Raytheon

Highway Transportation Management System

Mobile Reader User's Manual

Version: 1.0

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Version Change History

Revision	Paragraph	Explanation
1.0	All	Initial release

Table Of Contents

List of Figures

1   Introduction

The Mobile Reader provides the capability for MnPass Enforcement personnel to interrogate a vehicle and determine if there is a valid MnPass transponder in the vehicle, and that the Transponder has had toll collected within a predetermined period of time.

1.1   Mobile Reader Hardware Overview

The Mobile Reader consists of a DSRC Reader unit, a patch antenna, a PDA with mount, and connecting cables. The Pocket PC uses the Windows$_{TM}$ Pocket PC 2003 operating system. The Portable Reader Application program resides on the Pocket PC, and provides the Portable Reader operator interface and control functions. Figure 1.1-1 shows the Mobile Reader Antenna placement. Figure 1.1-2 shows the DSRC Reader used as the Mobile Reader.
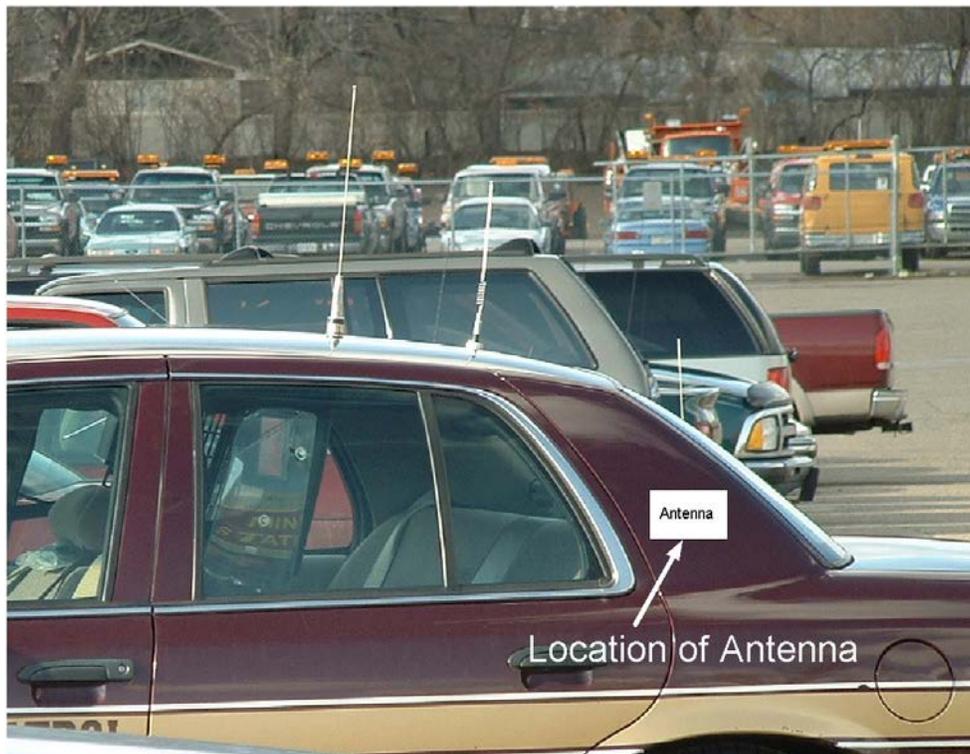
Figure 1.1-1 Mobile Reader Antenna Location

Figure 1.1-2 DSRC Mobile Reader Unit

The Reader is controlled by commands issued by the Mobile Reader Application program from the Pocket PC as directed by operator actions. The Reader processes these commands, communicates with the transponder as required, and responds with appropriate data or status.

1.2   Safety Considerations

The Mobile Reader software and the Reader have safeguards to assure that the Reader will not transmit until the user is ready to read the transponder. In addition, the operator must specifically select the operation that will require the Reader to transmit. The operator must assure that there are no people within 0.3336 meters of the Reader antenna prior to operation of the Reader. The antenna is mounted on the right rear pillar of the enforcement vehicle. This provides a ground plane preventing radiation from entering the inside of the car. However, as an added safety precaution, no one should be sitting in the back seat of the enforcement vehicle while the Reader is being used.

