now *only* come with a USB interface, so this really is only an issue for older PDAs.

If USB isn't an option for you, then you need to learn to disable Active Sync on the PDA before you run TRAXPDA. Look in the Active Sync section of your PDA to find the section where you can disable Active Sync (Hint: Start, Active Sync, Tools, Options). Call us if you can't figure out how to do this.

From reading this it may seem like you are unlikely to ever get your GPS receiver to work with TRAXPDA, but it really isn't that bad. Most receivers are well behaved and the documentation helps you figure out how to set it up properly. If all else fails, just call us.



Figure A-9:
GPS Data
Screen

Reception Problems

These are problems that occur after your PDA has successfully connected with the GPS receiver. You are connected but you aren't getting good location data.

In TRAXPDA you will see this on the GPS Details screen, shown again here.

If the status line shows *Synched...*, like it is here, then you know that the connection is OK and TRAXPDA is getting characters from the GPS Receiver. Those characters may or may not make any sense, however, so the connection settings may still be wrong.

You may see that the time is correct, and incrementing every second. This means the format is correct and all of the settings (*Comm Port Number and Baud Rate*) are correct.

If the latitude and longitude are blank or obviously wrong, if the Fix =0 and/or the HDOP setting is very high then you have a reception problem.

GPS receivers need a relatively un-restricted view of the sky so they can receive the radio signals from the satellites. Anything that can block these signals can cause problems. Sometimes moving just a few feet can make a big difference. Obvious things like tall buildings and tunnels can cause problems, but so can thick foliage, power lines, or clouds with lots of moisture in them.

The first time you use a receiver you may have to wait several minutes for the receiver to figure out where it is. If you drive more than 50 miles the GPS receiver may also take some time to get a fix. Be patient and usually the receiver will find the satellites and give you your location.

Some receivers come with external antennas. These are usually more sensitive than the smaller, built-in antennas. This might be an option if you often find the receiver you have doesn't give the results you expect.

Also make sure the batteries in the GPS receiver and/or PDA are freshly charged. Many receivers have connectors so you can use the cigarette adapter in your car to power the receiver. This might give the receiver enough power to get a fix if the batteries are low.

Normally these are not issues. GPS receivers have become so reliable that if you don't get a good fix within a few minutes when you are at the study site then there probably is a problem with the receiver, and it should be returned for servicing.