2   Applicable Documents

The following documents apply to the extent specified herein:

None.

3   Setup and Installation

The Mobile Reader consists of a DSRC Reader unit, a patch antenna, a PDA with mount, and connecting cables. The Reader installation is not covered in this manual, as it must be professionally installed by Raytheon or its designated installer.

4   Mobile Reader Operation

4.1   Startup

To turn on the Mobile Reader, press the power switch on the PDA after verifying that no one is within 0.3336 meters of the Mobile Reader antenna. The power switch is the On/Off switch at the top of the PDA. After the PDA has powered up, the Today screen will be displayed, as shown in Figure 4.1-2. Select Start, then select Mobile Reader from the pull down menu. This is shown in Figure 4.1-3.
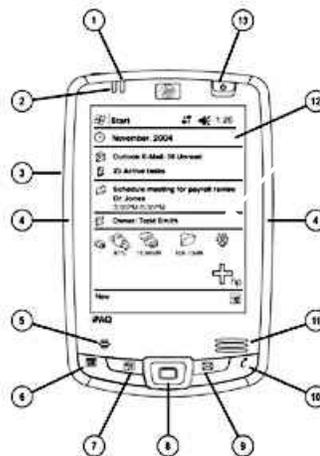
Front Image

1. Charging/Notification LED
2. Wireless LED
3. Voice Record Button (side)
4. Rubber Side Grips
5. Microphone
6. Calendar Button
7. Contacts Button
8. 5-way Navigation Button
9. Messaging Button
10. iTask Button
11. Speaker
12. Color Display
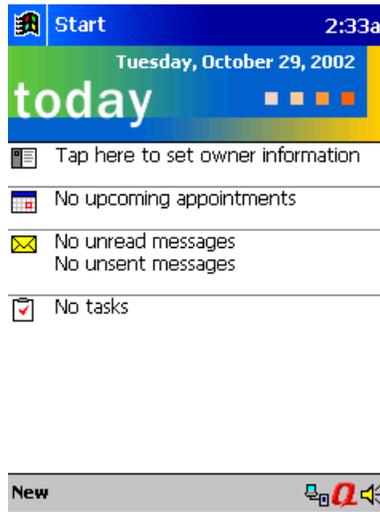13. Power Button

Figure 4.1-1 Layout of PDA

Figure 4.1-2 Mobile Reader Today Screen

Figure 4.1-3 Mobile Reader Pull Down Menu Screen

4.2　Initiating Transponder Search

Figure 4.2-1 shows the Mobile Reader Start Screen. Press anywhere on the screen to initiate a search after verifying that no one is within 0.3336 meters of the Mobile Reader antenna. The search should be initiated when the patrol car is correctly positioned with respect to the vehicle to be tested. If the enforcement vehicle is stationary, then initiate the Search by pressing anywhere on the screen when the vehicle in question can be seen in the rear mirrors of the enforcement vehcile. If the patrol vehicle is moving, initiate the Search by pressing anywhere on the screen when the enforcement vehicle is adjacent to the vehicle in question. The enforcement vehicle must then pass the vehicle in question.
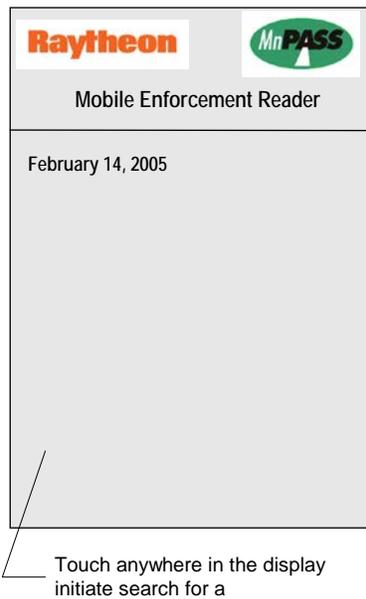
Figure 4.2-1 Mobile Reader Startup Screen

4.3   Search Results – Valid Read

If the Search was successful, a VALID read will result. This can be seen in Figure 4.3-1. The PDA will display VALID in green lettering. In addition, a "BING" sound can be heard. This means that the transponder had toll collected within the allotted time. The display will also show the tag ID, the time the TAG had toll collected from it, and the difference in time, displayed in Seconds, Minutes or Hours or Days.
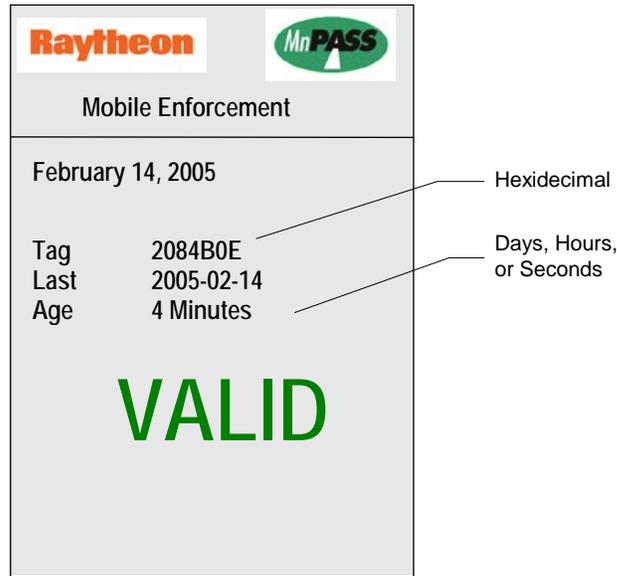
Figure 4.3-1 Valid Transponder Screen

4.4 Search Results – Valid Read – No Exception List

This screen, shown in Figure 4.4-1, is the same as the normal search results with a Valid Read, except there is an indication that an exception lists does not exist. This means the transponder had toll collected within the allotted time, but the ID was not compared against an exception list. This also means that the user should insert a flash memory card with the exception list.
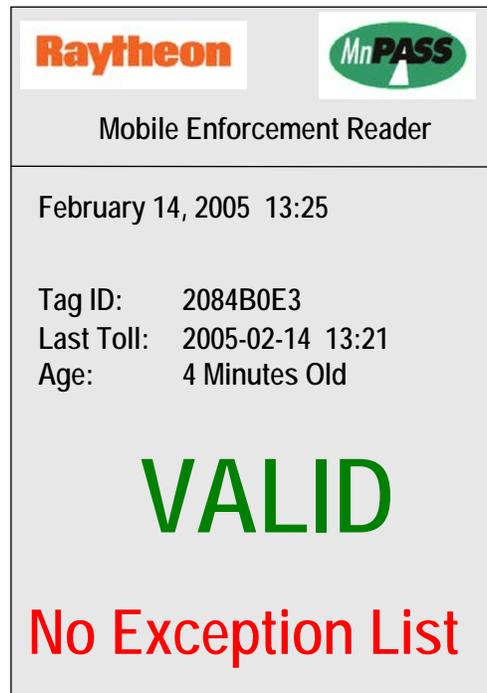
Figure 4.4-1 No Exception List Screen

4.5 Search Results – No Tag

If the Search did not result in a Transponder Read, then NO TAG will be displayed in RED on the PDA, and a BONG BONG sound will be heard from the PDA. This is shown in Figure 4.5-This means that the Mobile Reader was unable to pick up a transponder during the Search window.
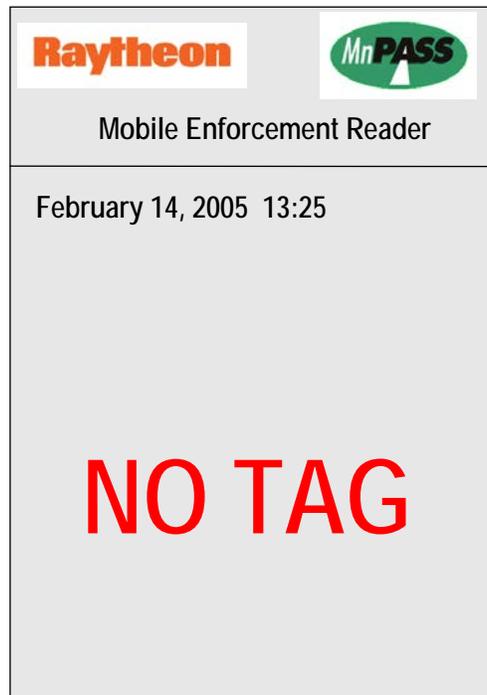
Figure 4.5-1 No Tag Screen

4.6   Search Results – Stolen Tag

If the Search successfully found a transponder, but an examination of the exception list determined that the transponder found was on the list due to the transponder being stolen, then the PDS will display STOLEN in RED. In addition, the PDA will generate a BONG BONG sound. Touching anywhere on the screen will initiate another transponder READ. This should only be performed after verifying that no one is within 0.3336 meters of the Mobile Reader antenna.

Figure 4.6-1 Stolen Screen
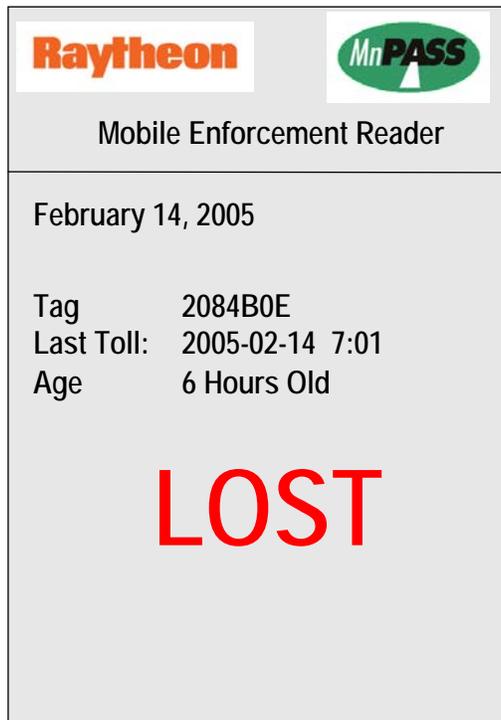
4.7   Search Results – Lost Transponder

If the Search successfully found a transponder, but an examination of the exception list determined that the transponder found was on the list due to the transponder being lost, then the PDS will display LOST in RED. In addition, the PDA will generate a BONG BONG sound. The PDA will also display the ID of the transponder, and the time it was last written to as well as the elapsed time since it was last written to. Touching anywhere on the screen will initiate another transponder READ. This should only be performed after verifying that no one is within 0.3336 meters of the Mobile Reader antenna.

Figure 4.7-1 Lost Screen

4.8 Search Results – Invalid Transponder

If the Search successfully found a transponder, but the Transponder did not have the proper MnPass agency code, then the PDS will display INVALID in RED. In addition, the PDA will generate a BONG BONG sound. The PDA will also display the ID of the transponder, and the time it was last written to as well as the elapsed time since it was last written to. Touching anywhere on the screen will initiate another transponder READ. This should only be performed after verifying that no one is within 0.3336 meters of the Mobile Reader antenna.

Figure 4.7-1 Invalid Screen

4.9   Exception List Update

A properly formatted exception list must be located on the flash memory card and installed in the PDA in order for exception list processing to occur.

Appendix A.   Acronyms and Definition of Terms

DSRC ....Dedicated Short Range Communications

ID ....Identification

LED..Light-Emitting Diode

PC...Personal Computer

PDA..Portable Data Assistant

RF...Radio Frequency

VRC ....Vehicle-Roadside Communication